

# Helical Foundation Systems



**The leading edge  
in helical  
foundations**



**Building Solid Foundations**

# MacLean-Dixie—The Leading Edge



## MacLean-Dixie's helical foundation systems offer the leading edge.

If you're still considering concrete or pile driven foundations as the best solution for your projects, MacLean-Dixie is about to change your mind. Our Helical Foundation Systems can help you finish jobs faster and more cost effectively. Even better—using MacLean-Dixie products is the best way to ensure solid, stable foundations that last for the life of the structure.

### Why our helical piles are the best choice.

MacLean-Dixie's proprietary helical edge sets us apart. Unlike helical piles with straight edges on their helices, ours has a specially rounded bevel edge to cut through the earth efficiently. So there's less torque required to screw it in and less strain on the helices and shaft. We offer a Round Corner Square (RCS) solid steel square shaft or pipe type for maximum stability depending on soil conditions.

MacLean-Dixie HFS™  
proprietary edge



Standard equipment  
and less manpower



MacLean-Dixie foundation systems install quickly and easily. They're simply screwed down into stable soil strata using hydraulic torque motor installation equipment. There's no excavating or spoils to remove. No hammering or vibration that can disturb surrounding structures.

### The hard facts: the problem with concrete alone.

Excavating for a poured foundation requires a lot of heavy equipment, a large crew—and a large budget. Not to mention getting rid of all the spoils. And what if it's contaminated? Why risk a potential EPA disposal issue?

With MacLean-Dixie's helical piles, there's no excavation required and surrounding soil is barely disturbed, so there are no spoils to remove. Better yet, there's no concrete cure time, which means no downtime for your crew. Our piles can be installed in any weather and in limited-access areas.

### A comprehensive line of products.

No matter what your foundation project, we have the right product for the job. Our complete line includes everything you need for new construction, repair and restoration, walkways, marinas and lighting foundation applications. Products include helical and resistance piles, tieback anchors and soil nails, all of which must pass rigorous quality tests before they leave our plant.

### The best products hands down.

There's a reason MacLean-Dixie products are known as the best in the business. Our quality control standards are uncompromisingly high every step of the way. We expect only the best, starting with the raw materials we purchase, through the manufacturing process, and all the way down to the certifications of the installers on the job. And because we're one of the largest manufacturing facilities in the industry, we're equipped to handle large projects more efficiently and more cost effectively.

MacLean-Dixie HFS™  
manufacturing  
facility





## Only first-quality steel.

Every one of our parts, from the smallest nut to the largest pile, is made from only first-quality steel with properties guaranteed to meet ASTM steel material specifications. Steel that doesn't meet these strict strength, content and quality standards is refused and never allowed into our plant. And all final products, unless otherwise specified, are hot dip galvanized in accordance with ASTM A-153 or A-123 specifications.

### Independent steel certification



## Rigorous inspections. And high expectations.

Random helices and extension bars are torque tested weekly to ensure that they meet compression and tension load requirements. Steel wall thicknesses, drilled holes and welds are checked throughout the fabrication process. And RCS

solid steel square shaft lead sections are stamped by the welder. So you can be 100% sure that our products will meet your high expectations, too.

## Find out more at **MacLeanDixie.com.**

Visit our web site for more information and technical specifications on all of our products.

