CONSULTING GROUP

Report of Geotechnical Investigation

Proposed Mercer County Solar Power Plant
West of U.S. Highway 127 (US-127)
Bisected by Jackson Pike
Harrodsburg, Mercer County, Kentucky

Latitude 37.82212˚ N
Longitude 84.87150˚ W

Prepared for:

Savion, LLC
16105 W. 113th Street, Suite 105
Lenexa, Kansas 66219

G2 Project No. 193508
December 27, 2019

CONSULTING
GROUP

December 27, 2019

Mr. Jonathan Dimitriou, P.E.
Savion, LLC
16105 W. 113th Street, Suite 105
Lenexa, Kansas 66219

Re: Report of Geotechnical Investigation
Proposed Mercer County Solar Power Plant
West of U.S. Highway 127 (US-127), Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

Dear Ms. Dimitriou:

We have completed the Geotechnical Investigation for the proposed Mercer County Solar Power Plant located on the west side of US-127 in Harrodsburg, Kentucky. This report presents the results of our observations, on-site testing and analyses, and our recommendations for site preparation, foundation design, and construction considerations as they relate to the geotechnical conditions beneath the site.

We appreciate the opportunity to be of service to Savion, LLC and look forward to discussing the recommendations presented. In the meantime, if you have any questions regarding the report or any other matter pertaining to the project, please call us.

Sincerely,

G2 Consulting Group, LLC

Jeffrey D. Crow
Project Engineer

David L. Wanlass
Project Manager

STATE OF KENTUCKY
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Project Consultant

JDC/DLW/BJW
Enclosures

CONSULTING GROUP

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PROJECT DESCRIPTION

The project site, identified as the Mercer County Power Plant, is located on the west side of U.S. Highway 127 (US-127) in Harrodsburg, Mercer County, Kentucky. The overall area is identified on the attached Geotechnical Test Location Plan, Plate No. 2, in relation to the surrounding area. The total lease area of the property is approximately 1,800 acres.

We understand the development will include large areas of solar photovoltaic panel arrays. The solar panels and tracker tilt style frames may be supported on galvanized steel W6x9 driven posts extending approximately 4 to 8 feet below grade. The development will include numerous auxiliary systems and structures designed to convert the collected energy to electricity and transmit the electricity off site. The auxiliary systems and structures may include power conversion enclosures, transformers and overhead power transmission lines; however, these have not as yet been identified or laid out. Most of the other structures are typically supported on shallow spread footing foundations or mat foundations. The power transmission monopoles are supported on drilled cast-in-place concrete pier foundations. The development is also anticipated to include underground utilities, site surface drainage features, gravel surfaced site roads and access roads.

Final design grades were not available at the time of this report; however, proposed site grades are expected to be generally similar to existing grades. Approximate existing grades range from Elevation 820 feet to 915 feet, but earthwork will include minor to moderate grade cuts and fill placement to correct grade disparities and to prepare structure pads, pavement subgrades and site drainage excavations. At the time of this report, no other specific project or structural information regarding the proposed development was available for review.

SCOPE OF SERVICES

The field operations, laboratory testing, and engineering report preparation were performed under the direction and supervision of a licensed professional engineer. Our services were performed according to generally accepted standards and procedures in the practice of geotechnical engineering. Our scope of services for this project was as follows:

1. G2 installed a total of thirty-two (32) non-galvanized steel W6x9 test posts to embedment depths ranging between 2 and 8 feet below existing ground surface within the proposed solar array fields. Two (2) test posts were installed at thirteen (13) test locations TP-1 through TP-13. One (1) test post was installed at six (6) test locations PD-1 through PD-6, where air-rotary hammer drilling methods were used to extend a pilot hole into the weathered bedrock to a depth of 8 feet below existing grade prior to post installation.
2. G2 excavated thirteen (13) test pits (TP-1 through TP-13) to depths ranging between 2-1/2 and 8 feet below the existing ground surface, where excavation refusal was generally encountered within the weathered bedrock.
3. G2 performed a total of twenty (20) soil borings using conventional drilling (soil) and coring (rock) methods. Soil boring B-1 was performed near the proposed substation and extended to a depth of 11-1/2 feet (approximately 10 feet below bedrock contact). Soil borings B-2 through B-20 were performed within the proposed solar array area and extended to depths ranging between 3 and 20 feet, where drilling refusal was generally experienced within the underlying bedrock. Coring of the bedrock was performed within borings B-1, B-4, B-8, B-12, B-17 and B-20 to depths ranging between 5 and 10 feet below the bedrock contact.
4. G2 performed field and laboratory electrochemical testing and analyses to determine the soil electrical resistivity and soil chemical corrosivity.
5. G2 performed in-situ thermal resistivity testing at various depths at six (6) locations. In addition, laboratory thermal resistivity testing was performed on a total of twenty-four (24) remolded soil samples obtained from the same test locations.

6. G2 performed laboratory geotechnical testing, including Standard Proctor compaction, California Bearing Ratio (CBR), grain-size distribution (sieve analyses), Atterberg limits, unconfined compressive strength, moisture content, organic matter content determinations (loss-on-ignition), rock quality designation (RQD), and visual engineering classification on representative samples obtained from the test pit excavations.
7. G2 prepared this geotechnical engineering report. This report includes recommendations based on the encountered and tested geotechnical conditions at the site.

FIELD OPERATIONS

Savion, LLC and G2 Consulting Group, LLC (G2) selected the number, depths and locations of the soil borings, test pits and test posts based on the features of the proposed development and site access conflicts. A G2 representative staked the proposed test locations in the field at the approximate locations indicated on the attached Geotechnical Test Location Plan, Plate No. 2.

Soil Borings, Rock Cores and Rock Drilling

The subsurface conditions throughout the proposed development area were explored by performing twenty (20) soil borings, B-1 through B-20, and six (6) pilot holes for post testing of pre-drilled limestone, PD-1 through PD-6, at the approximate locations shown on the Geotechnical Test Location Plan, Plate No. 2. The borings were drilled by Strata Group, LLC using an all-terrain vehicle mounted rotary drill rig under the guidance and direction of G2 personnel.

Continuous-flight, 4-inch inside diameter flight-augers were used to advance the boreholes to the explored depths or drilling refusal. At borings B-1 through B-20, soil samples were obtained at intervals of 2-1/2 feet within the upper 10 feet and at intervals of 5 feet or drilling refusal below that depth. These samples were obtained by the Standard Penetration Test method ASTM D 1586, which involves driving a 2-inch diameter split-spoon sampler into the soil with a 140-pound weight falling 30 inches. The sampler is generally driven three successive 6-inch increments, with the number of blows for each increment recorded. The number of blows required to advance the sampler the last 12 inches is termed the Standard Penetration Resistance (N). The blow counts for each 6-inch increment and the resulting N-values are presented on the individual soil boring logs.

Where drilling refusal was encountered within soil borings B-1, B-4, B-8, B-12, B-17 and B-20, coring of the underlying limestone bedrock was performed using a 2-inch inside-diameter diamond-tipped core-barrel to depths ranging between 5 and 10 feet below the bedrock contact at each location.

Where shallow limestone bedrock was previously determined by others to be present, or where soil boring drilling refusal was encountered during soil boring operations, pilot holes into the bedrock were performed at the locations identified as PD-1 through PD-6 using air rotary hammer drilling methods. The 6-inch diameter pilot holes were extended to a depth of 8 feet below the ground surface for subsequent post testing of pre-drilled limestone. The soil and rock cuttings were placed back into the pilot holes.

The soil and rock core samples obtained during field operations were placed in sealed containers in the field and brought to our laboratory for testing and classification. During the field operations, a G2 engineer maintained a log of the encountered subsurface conditions, including changes in stratigraphy and observed groundwater levels. The final soil boring logs, presented on Figure Nos. 1 through 39, are based on the field boring logs and laboratory soil classification and test results. General Notes defining the nomenclature used on the soil boring logs and elsewhere in this report are presented on Figure No. 94. Upon completion of drilling operations, the boreholes were backfilled with auger cuttings.

Post Load Testing

Test Post Installation

G2 obtained new 10-foot long non-galvanized steel W6x9 test posts for the thirty-two (32) test posts. The following post properties were assumed for the W6x9 test posts:

Property	W6x9
Depth	5.90 inches
Flange Width - bf	3.94 inches
Flange Thickness – tf	0.215 inches
Web Thickness - tw	0.170 inches
Moment of Inertia - Ix	16.4 in^4
Section Area - A	2.68 in^2
Young's Modulus, Es	29 ksi
Yield Stress - Fy	50 ksi
Hot Dip Galvanization	3 mils

A John Deere 310K backhoe fitted with an FRD Furukawa F9 hydraulic impact hammer, having an impact energy rating of 1,500 ft-lbs and an adjustable maximum impact rate of 900 bpm, was used to drive each test post to the final test embedment depth. The G2 field staff used the maximum impact rate setting after maximum push depths were encountered. A proprietary drive head was used with the impact hammer to maintain post head seating and alignment. During driving operations, post plumbness was monitored and adjusted as needed. After driving operations, each post was saw-cut approximately 12 to 24-inches above grade and a 1-1/4-inch diameter hole, centered 2-3/4 inches below the top of the post, was cut through each beam web to provide a connection point for the post tension test apparatus.

Excavator and Vibratory Hammer Used for Post Installation

The following table presents the final test post locations and embedment depths. The GPS coordinates presented are based on handheld GPS (Garmin®) in conjunction with Google Earth® software.

