

# HELICAL PULLDOWN<sup>®</sup> Micropiles REPORT

## A CASE HISTORY

Chance Civil Construction Distributor:  
DANBRO Distributors, Philadelphia, Pennsylvania

<b>Project:</b> Tasker Homes Philadelphia, PA	<b>Geotechnical Engineer:</b> Powell-Harpstead, Inc.	<b>Structural Engineer:</b> Pennoni Associates	<b>General Contractor:</b> Keating Building Corp.	<b>Helical Pile Sub-Contractor:</b> D'Angelo Brothers, Inc.
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**Introduction:**

The Philadelphia Housing Authority reconstructed the Tasker Homes housing complex in southern Philadelphia, Pennsylvania, adjacent to the Schuylkill Expressway in the Grays Ferry area.

The original Tasker Homes development was built from 1940 to 1941 and consisted of two and three-story residential brick buildings. These buildings originally were supported by timber piles.

When those buildings were demolished, material larger than 8 inches was crushed. The resulting rubble was sorted to remove unsuitable material. The remaining material (brick and concrete rubble, asphalt, mortar, gravel, sand and rock) was used as fill on top of existing urban fill. The urban fill was highly variable in composition and typically consisted of dark brown to black silty fine sand to sandy silt with various amounts of ash, brick fragments, gravel, clay and even isolated areas of household trash. The fill layers were underlain by alluvial soils. These alluvial soils were predominantly granular consisting of silt, sand and gravel with some clay and generally became denser with increased depth.

Foundations for the new structures had to bear in the alluvial soil below the urban fill to ensure adequate support.



**Phase II installation with completed Phase I homes in background**

**Foundation Options**

The foundation options were complicated by both the depth and heterogeneous nature of the fill. In addition, the urban fill was classified as "regulated", resulting in high disposal fees at a landfill.

Conventional strip and spread footing would require being founded on properly compacted select load-bearing fill or competent native alluvial soils. This would have required over-excavation and backfill. Disposal cost of the regulated fill made this cost prohibitive. Similarly, drilled shafts were not economical due to the disposal cost of the spoils.

Timber piles 20- to 30-feet long with a 20-ton design load were

recommended for support of all new structures, steps and utilities for the project.

The HELICAL PULLDOWN<sup>®</sup> Micropile (HPM) was quoted as an alternate deep foundation. This system could provide a 40-ton working load in the same 20- to 30-foot depths as the driven timber pile with the advantage of being easily extended deeper if required. Vibration-free installation and minimal mobilization/demobilization costs were other advantages. The grout column also would protect the steel shaft in the potentially corrosive urban fill.

With these advantages and the economic benefit, the HPM was

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incorporated into the project design.

The design load was 40 tons with an ultimate capacity of 80 tons required. A series of eight preproduction compression tests were conducted across the site. Soil borings were used to select test locations that provided a variety of soil conditions. These tests were conducted to meet the ASTM D1143 Standard, Quick Load Test Method for Individual Piles.

The project was completed in three phases. Phase I used an SS175 helical pile with 8-, 10- 12- & 14-inch diameter helices and a 5-inch diameter grout column. Phase II and III used an SS175 helical pile with 6-, 8-, 10- and 12-inch helices and a 5-inch grout column. Installation depths varied from 15 to 50 feet across the site with the majority from 20 to 30 feet.

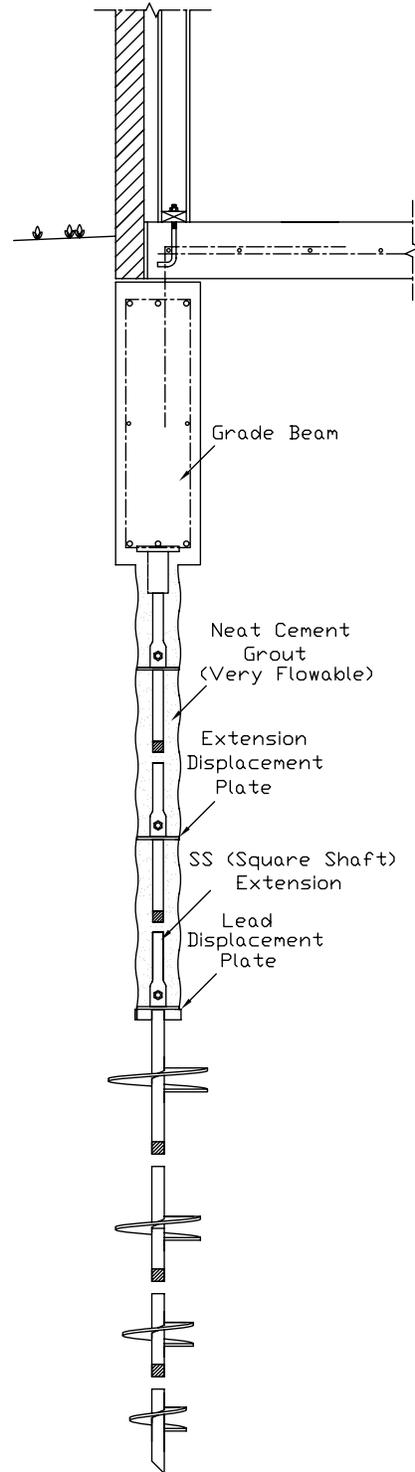
The lightly loaded porches for all three phases were supported with an SS150 helical pile with 8-, 10- & 12-inch helices and a 4-inch grout column.

**Summary**

3,645 HELICAL PULLDOWN® Micropiles were installed to support 554 two- and three-story residential dwelling units across 18 city blocks on the 44 acre site.



**Plan view of Tasker Homes Development**



**Phase I SS175 HELICAL PULLDOWN® Micropile and Grade Beam**