### Traceable heat code quality control



### MacLean-Dixie HFS welder's mark



ICC-ES  
Legacy Report  
PFC-5551 & 21-47

## Consistent quality testing for every aspect of MacLean-Dixie's helical strength.

### Hole size and location gauge for consistent extension fit



### Upset socket depth and hole location gauge for accurate attaching



### Wall thickness gauge for torsion strength



### Six point helical test for weld integrity



### Rigorous helical torsion test to meet our strict guidelines



### Extension bar torsion testing



Building Solid Foundations

# Specialty Applications



## Specialty Applications

### Walkways: Shangri-la Botanical Gardens

— Orange, Texas

Over 850 helical steel piles were used as the foundation system for 2,400 feet of boardwalk through wetlands, swamps and ponds. A series of 1-1/2" RCS square shaft piles were installed 15 to 25 feet deep for a working load of 15 KIP vertically and 10 KIP laterally. Beam saddles were placed on the vertical piles to support wood beams. A threaded stud adapter was attached diagonally to the wood beam. Three classrooms, a bird blind and a nature discovery building in other remote areas were also supported by battered helical steel piles. A 6"x 6" x 1/2" thick steel plate was bolted to the top of each pile, then cast into a concrete pile cap which supported large timber columns. The new foundation is capable of resisting 5 KIP lateral load, 15 KIP vertical load and overturning moments.

Helical steel piles being installed into swampland



Battered helical steel piles for support



Concrete pile caps cast to support timber columns



Two rows of helical anchors installed



Drilling helical tiebacks



### Marine application:

**Inlet Watch Marina and Yacht Club**—Wilmington, North Carolina

A bowing and deteriorating bulkhead was replaced with a new fiberglass wall and two rows of helical anchors. Contractors used a configuration consisting of 1-1/2" RCS solid steel square shaft 8"-10"-12" lead helices with an ultimate capacity of 3,400 pounds. The top row of anchors were installed to 17 feet with a design load of 7 KIP. The second row was installed to 14 feet with a capacity of 21 KIP. The contractor installed over 700 feet of sheeting with 208 helical tiebacks in record time, overcoming many technical issues like drilling through two sets of old planks, wet sand and changing water levels due to the tide.

**Lighting application: for roadway streetlights, signage poles and commercial lampposts**—Suitable for all locations and climates.

MacLean-Dixie Lighting Systems offer quick installations in any weather using minimal manpower and a hydraulic drivehead mounted to your own equipment.

Minimal manpower



Installs in five minutes





## Marinas, walkways and lighting

### The product of choice from coast to coast.

MacLean-Dixie's helical piles are environmentally friendly. Our piles are ideal substitutes for dead men anchors in bulkheads, and as sea wall tiebacks and boat moorings. They can also be used to replace deteriorated wooden dock piles. Installation is quick and simple, even in environmentally sensitive locations. All that's needed is a lightweight drive tool—there's no vibration hammer and no welding. The piles simply bolt together, allowing you to screw into stable strata, regardless of depth of water or soil.

Braced brackets and placed tension anchors for support



### No better way to install walkways.

Conventional helical piles can be used to support light bridges, golf cart paths, and walkways through swamps and marshes. A series of braced brackets with intermittently placed tension anchors consisting of helical piles are usually capped

with a wood deck and railing system. The installation of a helical walkway system limits the disturbance in sensitive areas like wetlands, botanical gardens or beachfronts. No access road is required, just your own lightweight equipment outfitted with a hydraulic driver.

### Shedding light on a more economical foundation system.

MacLean-Dixie's helical piles can also be used when installing roadway area lighting and signage poles. Traditional cast-in-place or precast concrete foundations require excavation, spoils removal and backfill—and a lot of concrete and manpower, which eat up your precious time and money. Our helical piles can be screwed through the soil in a matter of minutes using a hydraulic drivehead mounted to your own construction equipment. It's that simple. Forget about excavation and concrete cure time. Once the piles are in place, you're ready to install your lighting or signage poles because the piles can be loaded immediately.