Test Pit No.	Post No. (embedment depth)	Latitude (deg)	Longitude (deg)	Notes
TP-1	1A (2ft)	37.83863°	-84.86728°	1B offset approximately 150 feet southeast from 1A
	1B (4-1/4ft)	37.83833°	-84.86703°	
TP-2	2A (4ft) & 2B (6ft)	37.83145°	-84.86695°	
TP-3	2A (2-1/2ft) & 2B (3ft)	37.82428°	-84.86747°	
TP-4	4A (4ft) & 4B (5-1/4ft)	37.81960°	-84.87423°	
TP-5	5A (5ft) & 5B (7ft)	37.82113°	-84.85611°	
TP-6	6A (4ft) & 6B (5-1/2ft)	37.81913°	-84.86133°	
TP-7	7A (4ft) & 7B (6ft)	37.81512°	-84.87457°	
TP-8	8A (6ft) & 8B (8ft)	37.81412°	-84.85789°	
TP-9	9A (2-1/4ft)	37.81136°	-84.86544°	9B offset approximately 350 feet south from 9A
	9B (3ft)	37.81039°	-84.86537°	
TP-10	10A (3ft) & 10B (4-1/4ft)	37.80729°	-84.87122°	
TP-11	11A (5-1/2ft) & 11B (8ft)	37.80486°	-84.86358°	
TP-12	12A (2-1/2ft)	37.80022°	-84.86640°	12B offset approximately 50 feet south from 12A
	12B (4-1/2ft)	37.80012°	-84.86641°	
TP-13	13A (3-1/2ft) & 10B (4-1/4ft)	37.79610°	-84.86605°	
PD-1	4ft soil + 1/2ft rock = 4-1/2ft	37.83506°	-84.85579°	
PD-2	3ft soil +3ft rock = 6ft	37.81468°	-84.85126°	
PD-3	4in soil + 3ft 2in rock = 3-1/2ft	37.79432°	-84.87050°	
PD-4	6ft soil + 2ft rock = 8ft	37.82924°	-84.85437°	Location within 50 feet of boring B-5
PD-5	3-1/2ft soil + 1-1/2 ft rock = 5ft	37.82207°	-84.86181°	Location within 50 feet of boring B-7
PD-6	3-1/2ft soil + 1-1/2ft rock = 5ft	37.81122°	-84.87051°	Location within 50 feet of boring B-13

Actual continuous drive times ranged from 15 seconds to minutes; however, periodic plumbness checks and adjustments resulted in installation times of up to 10 minutes. The estimated rate of installation varied from 0.1 to 2 inches of penetration per second during variable driving resistance with the high vibratory hammer setting on. During installation, the average relative drivability per location was observed as follows:

Test Pit No.	Average Push Depth	Average Driving Rate after Push Depth with Hammer on High Vibratory Setting
TP-1A	1 foot	0.5 to 1 in/sec to 2 feet, refusal thereafter
TP-1B	4 feet	0.25 in/sec to 4-1/4 feet, refusal thereafter
TP-2 A/B	1-1/2 feet	1 to 2 in/sec to 5 feet, 0.25 to 0.5 in/sec to 6 feet, refusal thereafter
TP-3 A/B	1 foot	0.25 to 0.5 in/sec to 2 feet, 0.1 to 0.3 in/sec to 3 feet, refusal thereafter
TP-4 A/B	2 feet	0.75 to 1.5 in/sec to 5 feet, 0.1 to 0.25 in/sec to 5-1/4 feet, refusal thereafter
TP-5 A/B	1 foot	0.3 to 0.5 in/sec to 3-1/2 feet, 0.25 to 0.5 in/sec to 7 feet, refusal thereafter
TP-6 A/B	2 feet	0.25 to 0.5 in/sec to 5-1/4 feet, 0.1 to 0.2 in/sec to 5-1/2 feet, refusal thereafter
TP-7 A/B	3 feet	0.75 to 1.5 in/sec to 5-1/2 feet, 0.25 in/sec to 6 feet, refusal thereafter
TP-8 A/B	1 foot	1 to 2 in/sec to 2-1/2 feet, 0.25 to 0.5 in/sec thereafter
TP-9A	1 foot	0.75 to 1.5 in/sec to 1-3/4 feet, 0.25 in/sec to 2-1/4 feet, refusal thereafter
TP-9B	1 foot	0.75 to 1.5 in/sec to 2-1/4 feet, 0.25 in/sec to 3-feet, refusal thereafter
TP-10 A/B	2 feet	1 to 2 in/sec to 4-1/4 feet, refusal thereafter
TP-11 A/B	2-1/2 feet	1 to 2.5 in/sec to 5 feet, 0.25 to 0.75 in/sec to 8 feet
TP-12A	1-1/2 feet	0.75 to 1.5 in/sec to 2-1/4 feet, 0.25 in/sec to 2-1/2 feet, refusal thereafter
TP-12B	1-1/2 feet	0.5 to 1.5 in/sec to 4-1/2 feet, refusal thereafter
TP-13 A/B	2-1/2 feet	0.5 to 1.5 in/sec to 3-1/2 feet, 0.25 to 0.5 in/sec to 4-1/4 feet, refusal thereafter

PD-1	1/2 feet	0.5 in/sec to 4-1/4 feet, refusal thereafter
PD-2	4 feet	1 in/sec to 5 feet, 0.5 in/sec to 6 feet, refusal thereafter
PD-3	4 inches	0.5 to 2 in/sec to 3-1/2 feet, refusal thereafter
PD-4	6 feet	0.5 to 0.75 in/sec to 8 feet, refusal thereafter
PD-5	2-1/2 feet	0.5 to 0.75 in/sec to 4 feet, 0.25 to 0.5 in/sec to 5 feet, refusal thereafter
PD-6	2-1/2 feet	0.75 to 1.25 in/sec to 5 feet, refusal thereafter

The web and flanges of the top and bottom of each extractable post were examined for damage that may have resulted during the installation process. The following table presents a summary of these observations. Please see the Post Head Photographic Documentation Figure Nos. 79 through 93 in Appendix A.

Post No.	Relative Degree of Damage	
	Top of Post	Bottom of Post
TP-1A	Minor	Minor
TP-1B	Minor	Minor
TP-2A	Minor	None
TP-2B	Minor	None
TP-3A	Minor	Minor
TP-3B	Minimal	Minor
TP-4A	Minor	None
TP-4B	Minimal	None
TP-5A	Minimal	None
TP-5B	Minor	Minor
TP-6A	Minor	None
TP-6B	Minor	Minor
TP-7A	Minimal	None
TP-7B	Minimal	None
TP-8A	Minor	None
TP-8B	Minor	None
TP-9A	Minimal	Minor
TP-9B	Minimal	None
TP-10A	Minimal	None
TP-10B	Minimal	None
TP-11A	Minimal	None
TP-11B	Minor	None
TP-12A	Minor	None
TP-12B	Minor	Minor
TP-13A	Minor	None
TP-13B	Minor	Moderate
PD-1	Minor	n/a (sawcut, left-in-place)
PD-2	Minor	None
PD-3	Minor	n/a (sawcut, left-in-place)
PD-4	Minor	n/a (sawcut, left-in-place)
PD-5	Minor	n/a (sawcut, left-in-place)
PD-6	Minimal	n/a (sawcut, left-in-place)

The noted damage to the tops of the posts can be characterized as minimal to minor deformation of the web and flanges, and is primarily attributed to adjustments to the alignment of the driving helmet during driving operations. The noted damage to the test post tips can generally be characterized as none or minor to moderate deformation of the web and flanges, and is primarily attributed to difficult driving into the underlying weathered limestone, where encountered. The upper portions of posts at predrill locations PD-1 and PD-3 through PD-6 were saw-cut and removed just above the bedrock contact, while the lower bedrock-embedded portion of the posts were left in place.

Post Tension Load Test

Tension post load tests were performed in general conformance with the procedures described in the ASTM D3689 method of testing for Deep Foundations under Static Axial Tensile Load. A fabricated aluminum reaction beam was supported on wood cribbing above the test post. An Enerpac hydraulic load jack, with a rated capacity of 30 tons, was used to apply a tensile load to the top of the test post. A Measurement Specialties, Inc. wireless pressure transducer with a pressure range up to 5,000 psi and accuracy of 0.25 percent was fitted to the manual hydraulic pump and calibrated to the jack load. The resulting jack loads during the load test were transmitted wirelessly and displayed on a hand-held computer.

Two (2) Motionics BlueDial wireless digital dial gauges with a resolution of 0.0005 inches were mounted to opposing sides of the post web using magnetic bases. Two steel L-channel reference beams were supported above grade adjacent to opposing sides of the test post and perpendicular to the reaction beam. The dial gauges were extended to a vertical position over and in contact with the reference beams. In addition, supplementary test data was manually recorded from the digital gauge displays in conjunction with the wireless transmission.

Post Tension Load Test Setup

The proposed load sequence was recommended by G2. Each post was incrementally loaded to the design load of 2,000 pounds. Once this load was reached, the post was unloaded and each post was loaded until tension load failure was experienced (greater than 0.25 inches of deflection). The posts were then loaded until approximately 1 inch of deflection occurred. Finally, the posts were unloaded and reloaded to determine the load at which 0.5 inch of additional deflection occurs after failure of the post had already been experienced to evaluate residual post capacity. Incremental load hold times were generally maintained for approximately 1 minute; however, a 5-minute hold time was observed at the design load of 2,000 pounds to evaluate post creep. A tension load greater than 10,000 pounds was applied at test post locations TP-6B, TP-8B, TP-11B, PD-1, PD-3, PD-5 and PD-6 prior to reaching a deflection of 0.25 inches; therefore, the test was terminated due to the high loading conditions. Post load test results are presented in Appendix A, Figure Nos. 95 through 126.

Post Lateral Load Test

Lateral post load tests were performed on two of the installed test posts at each test location in general conformance with the procedures described in the ASTM D3966 method of testing for Deep Foundations under Lateral Load. A John Deere 310K backhoe was used as a lateral reaction against the test post load in an effort to provide better resistance against the lateral loads. The fabricated aluminum reaction beam was placed between the front of the excavator and the test post, and was supported at-grade. The load jack was seated and leveled with wooden shims as necessary to assure the lateral load was applied to the post side flange face approximately three (3) inches above grade.