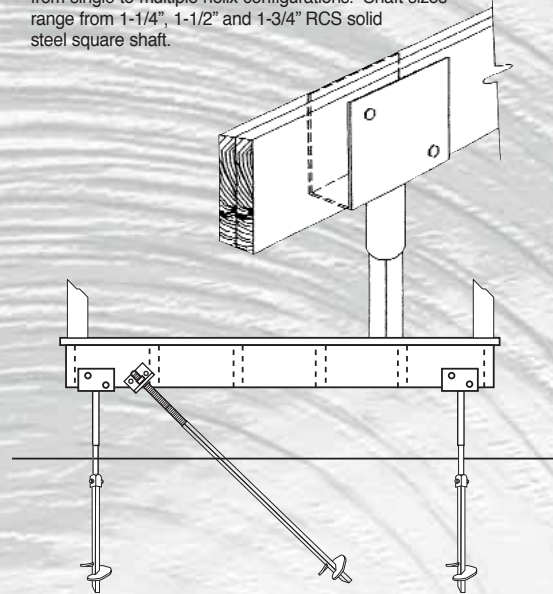
Up and running with minimal manpower and equipment



Helical piles can be installed in any weather, and even through frozen ground and asphalt. The soil around the piles remains undisturbed, with minimal disturbance to existing landscape. Because there's no vibration during installation, there's no damage to sensitive structures or instrumentation in the construction zone. And one set-up can complete the installation—there's no second visit required.

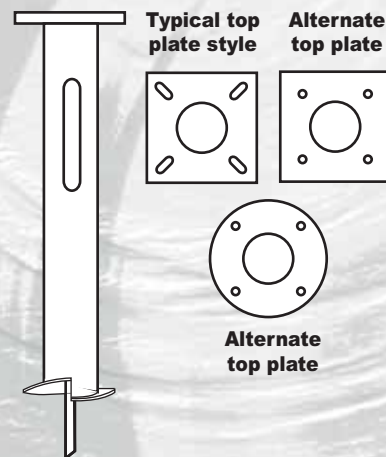
### Typical Walkway Helical Anchors

MacLean-Dixie helical piles for walkway applications are available from single to multiple helix configurations. Shaft sizes range from 1-1/4", 1-1/2" and 1-3/4" RCS solid steel square shaft.



### Standard lighting foundation material specifications

- Available in 6", 8" and 10" diameter sizes
- Lengths from 5-10 feet
- Includes wiring slot opening for cables
- Top plate configurations to meet pole base dimensions
- Hot dip galvanized to ASTM A-153
- Typically installed for lighting poles to 50" height



Building Solid Foundations

# New Foundations



## Build on our solid foundation.

### Lot line to lot line: residential structure—Brooklyn, New York

*This new six-story residential structure was planned next to buildings with foundations over 100 years old. Though initial soil borings pointed toward a spread footing, the site conditions discovered during actual excavation called for a revised foundation system based on helical piles. The use of piles kept the project on schedule, allowed contractors to access the site via the ramp being used for excavation, and the vibration-free installation did not impact the adjacent structures. A total of 54 piles were installed to an ultimate capacity of 80 KIP using MacLean-Dixie's D10 1-3/4" Round Corner Square (RCS) solid steel square shaft piles to an average depth of 30 feet.*

**Piles installed with no disturbance to adjacent structures**



### Pure helical pile foundation system:

#### CVS Pharmacy—Dallas, Texas

**Installed 1-3/4" RCS solid steel square shaft piles with steel plates**



*Located on highly expansive clay soils, these CVS Pharmacy stores are supported entirely on helical piles.*

*Contractors used a combination of 1-1/2" and 1-3/4" RCS solid steel square shaft piles with 6" x 6" x 1/2" thick steel plates bolted to the top. The steel plates were cast into the concrete floor slab, placing the building load directly on the helical piles. The first building rests on 128 helical piles installed to a depth of 15 feet by one crew using one machine in just three days. The second building rests on 157 piles installed to 25 feet by one crew in four days, in the mud, allowing the concrete contractor to start work one day later. A load test verified that the helical piles outperformed what was expected, even in the poor soils at these locations.*

**Building load directly on installed square helical piles**



**Building load directly on installed square helical piles**



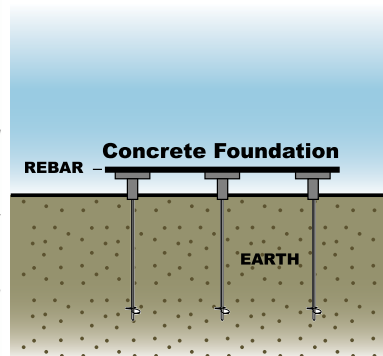
### Unique foundation structure: Metro-North's Riverdale Station Art—Riverdale, New York

*When Metro-North's Riverdale railroad station in the Bronx was refurbished, the project included the installation of a large, perforated-steel sculpture on the outdoor grounds. The site chosen for the artwork posed several challenges, namely numerous underground*

**Landscaping and fencing remain undisturbed**



*utilities, limited access due to a new fence and landscaping that couldn't be disturbed, plus excessive wind loads. This project consisted of installing 22 piles, which were battered to counteract the overturning loads.*





## Easy installation. Easy on your budget.

Why use Maclean-Dixie's helical piles for your new construction projects? The reason is simple—and so is the installation. There's no heavy excavating equipment needed, minimal noise compared to a pile driver and no vibration or disturbance to surrounding structures. Our helical piles install quickly—in fact, a 20-foot long pile can be installed in just minutes. Since there's no concrete required, there's no cure time. And construction of footings can begin immediately after piles are installed. So you save time, plus money and manpower.

## Stabilize structures on all soil types.

A lightweight hydraulic driving tool s the piles deep down until they become anchored in load-bearing soil or bedrock below. The piles are tied into the foundation rebar grid before the footings are poured. Once the final foundations are in place, the structural load is transferred to the helical piles, creating rock solid stability. And MacLean-Dixie's piles can be used in all soil types ranging from soft sand to compressible clay to areas with high water tables.

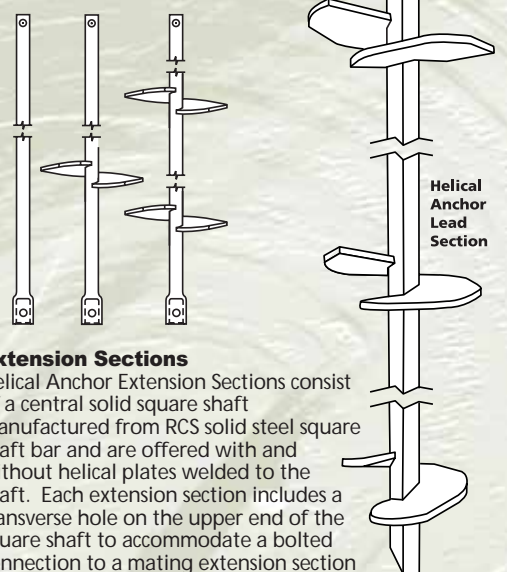
## The basics of a helical pile.

Helical piles are available in RCS solid steel square shafts or pipe, depending on your installing torque requirements and soil type. Helix diameters—from 4 to 16 inches—are based on load requirements. They are designed to "track" for minimal disruption during installation. In fact, the helices are manufactured with a constant pitch to ensure that the only contact is with the soil. The lead section with the square upset can be added on quickly. The extension sections are added by installing the bolts.

## MacLean-Dixie HFS™ 1-1/4", 1-1/2" and 1-3/4" RCS solid steel square shaft Multi-Helix Anchors

### Helical Anchor Lead Sections

Helical Anchor Lead Sections consist of a central solid steel square shaft manufactured from RCS solid steel square shaft bar with one or more helical-shaped steel plates welded to the shaft. The RCS solid steel square shaft material conforms to ASTM A-576 special quality hot-wrought steel. Each lead section has an earth-penetrating pilot point at the bottom end of the shaft and a transverse through hole at the upper end of the square shaft to accommodate a bolted connection to a mating shaft extension section.



### Extension Sections

Helical Anchor Extension Sections consist of a central solid square shaft manufactured from RCS solid steel square shaft bar and are offered with and without helical plates welded to the shaft. Each extension section includes a transverse hole on the upper end of the square shaft to accommodate a bolted connection to a mating extension section or adapter/bracket. Each extension section also includes an integrally forged square socket at the lower end of the shaft. The forged square socket is designed to fit over the lead section or other extension. Installing torque is transmitted through the upset socket and not the bolt. A transverse hole permits connection to the lead or extension section with a bolt and nut.