An Enerpac hydraulic load jack, with a rated capacity of 30 tons, was used to apply a lateral load to the side of the test post. A Measurement Specialties, Inc. wireless pressure transducer with a pressure range up to 5,000 psi and accuracy of 0.25 percent was fitted to the manual hydraulic pump and calibrated to the jack load. The resulting jack loads during the load test were transmitted wirelessly and displayed on a hand-held computer. Two (2) Motionics BlueDial wireless digital dial gauges with a resolution of 0.0005 inches were mounted using magnetic bases to opposing sides of the post web at the ground surface. A steel L-channel reference beam was supported above grade perpendicular to the load direction adjacent to the non-load side of the test post. The dial gauges were extended to a horizontal position parallel to the load jack and in contact with the side of the reference beam. In addition, supplementary test data was manually recorded from the digital gauge displays in conjunction with the wireless transmission.

Post Lateral Load Test Setup

The proposed load sequence was recommended by G2. The cyclic loading schedule was generally followed. Each post was laterally loaded in cyclical steps until it experienced load failure (greater than 0.5 inches deflection). The posts were then unloaded and reloaded to attempt to determine the load at which approximately 1 inch of deflection occurs. Incremental load hold times were maintained for approximately 1 minute. However, the load tests for TP-6B, TP-8A/B, PD-5 and PD-6 were terminated before a deflection of 1 inch could be reached due to high load resistance (greater than 10,000 pounds). At PD-1 and PD-3, the load test was terminated before a deflection of 1/2 inch could be reached due to high load resistance. Post load test results are presented in Appendix A, Figure Nos. 95 through 126.

Test Pits at Test Post Areas

Test pits were excavated near each of the proposed test post areas within the solar panel array field. The test pits were excavated using a John Deere 310K backhoe equipped with a 24-inch wide bucket. The test pits extended to depths ranging between 2-1/2 and 8 feet below the existing ground surface, where excavation refusal was generally encountered within the underlying bedrock. During excavation operations and subsequent test post extraction, a log of the encountered subsurface conditions was maintained for each location, including changes in stratigraphy and observed groundwater levels. Bulk samples of the excavated soils and from residual soils from extraction of the test posts were obtained and placed in sealed containers in the field for further laboratory testing and classification.

After completion of the excavation operations, the test pits were backfilled with the excavated soils. No controlled compaction of the backfill was performed during backfilling operations. The final test pit logs are based on the field logs, laboratory test results and laboratory soil classification. The test pit logs are presented in Appendix A, Figure Nos. 27 through 39. Photographic documentation of the test pit conditions is presented in Appendix A, Figure Nos. 66 through 78.

In-Situ Soil Thermal Resistivity Testing

During test pit excavations, in-situ thermal resistivity (Rho) testing was performed at locations B-1, TP-1, TP-2, TP-9, TP-11 and TP-13. In general, the tests were performed on undisturbed soils exposed in the test pit wall at various depths below the ground surface limited by excavation refusal where encountered. Thermal resistivity testing was performed using a KD2 Pro Thermal Properties Analyzer in general conformance with the procedures described in the ASTM D5334 method of testing. The complete results of the in-situ thermal resistivity tests are presented in Appendix A, Figure No. 127.

In-Situ Soil Electrical Resistivity Testing

In-situ soil electrical resistivity tests were performed at test locations B-1, TP-1, TP-2, TP-5, TP-7, TP-9, and TP-11 through TP-13. The testing was performed following the Wenner four-pin test procedure (ASTM G57-06) using a Nilsson Model 400 resistivity meter with steel probes. At all test post areas, the pins were set at a spacing of 2, 5, 10, 25 and 50 feet. The results of the electrical resistivity tests are presented in Appendix A, Figure Nos. 128.

LABORATORY TESTING

Representative soil samples were subjected to geotechnical laboratory testing to determine soil parameters pertinent to site preparation and foundation and pavement design. An experienced geotechnical engineer classified the samples in general conformance with the Unified Soil Classification System (USCS). Geotechnical laboratory testing included Standard Proctor compaction, California Bearing Ratio (CBR), grain-size distribution (sieve analyses), Atterberg limits, unconfined compressive strength, moisture content, organic matter content determinations (loss-on-ignition) and rock quality designation (RQD).

The thermal resistivity of remolded soil samples within a range of moisture contents were performed on six (6) bulk soil samples obtained from test pit excavations B-1, TP-1, TP-2, TP-9, TP-11 and TP-13 at depths ranging between 2 and 4 feet below the ground surface. The results were used to plot the Thermal Resistivity Dryout curves for each sample. To do this, a One-point Standard Proctor is performed on each bulk sample to determine the soil's maximum density at the sample's as-received moisture content. Three (3) remolded samples from each bulk soil sample are then prepared at the as-received moisture content and at a density equal to 85 percent of the maximum density value. The thermal resistivity of one of the samples from each bulk soil sample is determined at as-received moisture content using a KD2 Pro Thermal Properties Analyzer in general conformance with the procedures described in the ASTM D5334 method of testing. Then, all three remolded samples are placed in a 140˚F oven to dry until average moisture contents near 7 percent, 2-1/2 percent and 0 percent are achieved for each bulk sample. The thermal resistivity is determined at each of these average moisture contents. After testing individual samples, each sample will be extruded and the moisture content of the sample surrounding the analyzer's sensor depth of 2 inches is determined for comparison to the average moisture content. The complete results of the thermal resistivity testing on remolded soil samples and the corresponding "Thermal Dryout Curves" are presented in Appendix A, Figure Nos. 129 through 134.

Standard Proctor tests were performed for two (2) bulk soil samples obtained from the test pits at depth intervals ranging between the ground surface and 4 feet below the ground surface. The Standard Proctor tests were performed in general conformance with the procedures described in the ASTM D698 method of testing. The results of the Standard Proctor tests, including the maximum dry densities and optimum moisture contents, are presented in Appendix A, Figure Nos. 135 and 136.

The CBR value of compacted soils was determined for two (2) bulk soil samples obtained from the test pits at depth intervals ranging between the ground surface and 4 feet below the ground surface for use in pavement design. The CBR tests were performed in general conformance with the procedures described in the ASTM D1883 method of testing. The results of the CBR tests are presented in Appendix A, Figure Nos. 137 and 138.

Grain-size distribution analyses (sieve analyses) were performed on seven (7) samples obtained from the test pits at and soil borings depths ranging between 1 foot and 15 feet below the ground surface. The sieve analyses were performed in general conformance with the procedures described in the ASTM D6913 method of testing. The results of the sieve analyses are presented in Appendix A, Figure Nos. 139 and 140.

Atterberg limit determinations were performed on six (6) samples obtained from the test pits at and soil borings depths ranging between 2 feet and 5-1/2 feet below the ground surface. The Atterberg limit determinations were performed in general conformance with the procedures described in the ASTM D4138 method of testing. The Atterberg limits are presented in Appendix A, Figure No. 141.

Unconfined compressive strength tests were performed on fifteen (15) samples obtained from the borings in general conformance with the procedures described in the ASTM D2166 method of testing. Additional unconfined compressive strength tests were performed using a spring-loaded hand penetrometer device. The hand penetrometer estimates the unconfined compressive strength to a maximum of 4-1/2 tons per square foot (tsf) by measuring the resistance of the soil sample to the penetration of a calibrated spring-loaded cylinder. The unconfined compressive strength results are presented in Appendix A, Figure Nos. 142 through 144, and on the soil boring logs, Figure Nos. 1 through 20.

Natural moisture content determinations were performed in accordance with the ASTM D2216 method of testing. The organic matter content of representative samples was determined in accordance with ASTM Test Method D2974, "Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils". Compressive strength tests were performed on four (4) intact rock core specimens obtained from the borings in general conformance with the procedures described in the ASTM D7012 method of testing. The Rock Quality Designation (RQD) of each rock cores obtained was performed in general conformance with the procedures described in the ASTM D6032 method of testing. The results of the moisture content, compressive strength of intact rock, organic matter content, dry density, and RQD determinations are presented on the boring and test pit logs, Figure Nos. 1 through 39, at the depths the samples were obtained.

SITE CONDITIONS

The project site, identified as the Mercer County Power Plant, is located on the west side of U.S. Highway 127 (US-127) in Harrodsburg, Mercer County, Kentucky. The overall area is identified on the attached Geotechnical Test Location Plan, Plate No. 2, in relation to the surrounding area.

Jackson Pike running east-west and an existing railroad track running north-south bisect the project area. Grades within the site are generally flat to gently rolling with elevations ranging between 820 feet and 915 feet. Currently, the site is primarily agricultural land. Two existing overhead electrical power transmission lines run east-west through the entire site and north-south along the west side of the existing railroad track. The surrounding properties are primarily agricultural and residential.