### Corrosion Protection

Foundation Anchor Lead Sections, Extension Sections, connection bolts and nuts are hot dip galvanized per ASTM A-153, as required.

### Installation Torque Rating

The Ultimate Mechanical Strength Torque rating includes Lead Sections and Extensions

- 1-1/4" D3.4 RCS shaft Multi-Helix 3,400 [ft.-lb.]
- 1-1/2" D6 RCS shaft Multi-Helix 6,000 [ft.-lb.]
- 1-1/2" D7 RCS shaft Multi-Helix 7,000 [ft.-lb.]
- 1-3/4" D10 RCS shaft Multi-Helix 10,000 [ft.-lb.]



Building Solid Foundations

# Foundation Repair



## Restoration and repair of damaged foundations.

**Custom designed pile system: Basin Head Fisheries Museum**—Prince Edward Island, Canada

Part of the Basin Head Fisheries Museum, the historic 1941 Basin Head Cannery Building was floated off its original timber pilings and moved ashore during a storm. Since the Cannery could not be moved again and risk more damage, engineers recommended a new helical pile foundation installed from within the building. Due to unstable strata, Maclean-Dixie custom designed a modified pile system consisting of a 3-1/2" O.D. schedule 80 pipe pile with a single 12" diameter helix which incorporated a 1-1/2" Round Corner Square Shaft (RCS) solid steel square shaft pilot point. This pile penetrated the dense glacial till with minimal embedment and provided the required load-carrying capacity. The piles were encased in polyethylene sheathing for extra corrosion protection and to create a slip surface that would prevent ice accumulation. The piles were terminated with U-shaped brackets, which supported the timber floor joists and the building was lowered back onto its new helical pile foundation system.

U-shaped brackets terminate a new 80-pipe pile foundation



A square helical pile installation



Shoring system attached to square helical piles



**Temporary wall stabilization: Stone Ridge Public Library**—Stone Ridge, NY

Temporary support was needed to stabilize two walls of this early-1900's library that had begun to bow outward. The

original plan was to use dead weights to support temporary bracing, an eye sore as well as a costly measure. The solution was a shoring system using helical piles to resist the load exerted by the leaning wall. Twelve 1-1/2" helical piles were installed to 12 to 17 feet, six for each wall. At each wall, two vertical piles were installed for 5-KIP tension and attached to a threaded bar. Four more piles were installed for 5-KIP compression, and two of the four were battered to 54 degrees. These were attached to walkway support brackets. After the piles were installed, a shoring system was built and attached to piles. Eventually the walls will be rebuilt and the piles removed.

**Restoring sliding Tamura residence**—Woodinville, WA

A slide caused the foundation wall of this three-story residence to bow, break and separate. The repair project began with the installation of 24 single 12" helix, 1-1/2" RCS solid steel square shaft anchors to stop the lateral movement at 29 inches. Settlement, which was also occurring, was stopped at 12 inches by the installation of another 18 piles. To pull the wall back to plumb and level the house, the basement slab was removed and 150 cubic yards of fill was excavated. Then the wall was slowly pulled back into place laterally and horizontally. A new reinforced shotcrete wall further stabilized the cracked foundation. The excavated basement was backfilled with EPS Geofoam to reduce the load on the wall and slope. Another 24 tiebacks were installed on the front wall of the house and 60 underpinning piles were added to support the rest of the foundation, the interior loads and the new basement slab.

Anchors installed to halt lateral movement



Twenty-four tiebacks installed to support bowing wall





## Warning signs of foundation failure.

Visible structural damage to the inside or outside of an existing building is usually a sign of foundation failure. You may notice cracks in brick, tile or floor slabs. Walls may be bowing in or leaning out. Windows and doors may stick. Trim and molding may be misaligned. MacLean-

Cracks in the foundation



Dixie's Foundation Repair Systems can instantly restore a structure's stability so that these aesthetic repairs can be completed as well.