View from Northern Area of Site (Near TP-1) Facing South

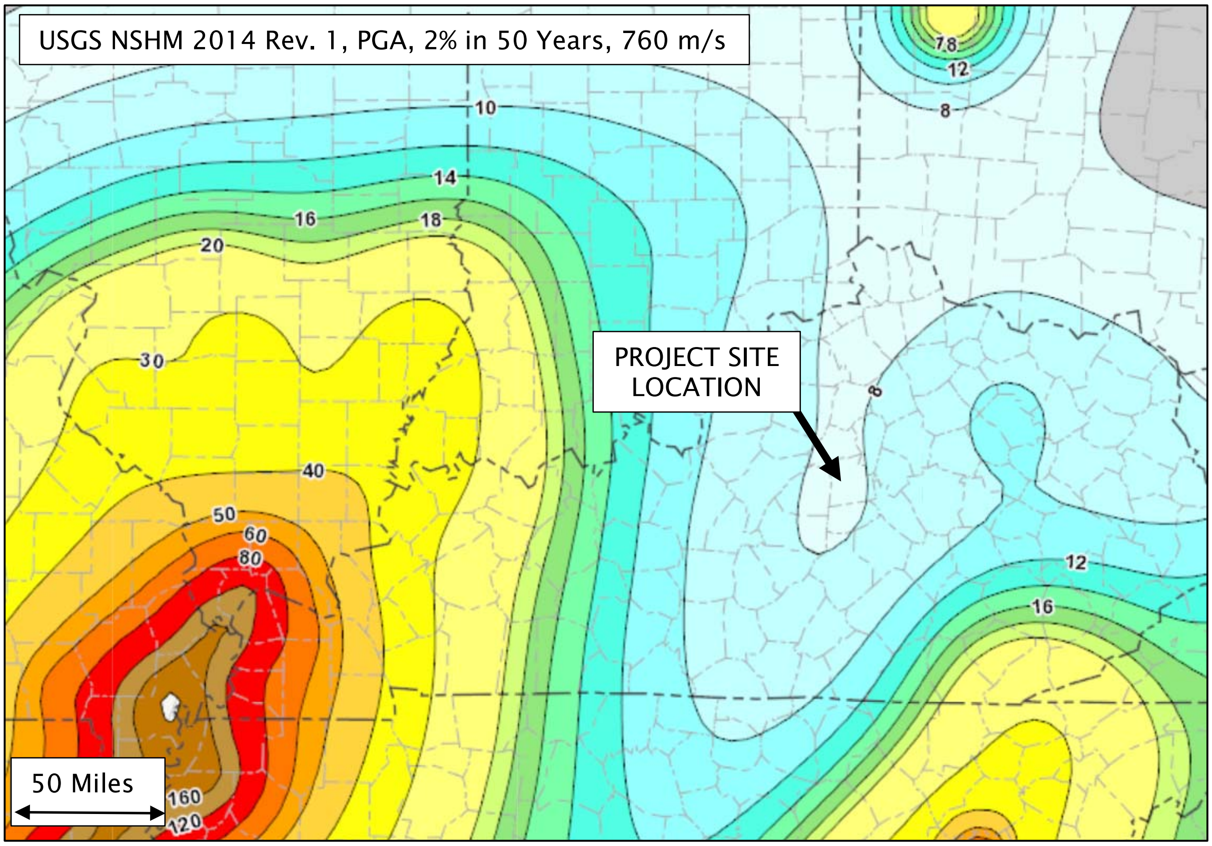
View from Southern Area of Site (Near TP-12) Facing North

SUBSURFACE CONDTIONS

Site Seismicity

Based on the 2015 International Building Code, our familiarity with soil conditions in the area, and our engineering judgement, structures may be designed for seismic loading conditions on the basis of the following seismic coefficients and classifications. Once additional information is obtained from deeper soil borings or other geotechnical investigations, the Site Class assumed below shall be confirmed.

- Site Class C – Very Dense Soil and Soft Rock
- Maximum Considered Earthquake Spectral Response Acceleration
    - At short periods (S_S) = 0.180g
    - At one second period (S_1) = 0.095g
- Maximum Considered Earthquake Spectral Response Acceleration (adjusted for site class)
    - At short periods (S_{MS}) = 0.216g
    - At one second period (S_{M1}) = 0.162g
- Five Percent Damped Design Spectral Response Acceleration
    - At short periods (S_{DS}) = 0.144g
    - At one second period (S_{D1})= 0.108g



It should be noted that the USGS identifies this site as lying within the marginal influence of the New Madrid Seismic Zone. The development of shear strains tending to cause liquefaction of soils is governed by the character of the ground motion (i.e. acceleration and frequency), soil type, groundwater level, and in-situ stress conditions. Granular soils below the water table are more likely to liquefy than granular soils above the water table. In the event of an earthquake episode producing accelerations of up to 0.216g, there is a very low potential for localized liquefaction to occur within the generally stiff to very stiff clay soils and limestone bedrock beneath the site.

Subsurface Soil Conditions

Approximately 4 to 13 inches of dark brown lean to fat clay tilled earth is present at the ground surface of each test location (borings B-1 through B-20, PD-1 through PD-6, and test pits TP-1 through TP-13). The surficial soils appear to have been tilled for agricultural purposes. The tilled earth soils are stiff to very stiff in consistency with unconfined compressive strengths ranging from 2,000 to 5,500 pounds per square foot (psf), organic matter contents ranging from 4.4 to 7.5 percent, moisture contents between

25 and 32 percent, and a silt-clay content (percent passing No. 200 sieve) of approximately 90 percent. In addition, the tilled earth soils have a California Bearing Ratio (CBR) value of 3.3 at 95 percent compaction and 2.4 at 90 percent compaction.

Native lean to fat clay generally underlies the tilled earth soils at each test location and extends to varying depths ranging between 1 foot and the maximum explored depth of 20-1/2 feet. The native cohesive soils are generally stiff to very stiff in consistency with unconfined compressive strengths ranging from 2,000 to 7,500 psf. However, medium cohesive soils are present to a depth of 4 feet within B-12 and B-19 with unconfined compressive strengths ranging from 1,330 to 1,670 psf. In addition, hard cohesive soils are present at various depths within B-2 through B-4, B-8 and B-11 with unconfined compressive strengths greater than 8,500 psf. The native cohesive soils have dry densities ranging from 81 to 113 pounds per cubic foot (pcf), and natural moisture contents ranging from 12 to 42 percent. The native cohesive soils have liquid limits between 32 and 77 percent, and plasticity indexes between 11 and 45 percent. In addition, the native cohesive soils between the depths of 1 foot and 4 feet have a California Bearing Ratio (CBR) value of 6.5 at 95 percent compaction and 4.5 at 90 percent compaction.

In general, native faintly to slightly weathered gray limestone underlies the tilled earth and native cohesive soils at each location and extends to the explored depths. However, no limestone bedrock was encountered within B-18. The weathered limestone is shallow (present within the upper 5 feet) at borings B-1, B-5, B-7, B-8, B-13, B-14, B-16, B-20, PD-1 through PD-6, and test pits TP-3, TP-5, TP-9, TP-10, TP-12 and TP-13. The weathered limestone is moderately strong to strong in abrasion, with unconfined compressive strengths ranging from 13,100 to 26,100 pounds per square inch (psi), moisture contents ranging from 0 to 1 percent, and dry densities ranging from ranging from 160 to 167 pounds per cubic foot (pcf). In addition, the weathered limestone has Rock Quality Designations (RQD) ranging between 30 and 92 percent.

The Soil Boring Logs, Figure Nos. 1 through 20, Pilot Hole Boring Logs, Figure Nos. 21 through 26, and Test Pit Logs, Figure Nos. 27 through 39, are presented in Appendix A. The stratification depths shown on the soil boring and test pit logs represent the soil conditions at the exploration locations. Variations may occur between exploration locations. Additionally, the stratigraphic lines represent the approximate boundary between soil types. The transition may be more gradual than what is shown. G2 has prepared the logs on the basis of laboratory classification and testing as well as field logs of the soils encountered.

Additional photographic documentation of the conditions at each test pit location is presented on Figure Nos. 66 through 78 in Appendix A. General Notes Terminology defining the nomenclature used on the test pit logs and elsewhere in this report are presented on Figure No. 94, Appendix A.

Groundwater Conditions

Groundwater was encountered during and upon completion of drilling operations at a depth of 19-1/2 feet within soil borings B-18, corresponding to an approximate elevation of 863.5 feet. No groundwater was encountered within the remaining soil borings or test pits during or upon completion of field operations. Fluctuations in groundwater levels should be anticipated due to seasonal variations and following periods of prolonged precipitation. Groundwater observations made during drilling and excavation operations in predominantly cohesive soils are not necessarily indicative of the static groundwater level. This is due to the low permeability of such soils and the tendency of drilling operations to seal off the natural paths of groundwater flow.

Thermal Resistivity

During test pit excavations, in-situ thermal resistivity (Rho) testing was performed at locations B-1, TP-1, TP-2, TP-9, TP-11 and TP-13. In general, the tests were performed on undisturbed soils exposed in the test pit wall at various depths below the ground surface limited by excavation refusal where encountered. Thermal resistivity testing was performed using a KD2 Pro Thermal Properties Analyzer in general conformance with the procedures described in the ASTM D5334 method of testing. The complete results of the in-situ thermal resistivity tests are presented in Appendix A, Figure No. 127. A summary of the test results is presented in the following table:

Location	Depth (ft)	Thermal Resistivity (˚C-cm/W)
B-1	1	68.9
TP-1	2	63.2
	3	40.9
	4	57.9
TP-2	2	63.2
	3	71.4
	4	80.7
TP-9	1.5	84.6
	2.5	94.6
TP-11	2	53.2
	3	59.2
	4	51.4
TP-13	2	55.3
	3	63.9
	4	90.8

In addition to in-situ thermal resistivity testing, laboratory testing to determine the thermal resistivity (Rho) of remolded soil samples prepared across a range of moisture contents was performed on bulk soil samples obtained at general depths ranging between 1 and 4 feet within each test pit unless excavation refusal was encountered. The results were used to plot the Thermal Resistivity Dryout curves for each sample. To do this, a One-point Standard Proctor maximum dry density was determined for each sample at its as-received moisture content. Four remolded samples from each bulk soil sample were prepared at the as-received moisture content (between 23 and 30 percent) and at a density equal to approximately 85 percent of the maximum dry density value. The thermal resistivity of one of the samples was determined at the initial moisture content using a KD2 Pro Thermal Properties Analyzer in general conformance with the procedures described in the ASTM D5334 method of testing. The three remaining remolded samples for each bulk sample were then placed in a 140˚F oven to dry until incrementally dryer average moisture contents ranging between 6.6 and 0.2 percent were achieved. The thermal resistivity was determined at each of the three dryer average moisture contents. After testing individual samples, the sample was extruded and measured for shrinkage and density change. A portion of the extruded sample was cut from the area where the analyzer's probe sensor performs the Rho test (approximately 2 inches below the top of the sample). The moisture content at the approximate sensor depth was determined for comparison to the average moisture content.

The complete results of the thermal resistivity testing on remolded soil samples and the corresponding "Thermal Dryout Curves" are presented in Appendix A, Figure Nos. 129 through 134. A summary of the Rho test results is presented in the following table:

Location (Depth, ft)	Soil Type	Initial Compaction (%)	Maximum Sample Shrinkage (%)	Average Moisture Content of Sample (%)	Moisture Content at Sensor (%)	Thermal Resistivity (˚C-cm/W)	Temp (˚C)
B-1 (0.5 to 1)	Lean Clay	87.9	2.9	25.8	24.9	114	19.4
				6.0	6.3	387	21.7
				3.1	3.6	422	20.4
				0.6	0.6	433	23.2

TP-1 (2 to 4)	Fat Clay	85.1	3.7	23.3	22.7	68	17.0
				4.3	4.6	84	19.8
				1.8	1.0	128	20.5
				0.5	0.6	175	20.5
TP-2 (2 to 4)	Fat Clay	88.4	5.0	30.4	30.4	99	18.0
				5.7	5.6	106	21.4
				2.3	3.0	110	20.4
				0.3	1.9	144	21.4
TP-9 (1 to 2)	Fat Clay	85.4	3.8	27.3	27.2	85	17.8
				5.8	6.4	155	20.9
				2.3	2.9	189	21.0
				0.2	1.5	200	20.6
TP-11 (2 to 4)	Fat Clay	85.4	2.3	25.2	24.7	60	19.1
				3.7	3.8	171	21.9
				1.6	1.5	211	20.8
				0.6	0.8	241	23.2
TP-13 (2 to 4)	Fat Clay	84.5	4.9	29.3	28.6	89	18.9
				6.5	6.6	93	20.8
				2.7	1.6	199	20.6
				1.5	0.8	308	19.8

The estimated thermal resistivity (Rho) values at the sample's interpolated average moisture content of 2-1/2 percent ranged between 110 and 425 ˚C-cm/W and averaged 208 ˚C-cm/W. The estimated thermal resistivity (Rho) values at the sample's interpolated sensor moisture content of 2-1/2 percent ranged between 110 and 426 ˚C-cm/W and averaged 205 ˚C-cm/W. The average Rho at an interpolated moisture content of 2-1/2 percent using both the average and sensor and moisture content data is 206 ˚C-cm/W.

Corrosion Potential

In-situ Soil Electrical Resistivity

In-situ soil electrical resistivity was performed at nine (9) test locations. The complete results of the in-situ soil electrical resistivity tests are presented in Appendix A, Figure No. 128. A summary of the test results is presented in the following table:

	Depth 0–2ft ohm-cm	Depth 0–5ft ohm-cm	Depth 0–10ft ohm-cm	Depth 0–25ft ohm-cm	Depth 0–50ft ohm-cm
Minimum	3,064	4,022	5,937	13,405	26,810
Maximum	11,490	18,193	34,470	39,258	67,983
Average	6,830	9,700	14,310	27,080	41,230

The test results indicate that the electrical resistivities of the soils extending to a depth of 50 feet range between 3,064 and 67,983 ohm-cm. Based on the test results, the upper soils to within the range of proposed post embedment depths should generally be considered mildly corrosive to corrosive based on the standard limits in the table below.

Soil Corrosivity	Soil Resistivity (ohm-cm)
Extremely/Very Corrosive	Less than 1,000
Corrosive	1,000 to 5,000
Moderately Corrosive	5,000 to 10,000
Mildly Corrosive	Over 10,000

Laboratory Soil Electrical Resistivity

In addition to in-situ electrical resistivity testing, laboratory testing to determine the soil electrical resistivity (ohm-cm) of remolded soil samples prepared at as-received and saturated moisture conditions was performed on bulk soil samples obtained from five (5) locations at depths ranging between 2 and 3 feet. The testing was performed on our behalf by Essential Corrosion Protection (Columbia, MD). A summary of the laboratory electrical resistivity test results is presented in the following table:

	Remolded Soil Electrical Resistivity (ohm-cm)	
Location	**As-Received Moisture Condition**	**Saturated Moisture Condition**
B-1	3,200	2,000
TP-1	7,900	7,400
TP-9	14,000	7,000
TP-11	5,100	4,300
TP-13	15,000	6,900
Average	9,040	5,520

The test results indicate that the electrical resistivities of the soils at depths between 2 and 3 feet range between 2,000 and 15,000 ohm-cm. Based on the test results, the upper soils should generally be considered mildly corrosive to corrosive based on the standard limits in the table above.

Soil Chemical Corrosivity

Laboratory chemical tests were performed on bulk soil samples obtained from five (5) locations at depths ranging between 2 and 3 feet. The testing was performed on our behalf by Essential Corrosion Protection (Columbia, MD). The testing included soil pH, chloride content, sulfate content, and oxidation-reduction potential (redox). The complete results of chemical testing are presented in Appendix B. A summary of the test results is presented in the following table:

Location	pH	Sulfates (ppm)	Chlorides (ppm)	Redox Potential, Eh (mV)
B-1	6.7	5	50	340
TP-1	6.4	<5	45	353
TP-9	5.1	<5	20	437
TP-11	6.6	<5	65	359
TP-13	5.3	<5	20	404
Average	6.0	<5	40	379

<u>pH</u>

The measured pH values range from 5.1 to 6.7 indicating the soils are generally neutral to slightly acidic. Based on these results, the pH values of the on-site soils suggest the soils may be slightly corrosive to buried metallic structures or pipelines due to pH.

<u>Sulfate Content</u>

High contents of sulfates of sodium, calcium, potassium and magnesium can contribute to soil corrosivity based on the following standard limits:

Soil Corrosivity	Sulfate Content (ppm)
Negligible	Less than 150
Moderate	150 to 1,500
Severe	1,500 to 10,000
Very Severe	Over 10,000

The sulfate content of the on-site soils is less than 5 ppm (mg/L), indicating there should be a negligible increase in corrosion rates of buried metallic structures or pipelines due to sulfate content.

Chloride Content

Typically, chloride ion contents greater than 150 ppm are indicative of contaminated soils that could potentially be corrosive to metal. The chloride content of the on-site soils is less than 65 ppm indicating there should not be an increase in corrosion rates of buried metallic structures or pipelines due to chloride ion content.

Oxidation-Reduction Potential

The oxidation-reduction potential of soils identifies the potential for anaerobic bacterial corrosion. Redox potentials and their relationship to potential soil corrosivity are presented in the following table:

Soil Corrosivity	Redox Potential (mV)
Very Corrosive	Less than 100
Moderately Corrosive	100 to 200
Slightly Corrosive	200 to 400
Non-corrosive	Over 400

The measured redox potentials range from 340 to 437 mV. These test results indicate there could be a slight increase in corrosion rates of buried metal structures or pipelines due to anaerobic bacterial corrosion near the test pit locations.

DESIGN RECOMMENDATIONS

Earthwork

Site and Subgrade Preparation

Earthwork operations are expected to consist of removing the existing vegetation and organic soils, cutting existing soils or placing engineered fill to achieve proposed site design grades and minimize severe surface undulations within proposed solar panel areas, excavating for foundations and underground utilities, and preparing the subgrade for support of access and maintenance drives. G2 recommends all earthwork operations be performed in accordance with specifications that have been prepared by a Kentucky licensed professional engineer and be properly monitored in the field by qualified technical personnel under the direction of a licensed engineer.

Approximately 4 to 13 inches of tilled earth with organic matter contents ranging between 4 and 8 percent was encountered at each test location. Some topsoil should be anticipated at other areas within the project site where prior agricultural activities have not occurred. At the beginning of the earthwork operations, all vegetation and their root mass should be grubbed from proposed construction areas and disposed of off site. Where buildings or auxiliary structures supported on shallow spread footing foundations or mat foundations are planned, the full depth of any existing topsoil shall be completely undercut from within the structure footprints. All undercuts for structures should extend a distance laterally beyond the structure perimeter at least equal to the depth of the undercut.

Where engineered fill will be placed to raise site grades, any existing topsoil must be completely undercut prior to fill placement. The existing topsoil may remain where solar panel arrays are planned, except where engineered fill is being placed to raise the grade. Where site access and site perimeter roads are planned, any existing topsoil must be completely undercut due to excess organic matter. Where interior maintenance roads are planned, any topsoil containing 5 percent or more organic matter shall be completely undercut. The results of organic matter content testing of thirteen (13) topsoil samples indicated that eight (8) of the samples (TP-1, TP-4, TP-6 through TP-9, TP-12 and TP-13) had organic matter contents of 5 percent or more.

Once the proposed subgrade has been exposed, and prior to placement of engineered fill and/or construction of pavement sections, the exposed subgrade in proposed pavement and auxiliary structure areas should be thoroughly proof-rolled using a heavy rubber-tired vehicle, such as a fully-loaded dump truck or front-end loader, and should be visually evaluated for instability and/or unsuitable conditions. Any unstable or unsuitable areas noted should be undercut and replaced with engineered fill.

Sheep-foot roller compaction equipment should be used for all compaction operations using on-site cohesive soils. We anticipate the subgrade soils will consist primarily of fat clay. These native soils are highly prone to instability due to fluctuations in moisture content and will become very unstable during prolonged precipitation periods. As such, we recommend site grading operations be performed during the warmer and lower-precipitation months of the year.

Engineered Fill Soils and Placement

The on-site cohesive soils (lean to fat clay) have a high potential for shrinkage or swelling with decreases or increases in moisture content (Liquid Limit = 32 to 77; Plasticity Index = 11 to 45), particularly after they have been disturbed and recompacted. Structure foundations and floor slabs should not be supported directly on engineered fill prepared from on-site cohesive soils. Soil improvement techniques, such as lime stabilization, may be considered to modify the properties of the on-site cohesive soils and allow its reuse as engineered fill for support of structures. If desired, supplementary recommendations for lime treatment can be provided, including determination of the appropriate lime content and depth of lime treatment. Consideration may also be given to undercutting some of the native cohesive soils and replacing it with non-expansive granular soil or low-strength flowable fill (approximate compressive strength of 100 to 150 psi). If granular soil fill is used, supplementary drainage of the fill layer will need to be provided to prevent accumulation of water within the granular fill.