### What causes damage?

Hot, dry conditions and decomposing organic material can cause soil to settle, leading to cracks in a structure. Tree roots can outgrow their spaces and creep under foundations, causing them to buckle. Leaking water lines or poor drainage can soften soil, caving it in below foundations. And sites that were improperly prepared initially can also have inherent stability problems. No matter what the cause of foundation failure, MacLean-Dixie has the solution.

## Simple repairs, inside or outside.

There's no need to dig out or remove entire old, damaged foundations. When you use MacLean-Dixie's Foundation Repair Systems, all that's required is excavation of a small work area, whether the repair is inside or out. There's no heavy equipment needed, no vibration and no hassles.

Our helical piles can be used to stabilize moved walls and restore foundations to stable positions, permanently securing them in place again. How do they work? Helical piles are ed through the earth, down into the solid strata below. Proprietary brackets are attached to the concrete foundation at intervals in the damaged area. A jack lifts the foundation to the required position. It's then firmly bolted to the bracket, which permanently transfers the structure's load to stable strata.

## Straighten and stabilize bowed walls.

MacLean-Dixie's tieback anchors can be used to straighten bowed foundation and retaining walls. For a single helix installation, first excavate to the base of the foundation to a width sufficient to fit the single helix lead. A 3-inch diameter hole is cored through the foundation wall. The top of the lead section is placed through the hole from outside the foundation wall and connected on the inside with an extension. The tieback is then installed to the required distance.

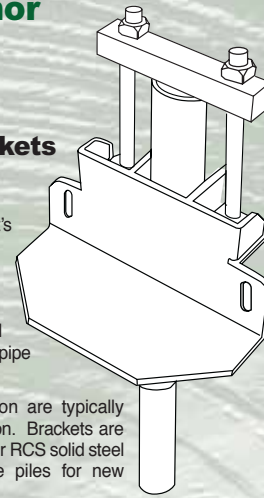
For multiple helix leads, a hole is cored through the foundation wall to permit the largest diameter helix to pass through. Installation of the lead and extensions takes place from the inside. A threaded adapter with the upset socket is connected to the extension and a bearing plate on the inside wall. The nut is turned to apply load to the tieback anchor and stabilize or straighten the bowed wall.

## MacLean-Dixie HFS™ foundation and tieback anchor brackets

### 25/40 KIP Foundation Brackets

MacLean-Dixie offers several styles of foundation repair brackets to meet each project's requirements. Typical brackets are engineered for load capacities to 100 KIP and for the range of square shaft piles to 1-3/4" RCS solid steel square shaft and round pipe piles to 4" diameter.

Brackets for new construction are typically placed on top of the extension. Brackets are available for placing onto either RCS solid steel square shaft or round pipe piles for new construction.

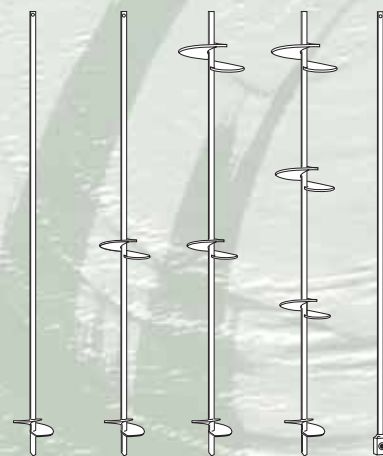


Brackets for foundation repair applications are available for placing onto either RCS solid steel square shaft or round pipe piles. The helical foundation pile is installed to the required depth. The bracket for outside wall repair is installed at the base of the foundation wall of the excavated hole. The bracket is bolted to the foundation wall. A hydraulic cylinder is used to lift the wall to the required level using the installed pile as a reaction force. A threaded assembly locks the bracket to the pile.

The bracket for floor repair is installed by coring a hole on the floor sufficient to permit the largest helix diameter to pass. A bracket with threaded stud is used to apply a load using the installed anchor as a reaction force.

The brackets are manufactured from ASTM A-36 steel and either hot dip galvanized to ASTM A-153 or not galvanized as required.

### Tieback Anchors



Single Dual Triple Quad Extension Bar



Building Solid Foundations

# Tension Applications



## Solid reasons to choose MacLean-Dixie.

### Sewage replacement job: Hi Tech Copy Center and Williams Pharmacy—Saint Louis, Missouri

When a box culvert and storm sewer system were relocated from underneath the Hi Tech Copy Center and Williams Pharmacy, both structures needed to be stabilized. Used in both tension and compression applications, helical anchors were selected as the best solution for the new soil retention system. After excavating and exposing the footing, 15 piles were installed to a depth of 25 feet at 70 to 75 KIP. Each pile used a helix configuration of 8"-12"-12" diameter on a 3-inch diameter Schedule 80 pipe.

Fifteen piles  
installed at 25' at  
70-75 KIP



Installed  
into place



Thirty piles and  
92 anchors with all  
accessories



### Suspension bridge—Colchester, New York

Pre-tensioned  
to 15 tons



A temporary support was needed to take the weight off the bridge bearings and U-bolts so they could be replaced. Four piles, pre-tensioned to 15 tons, were installed in a tieback application using D10 material 1-3/4" Round Corner Square (RCS) solid steel square shaft and terminated with a Triple Guy Adapter. Each suspension cable was temporarily attached to a custom-fabricated apparatus that transferred the cable load to the piles.

### Upscale residential home: retaining wall—Holmdel, New Jersey

Two-tiered wall  
installation



Homeowner builds  
in the community  
of his choice



Finished tiers



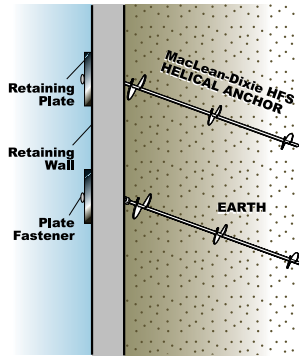
A potential homeowner was interested in building a home on a lot that had been deemed practically unusable in an established community. In order to arrest creep, a major retaining wall was erected to support the structure. The wall includes two tiers of tiebacks that range from 50 to 100 KIP with tension anchors installed to a depth in excess of 40 feet.

The retaining wall was secured with 40 helical tieback anchors using 8"-10"-12" diameter helices and 1-3/4" and 2" RCS solid steel square shaft.



## The advantages of tieback anchors.

Helical piles can be installed at any angle and are often used in tension applications like guy wires, retaining walls, tent supports, buried pipelines and moorings. Used as tieback anchors, our helical anchors can be screwed at the required angle through problem soils until load-bearing strata are reached. Installed as tiebacks, helical anchors can stabilize walls that have been improperly constructed and can restore walls that have been damaged by poor drainage or expansive soils.

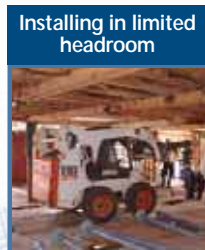


## The best way to nail down stability.

MacLean-Dixie's soil nails are a solid choice for vibration-free installations such as construction next to existing structures and reinforcement of embankments. In areas where rain could create a slide of slip plane soil, metal mesh is applied and sprayed with shotcrete or gunite to hold the outside surface in place. Using top-down excavation, the nails are quickly screwed into the soil using standard installation equipment and immediately ready for loading. There's no waiting or cure time compared to traditional grouted soil nails. Bearing plates and threaded bolts attach easily for quick stabilization of soil.

## Limited access? No problem.

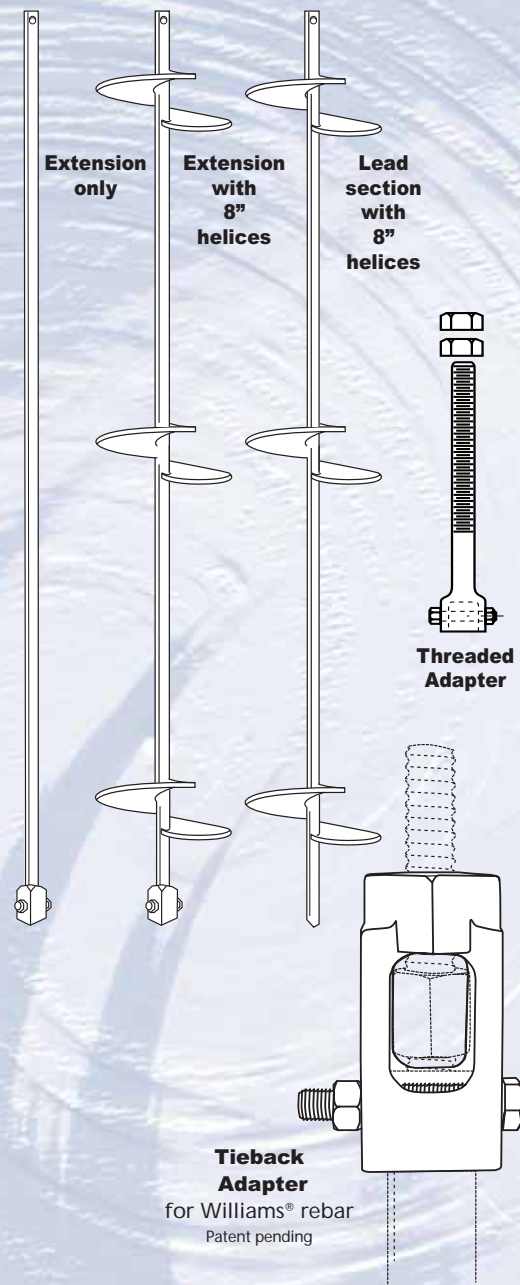
If you have a challenging site with limited access like low overhead or restricted width, MacLean-Dixie's helical foundation piles are the right products for the job. They can be installed using a lightweight hydraulic driving tool that fits into even the tightest work spaces. There's no soil spoils to remove and they install in any weather with just a small crew needed.



## Tieback soil nails and terminations

**Providing the termination to fit your application and stabilize your load.**

Extension sections, adapters and connection bolts and nuts are hot dip galvanized per ASTM A-153.



Building Solid Foundations

# **MacLean-Dixie.**

## **Built on a solid foundation.**

MacLean-Dixie is part of MacLean-Fogg, a diversified international manufacturing enterprise with more than half a billion dollars in sales. A result of the acquisition and merger of Joslyn and Dixie, two prominent soil anchor manufacturers, MacLean-Dixie is now one of the leading suppliers of steel deep foundation systems for use in residential, commercial and marine applications. Our comprehensive product line for residential and commercial applications includes engineered solutions for tension, compression and structural stabilization in many different soils.

### **Quality that is second to none.**

Why do installers and engineers across the nation choose MacLean-Dixie products time and time again? Perhaps it is because our impeccable quality standards and rigorous testing procedures ensure that our products are second to none.

### **Every welder certified under AWS D1.1.**

Our standards are just as high with our employees as they are with our products. All our critical joints are welded by craftsmen who maintain industry certification.

### **Materials are traceable to the steel mill.**

We can trace every lot of steel back to the original mill that produced it. So we know that the chemistry, plus physical and dimensional properties are in accordance to our stringent standards.

### **State-of-the-art fabrication.**

With one of the largest manufacturing facilities in the industry, we're equipped to turn products around faster, more efficiently and more cost effectively.

Visit **[www.MacLeanDixie.com](http://www.MacLeanDixie.com)** for more information and technical specifications.



**Building Solid Foundations**

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