Engineered fill should consist of pre-approved environmentally clean soils, and should be free of organic matter, frozen soil clods, or other harmful material. Engineered fill should have a liquid limit less than 40 percent and a plasticity index of less than 12 percent. Engineered fill should be placed in uniform horizontal layers, not more than 9 inches in loose thickness. The engineered fill should be compacted to achieve a density of at least 95 percent of the maximum dry density as determined by the Standard Proctor compaction test (ASTM D698).

If the native cohesive soils are to be used as engineered fill, we recommend they be lime-treated to improve the soil stability and resistance to shrink and swell. If lime-treated soil is used as engineered fill, the treated soil should be moisture conditioned to within 3 percent above the optimum moisture content. If imported non-cohesive granular fill soils are used as engineered fill or aggregate base material for roadways, the granular fill should be compacted at moisture contents that are within 2 percent above or below the optimum moisture content.

Excavation Slopes and Support

For open cut temporary excavations where space is available, temporary unsurcharged slopes to a maximum depth of 5 feet may be sloped back without shoring at 3/4 units horizontal to 1 unit vertical (3/4H:1V) within the existing native cohesive soils. Where sloped excavations are used, the tops of the slopes should be barricaded to prevent vehicles and storage loads within 5 feet of the tops of the slopes. If materials are stored or equipment is operated near an excavation, shoring and slopes must be designed to resist the additional lateral pressure due to the surcharge loads. Berms are recommended along the tops of slopes as necessary to prevent runoff water from entering the excavations and eroding the slope faces.

Where sloped excavations are not possible, shoring may be required to support vertical cuts that extend below a depth of 5 feet and where personnel will enter the excavations. For design of multi-level braced or tied-back shoring, we recommend the use of a rectangular distribution of lateral earth pressure. It may be assumed that the retained soils with a level surface behind the braced shoring will exert a lateral pressure equal to 26H in pounds per square foot, where H is the height of the shoring in feet. For design of single-level braced or tied back shoring and cantilevered shoring, a trapezoidal distribution of lateral earth pressure may be used. It may be assumed that the retained soils with a level surface behind cantilevered shoring will exert a lateral pressure equal to that developed by a fluid with a density of 35 pounds per cubic foot (pcf) for soils above water level. If construction traffic or material storage is allowed within 10 feet of the vertical excavation, a uniform vertical pressure of 360 pounds per square foot should be added at the ground surface when determining the design lateral loads.

All excavations should be safely sheeted, shored, sloped, or braced in accordance with local or federal OSHA requirements. If material is stored or equipment is operated near an excavation, stronger shoring must be used to resist the extra pressure due to the superimposed loads and should be evaluated by an experienced professional engineer registered in the State of Kentucky. Care should always be exercised when excavating near existing roadways or utilities to avoid undermining them. In no case should excavations extend below the level of adjacent existing structures unless underpinning is planned.

Foundations

General

As noted previously, approximately 4 to 13 inches of dark brown tilled earth with approximately 4 to 8 percent organic matter was encountered within each soil boring and test pit. Some topsoil should be anticipated at other areas within the project site where prior agricultural activities have not occurred. Structure foundations should not bear on or within the existing topsoil or tilled earth, and engineered fill should not be placed over existing topsoil or tilled earth.

The underlying native cohesive soils have a high potential for shrinkage or swelling with decreases or increases in moisture content, particularly after they have been disturbed (soil bond structure broken down) and recompacted. Structure foundations and floor slabs are not recommended for support directly on engineered fill prepared from on-site cohesive soils.

Based on an evaluation using the Foundation Performance Association (FPA) method for estimating the depth of the moisture active zone, the upper 5 feet of the subsurface soils is considered susceptible to periodic expanding and shrinking fluctuations. Based on an evaluation using the Texas Department of Transportation method (TxDOT Designation Tx-124-E) for estimating Potential Vertical Rise (PVR), an unloaded surface structure has a PVR of approximately 1 inch if the native undisturbed soil is allowed to transition from a “dry” condition to a “wet” condition. Given the generally humid climate in this region, and the typical frequency of precipitation throughout the year in this region, the likelihood of significant soil moisture fluctuations occurring within the undisturbed native cohesive soils is low. It is estimated, therefore, that actual long-term shrinkage and swelling within the native cohesive soils will likely be limited to within the upper 2 feet of soil and less than the estimated PVR of 1 inch.

Based on these assumed soil and climate conditions, the **undisturbed** native cohesive soils are generally conducive to support of shallow foundation types, such as shallow spread footing or mat foundations for auxiliary systems and structures, provided some risk of differential soil expansion and/or settlement can be tolerated. It is critical to understand that once the native cohesive soils have been disturbed by excavation or construction traffic, the native soils are no longer suitable for reuse or re-compaction as engineered fill beneath foundations; therefore, every attempt should be made to excavate foundations neat and place foundation concrete and flowable fill (if used) as soon as practical to prevent such disturbance.

Solar Array Driven Post Foundations

General

We anticipate the driven post foundations will generally experience difficult driving conditions and high driving stresses during installation operations where shallow weathered limestone bedrock is encountered. The contractor must ensure the posts are not being overstressed during installation. In areas where shallow limestone bedrock is present, we recommend the contractor predrill a full-depth 6-inch diameter pilot hole extending through the native cohesive soils and terminating approximately 1 to 2 feet below the bedrock contact prior to driving post foundations. The auger cuttings from drilling operations should be placed back into the predrilled hole and tamped to a firm condition prior to post driving operations.

Frost penetration to a depth of 2 feet is possible in this area, and the on-site cohesive soils (lean to fat clay) are highly susceptible to frost penetration. In order to minimize the potential for frost jacking of post foundations in areas where the subsurface conditions consist of soil for the full post embedment depth, we recommend each post location be predrilled to a depth of 2 feet using an 8-inch diameter auger (assuming W6 post sections are to be used). The predrilled hole should be backfilled with Kentucky Transportation Center (KTC) dense graded aggregate base (DGB) or crushed stone base (CSB) and tamped to a firm condition prior to post driving operations.

If the anticipated post installation methods differ from our assumptions, G2 must be notified so we can review the recommendations provided herein.

Field Post Load Tests

During our field investigation, thirty-two (32) W6x9 galvanized steel test posts were driven to depths ranging between 2 and 8 feet below the existing ground surface using an FRD Furukawa F9 hydraulic impact hammer. Two (2) posts were driven at test location TP-1 through TP-13. One (1) test post was driven at test locations PD-1 through PD-6, where air-rotary hammer drilling methods were used to extend a 6-inch hole into the weathered bedrock to a depth of 8 feet below existing grade. The auger cuttings were tamped back into the hole prior to post installation.

In general, the distance between test posts at each location was approximately 20 feet. However, shallow weathered limestone is present at TP-1, TP-9 and TP-12, so the distance between test posts at these locations ranged between 50 and 350 feet, Actual continuous drive times were between 15 and 120 seconds. The web and flanges of the post heads experienced minimal to minor damage during the test post installation operations. The noted damage to the test post tips can be characterized as none or minor to moderate deformation of the web and flanges, and is primarily attributed to difficult driving into the underlying weathered limestone where encountered.

At all of the test locations, both tension post load tests and lateral post load tests were performed on the installed posts. The load tests were generally performed within 1 to 3 hours of when the posts were installed. A tension load greater than 10,000 pounds was applied at test post locations TP-6B, TP-8B, TP-11B, PD-1, PD-3, PD-5 and PD-6 prior to reaching a deflection of 0.25 inches; therefore, the test was terminated due to the high loading conditions. Similarly, the lateral load tests for TP-6B, TP-8A/B, PD-5 and PD-6 were terminated before a deflection of 1 inch could be reached due to high load resistance (greater than 10,000 pounds). At PD-3 the load test was terminated before a deflection of 1/2 inch could be reached due to high load resistance, and at PD-1 the load test was terminated before a deflection of 1/4 inch could be reached due to high load resistance. The complete results of the post load tests are presented in Appendix A, Figure Nos. 95 through 126.

Driven Post Uplift Capacity

A summary of the as-tested ultimate uplift load test results for each test post area is presented graphically on Figure No. 145 in Appendix A. The depicted capacities are based on the field test results that were performed in a relatively short timeframe. The following table presents a summary of the as-tested uplift loads measured at the indicated deflections:

		Uplift Load (lbs)				
Post No.	Post Embedment Depth (ft)	Load @ 0.25-inch Deflection	Load @ 0.50-inch Deflection	Load @ 1.0-inch Deflection	Maximum Recorded Load During Initial Load Sequence	Reload @ 0.50-inch Deflection
TP-1A	2	933	780	480	1,045 @ 0.03 in.	470
TP-1B	4-1/4	2,040	2,190	2,460	2,464 @ 1.01 in.	2,340
TP-2A	4	5,120	5,050	4,150	5,454 @ 0.28 in.	3,740
TP-2B	6	5,600	5,740	5,370	5,911 @ 0.27 in.	4,580
TP-3A	2-1/2	1,950	2,290	2,960	2,996 @ 1.03 in.	3,080
TP-3B	3	5,620	6,210	7,260	7,318 @ 1.03 in.	6,480
TP-4A	4	2,390	2,740	3,250	3,267 @ 1.02 in.	3,170
TP-4B	5-1/4	4,040	4,060	3,910	4,126 @ 0.26 in.	3,530
TP-5A	5	5,180	5,810	5,470	5,940 @ 0.31 in.	4,790
TP-5B	7	7,090	8,420	8,510	8,539 @ 1.12 in.	9,600
TP-6A	4	5,130	5,110	4,880	5,219 @ 0.26 in.	3,980
TP-6B	5-1/2	>10,000	n/a	n/a	10,090 @ 0.18 in.	n/a
TP-7A	4	2,370	2,330	2,220	2,377 @ 0.26 in.	2,170
TP-7B	6	6,730	7,190	6,440	7,505 @ 0.29 in.	6,200
TP-8A	6	5,860	6,440	7,280	7,316 @ 1.02 in.	7,340
TP-8B	8	>10,000	n/a	n/a	10,747 @ 0.06 in.	n/a
TP-9A	2-1/4	1,770	1,860	1,990	2,009 @ 1.07 in.	2,150
TP-9B	3	1,770	1,680	1,350	1,808 @ 0.30 in.	920
TP-10A	3	2,280	2,610	3,190	3,207 @ 1.02 in.	3,140
TP-10B	4-1/4	5,350	6,550	8,830	8,923 @ 1.02 in.	7,530
TP-11A	5-1/2	4,670	4,840	4,550	4,961 @ 0.28 in.	4,440
TP-11B	8	>10,000	n/a	n/a	10,333 @ 0.09 in.	n/a
TP-12A	2-1/2	3,510	3,410	2,610	3,746 @ 0.29 in.	3,600
TP-12B	4-1/2	2,820	2,920	3,000	3,000 @ 1.01 in.	2,980
TP-13A	3-1/2	2,190	2,710	3,710	3,724 @ 1.01 in.	3,650
TP-13B	4-1/4	2,940	3,120	3,400	3,413 @ 1.02 in.	3,530
PD-1	4-1/2	>10,000	n/a	n/a	10,208 @ 0.02 in.	n/a
PD-2	6	2,810	3,710	5,430	5,573 @ 1.04 in.	5,660
PD-3	3-1/2	>10,000	n/a	n/a	10,003 @ 0.01 in.	n/a
PD-4	8	8,220	8,290	6,930	8,892 @ 0.28 in.	6,260
PD-5	5	>10,000	n/a	n/a	10,555 @ 0.02 in.	n/a
PD-6	5	>10,000	n/a	n/a	10,019 @ 0.02 in.	n/a

Note: Tension Load Acceptance Criteria is 0.25-inch deflection.

Based on the uplift load test results and the observed soil conditions at all boring and test pit locations, we have developed incremental ultimate capacities presented below that depict the recommended design ultimate uplift capacity of driven steel W6x9 posts versus embedment depths of 8 feet or less.

We recommend the following generalized incremental ultimate capacities be added for every foot of embedment below 2 feet:

- Native Undisturbed Cohesive Soil: 750-lbf per foot of embedment into undisturbed soil or 6-inch pre-drilled relief hole with auger cuttings tamped into hole prior to post installation.
- Native Limestone Bedrock: 1,250-lbf per foot of embedment into 6-inch pre-drilled relief hole with auger cuttings tamped into hole prior to post installation.

Given the varying elevation of limestone bedrock present throughout the project site, we recommend the use of four (4) Capacity Areas intended to represent the recommended design ultimate capacities in order to simplify design of post foundations. Plate No. 3, Capacity Area Plan, provides a pictorial that delineates the approximate limits of the four "Capacity Areas" relevant to the surrounding bedrock elevation. The transition between capacity areas will be more gradual than what is shown. It is **strongly recommended** that additional profile drilling and/or geophysical evaluation be performed to refine the bedrock depths and delineations across the site prior to establishing final design post foundation embedment depths.

It is critical to understand that if actual bedrock contact depth is deeper than anticipated for that capacity area, the post foundations will have reduced capacity and will be categorized appropriately up to Capacity Area 4 (no bedrock contact).

Ultimate Uplift Capacity for W6x9 Steel Posts (kips)				
Embedment (ft)	**Capacity Area 1** Bedrock Contact 2 feet or shallower	**Capacity Area 2** Bedrock Contact between 2 and 4-1/2 feet	**Capacity Area 3** Bedrock Contact between 4-1/2 and 6 feet	**Capacity Area 4** Bedrock Contact 6 feet or deeper
3	1.2	--	--	--
4	2.5	1.5	1.5	1.5
5	3.7	2.7	2.2	2.2
6	5.0	4.0	3.0	3.0
7	6.2	5.2	4.2	3.7
> 8	7.5	6.5	5.5	4.5

The presented design ultimate uplift capacities assume that no capacity is provided by the upper 2 feet of soil. This assumption is intended to model the potential condition where shrinkage of the soil surrounding the post occurs and the post has no direct contact with the upper 2 feet of native clay soil.

The incremental ultimate capacities are estimated based on observations and test data at soil boring, test pit and test post locations, and are intended for preliminary planning purposes only. The presented uplift capacities are, as noted, ultimate capacities of W6x9 steel posts that do not include any calculated factor of safety reduction. Given the increased confidence in the data obtained by direct static load tests, a relatively low factor of safety of 1.33 may be used in determining design capacities.

Driven Post Lateral Capacity

The following table presents summaries of the ultimate lateral loads measured at the indicated deflections:

		Lateral Load (lbs)			
Post No.	**Post Embedment Depth (feet)**	**Load @ 0.25-inch Deflection**	**Load @ 0.5-inch Deflection**	**Load @ 1.0-inch Deflection**	**Maximum Recorded Load**
TP-1A	2	490	830	1,320	1,346 @ 1.03 in.
TP-1B	4-1/4	1,940	2,360	3,010	3,037 @ 1.02 in.
TP-2A	4	2,740	3,380	3,990	4,008 @ 1.01 in.
TP-2B	6	3,180	4,680	6,100	6,209 @ 1.04 in.
TP-3A	2-1/2	1,530	2,320	3,550	3,610 @ 1.02 in.
TP-3B	3	1,570	2,830	4,050	4,050 @ 1.00 in.
TP-4A	4	2,580	3,620	4,410	4,426 @ 1.01 in.
TP-4B	5-1/4	3,020	4,740	6,750	6,789 @ 1.01 in.
TP-5A	5	2,970	5,370	8,560	8,614 @ 1.01 in.
TP-5B	7	3,000	5,410	8,910	8,942 @ 1.01 in.
TP-6A	4	3,210	4,430	5,880	5,915 @ 1.02 in.
TP-6B	5-1/2	3,790	6,290	>10,000	10,088 @ 0.88 in.
TP-7A	4	2,190	3,330	3,870	3,876 @ 1.01 in.
TP-7B	6	3,730	5,410	7,710	7,793 @ 1.02 in.
TP-8A	6	4,410	6,980	>10,000	10,053 @ 0.89 in.
TP-8B	8	4,840	7,450	>10,000	10,000 @ 0.73 in.
TP-9A	2-1/4	580	1,040	1,950	2,019 @ 1.04 in.
TP-9B	3	2,030	2,920	3,280	3,331 @ 1.09 in.
TP-10A	3	2,650	3,290	4,140	4,182 @ 1.02 in.
TP-10B	4-1/4	3,320	5,320	7,020	7,052 @ 1.01 in.
TP-11A	5-1/2	4,120	5,650	7,280	7,425 @ 1.05 in.
TP-11B	8	3,690	6,000	9,350	9,442 @ 1.01 in.
TP-12A	2-1/2	1,040	1,600	2,270	2,315 @ 1.03 in.
TP-12B	4-1/2	2,850	3,790	4,670	4,715 @ 1.03 in.
TP-13A	3-1/2	2,120	2,570	3,410	3,421 @ 1.00 in.
TP-13B	4-1/4	2,330	3,680	4,900	4,997 @ 1.04 in.
PD-1	4-1/2	>10,000	n/a	n/a	10,340 @ 0.25 in.
PD-2	6	2,240	3,400	5,440	5,468 @ 1.01 in.
PD-3	3-1/2	9,770	>10,000	n/a	10,200 @ 0.26 in
PD-4	8	2,720	5,120	8,510	8,514 @ 1.00 in.
PD-5	5	3,630	5,690	>10,000	10,173 @ 0.96 in.
PD-6	5	4,100	7,690	>10,000	10,063 @ 0.64 in.

Note: Lateral Load Acceptance Criteria is 0.50-inch deflection.

LPILE analyses were performed using LPILE Plus (version 2016.9.10) to “reverse model” the observed deflections at the applied lateral loads. Stiff Clay without Free Water, Sand (Reese) and Weak Rock soil models were assumed based on the observed soil conditions at each test location. The appropriate soil parameters, including cohesion, E50, friction angle, soil modulus, initial modulus of rock, uniaxial compressive strength, rock quality designation, strain factor, and soil effective unit weight were adjusted until 1/4 or 1/2 inch of deflection was approximated at the actual applied lateral load observed in the field for 1/4 or 1/2 inch of deflection. The 1/4-inch deflection model was used for PD-1 and PD-3 because actual test deflection for the piles were below 1/2-inch deflection at the maximum test load.

The detailed LPILE analyses for each of the lateral load tests are presented in Appendix A. The resulting modeled soil parameters based on the actual deflections and load conditions are presented in the following table:

Post No.	Modeled LPILE Parameters @ 1/2-inch Deflection										
	Depth (ft)		LPILE Soil Type	Phi (deg)	k (pci)	Cohesion (psf)	ε_{50} / Strain Factor	Uniaxial Compressive Strength (psi)	Initial Modulus of Rock Mass (psi)	RQD (%)	Unit Weight (pcf)
	From	To									
TP-1A	0	1/2	Stiff Clay	--	--	1,250	0.0082	--	--	--	115
	1/2	2	Stiff Clay	--	--	1,500	0.0076	--	--	--	125
TP-1B	0	1/2	Stiff Clay	--	--	1,250	0.0089	--	--	--	115
	1/2	3	Stiff Clay	--	--	1,250	0.0084	--	--	--	125
	3	4-1/4	Stiff Clay	--	--	2,000	0.0070	--	--	--	125
TP-2A	0	1/2	Stiff Clay	--	--	1,000	0.0096	--	--	--	115
	1/2	4	Stiff Clay	--	--	2,350	0.0071	--	--	--	125
TP-2B	0	1/2	Stiff Clay	--	--	500	0.0200	--	--	--	115
	1/2	5	Stiff Clay	--	--	1,850	0.0077	--	--	--	125
	5	6	Stiff Clay	--	--	2,750	0.0067	--	--	--	125
TP-3A	0	1/2	Stiff Clay	--	--	2,250	0.0072	--	--	--	115
	1/2	2-1/2	Stiff Clay	--	--	3,000	0.0064	--	--	--	125
TP-3B	0	1/2	Stiff Clay	--	--	2,000	0.0074	--	--	--	115
	1/2	2-3/4	Stiff Clay	--	--	2,000	0.0070	--	--	--	125
	2-3/4	3	Weak Rock	--	--	--	0.0005	500	100,000	0	150
TP-4A	0	1/2	Stiff Clay	--	--	1,000	0.0100	--	--	--	115
	1/2	4	Stiff Clay	--	--	2,500	0.0066	--	--	--	125
TP-4B	0	1/2	Stiff Clay	--	--	750	0.0120	--	--	--	115
	1/2	5-1/4	Stiff Clay	--	--	2,250	0.0065	--	--	--	125
TP-5A	0	1/2	Stiff Clay	--	--	1,400	0.0086	--	--	--	115
	1/2	4-1/2	Stiff Clay	--	--	2,000	0.0069	--	--	--	125
	4-1/2	5	Weak Rock			--	0.0005	500	100,000	0	150
TP-5B	0	1/2	Stiff Clay	--	--	1,000	0.0100	--	--	--	115
	1/2	4-1/2	Stiff Clay	--	--	1,700	0.0088	--	--	--	125
	4-1/2	7	Weak Rock	--	--	--	0.0005	500	100,000	0	150
TP-6A	0	1	Stiff Clay	--	--	1,500	0.0085	--	--	--	115
	1	4	Stiff Clay	--	--	3,500	0.0058	--	--	--	125
TP-6B	0	1	Stiff Clay	--	--	1,250	0.0092	--	--	--	115
	1	5-1/4	Stiff Clay	--	--	2,700	0.0077	--	--	--	125
	5-1/4	5-1/2	Weak Rock	--	--	--	0.0005	500	100,000	0	150
TP-7A	0	1	Stiff Clay	--	--	1,000	0.0094	--	--	--	115
	1	4	Stiff Clay	--	--	2,750	0.0062	--	--	--	125
TP-7B	0	1	Stiff Clay	--	--	1,000	0.0100	--	--	--	115
	1	5-1/2	Stiff Clay	--	--	1,950	0.0073	--	--	--	125

	5-1/2	6	Weak Rock	--	--	--	0.0005	500	100,000	0	150
TP-8A	0	1/2	Stiff Clay	--	--	750	0.0164	--	--	--	115
	1/2	6	Stiff Clay	--	--	3,000	0.0064	--	--	--	125
TP-8B	0	1/2	Stiff Clay	--	--	1,000	0.0125	--	--	--	115
	1/2	8	Stiff Clay	--	--	3,000	0.0064	--	--	--	125
TP-9A (offset)	0	1/2	Stiff Clay	--	--	750	0.0160	--	--	--	115
	1/2	2-1/4	Stiff Clay	--	--	2,000	0.0072	--	--	--	125
TP-9B	0	1/2	Stiff Clay	--	--	1,000	0.0105	--	--	--	115
	1/2	2-3/4	Stiff Clay	--	--	2,500	0.0067	--	--	--	125
	2-3/4	3	Weak Rock	--	--	--	0.0005	500	100,000	0	150
TP-10A	0	1/2	Stiff Clay	--	--	1,500	0.0084	--	--	--	115
	1/2	3	Stiff Clay	--	--	3,500	0.0055	--	--	--	125
TP-10B	0	1/2	Stiff Clay	--	--	1,500	0.0083	--	--	--	115
	1/2	4	Stiff Clay	--	--	2,600	0.0065	--	--	--	125
	4	4-1/4	Weak Rock	--	--	--	0.0005	500	100,000	0	150
TP-11A	0	1	Stiff Clay	--	--	1,000	0.0116	--	--	--	115
	1	5-1/2	Stiff Clay	--	--	3,000	0.0068	--	--	--	125
TP-11B	0	1	Stiff Clay	--	--	750	0.0156	--	--	--	115
	1	8	Stiff Clay	--	--	2,600	0.0067	--	--	--	125
TP-12A (offset)	0	1/2	Stiff Clay	--	--	1,400	0.0086	--	--	--	115
	1/2	2-1/4	Stiff Clay	--	--	2,000	0.0069	--	--	--	125
	2-1/4	2-1/2	Weak Rock			--	0.0005	500	100,000	0	150
TP-12B	0	1/2	Stiff Clay	--	--	1,000	0.0128	--	--	--	115
	1/2	4-1/4	Stiff Clay	--	--	1,700	0.0084	--	--	--	125
	4-1/4	4-1/2	Weak Rock	--	--	--	0.0005	500	100,000	0	150
TP-13A	0	1/2	Stiff Clay	--	--	750	0.0125	--	--	--	115
	1/2	3-1/2	Stiff Clay	--	--	2,250	0.0065	--	--	--	125
TP-13B	0	1/2	Stiff Clay	--	--	1,250	0.0100	--	--	--	115
	1/2	4-1/4	Stiff Clay	--	--	2,250	0.0067	--	--	--	125
PD-1	0	1/2	Sand (fill)	31	65	--	--	--	--	--	115
	1/2	2	Stiff Clay	--	--	5,750	0.0041	--	--	--	125
	2	4-1/2	Weak Rock	--	--	--	0.0001	500	100,000	0	150
PD-2	0	1	Sand (fill)	31	65	--	--	--	--	--	115
	1	4	Stiff Clay	--	--	550	0.0190	--	--	--	125
	4	6	Weak Rock	--	--	--	0.0005	150	100,000	0	150
PD-3	0	1-1/4	Sand (fill)	31	65	--	--	--	--	--	115
	1-1/4	3-1/2	Weak Rock	--	--	--	0.0004	150	100,000	0	150
PD-4	0	1	Sand (fill)	33	120	--	--	--	--	--	120
	1	6	Stiff Clay	--	--	2,700	0.0067	--	--	--	125
	6	8	Weak Rock	--	--	--	0.0005	150	100,000	0	150
PD-5	0	1	Sand (fill)	31	65	--	--	--	--	--	115
	1	3-1/2	Stiff Clay	--	--	1,600	0.0080	--	--	--	125
	3-1/2	5	Weak Rock	--	--	--	0.0005	500	100,000	0	150

PD-6	0	1	Sand (fill)	32	83	--	--	--	--	--	115
	1	3-1/2	Stiff Clay	--	--	4,500	0.0048	--	--	--	125
	3-1/2	5	Weak Rock	--	--	--	0.0005	500	100,000	0	150

The modeled LPILE soil parameters were then used to calculate the modeled deflections for comparison with actual deflections observed during field testing. The modeled deflections and actual deflections were compared to determine relative model concurrence and appropriateness of the selected design parameters as follows:

		0.25-inch Deflection Model		
Post No.	**Post Embedment Depth (ft)**	**Actual Load @ 0.10-inch Deflection (lbs)**	**Modeled Deflection @ Actual Load (in)**	**Relative Model Concurrence**
PD-1	4-1/2	4,700	0.08	Excellent
PD-3	3-1/2	4,500	0.08	Excellent

		0.5-inch Deflection Model				
Post No.	**Post Embedment Depth (ft)**	**Actual Load @ 0.25-inch Deflection (lbs)**	**Modeled Deflection @ Actual Load (in)**	**Actual Load @ 1-inch or Maximum Deflection**	**Modeled Deflection @ Actual Load (in)**	**Relative Model Concurrence**
PD-2	6	2,240	0.29	5,440 @ 1.00	1.12	Good
PD-4	8	2,720	0.17	8,510 @ 1.00	1.24	Good
PD-5	5	3,630	0.28	10,173 @ 0.96	1.15	Good
PD-6	5	4,100	0.20	10,063 @ 0.64	0.74	Good
TP-1A	2	490	0.06	1,320 @ 1.00	>10.00	Poor
TP-1B	4-1/2	1,940	0.24	3,010 @ 1.00	1.28	Good
TP-2A	4	2,740	0.23	3,990 @ 1.00	0.94	Excellent
TP-2B	6	3,180	0.19	6,100 @ 1.00	1.17	Good
TP-3A	2-1/2	1,530	0.10	3,550 @ 1.00	>10.00	Poor
TP-3B	3	1,570	0.06	4,050 @ 1.00	6.58	Poor
TP-4A	4	2,580	0.15	4,410 @ 1.00	1.06	Good
TP-4B	5-1/4	3,020	0.13	6,750 @ 1.00	1.89	Fair
TP-5A	5	2,970	0.12	8,560 @ 1.00	>10.00	Poor
TP-5B	7	3,000	0.17	8,910 @ 1.00	1.16	Good
TP-6A	4	3,210	0.16	5,880 @ 1.00	1.45	Fair
TP-6B	5-1/2	3,790	0.18	10,088 @ 0.88	2.65	Poor
TP-7A	4	2,190	0.11	3,870 @ 1.00	0.88	Fair
TP-7B	6	3,730	0.24	7,710 @ 1.00	1.26	Good
TP-8A	6	4,410	0.19	10,053 @ 0.89	1.50	Fair
TP-8B	8	4,840	0.22	10,000 @ 0.73	0.87	Good
TP-9A	2-1/4	580	0.05	1,950 @ 1.00	>10.00	Poor
TP-9B	3	2,030	0.13	3,280 @ 1.00	0.79	Fair
TP-10A	3	2,650	0.22	4,140 @ 1.00	1.23	Good
TP-10B	4-1/4	3,320	0.12	7,020 @ 1. 00	1.38	Fair
TP-11A	5-1/2	4,120	0.22	7,280 @ 1.00	1.13	Good
TP-11B	8	3,690	0.21	9,350 @ 1.00	1.14	Good
TP-12A	2-1/2	1,040	0.09	2,270 @ 1.00	2.25	Poor
TP-12B	4-1/2	2,850	0.20	4,670 @ 1.00	1.06	Good
TP-13A	3-1/2	2,120	0.24	3,410 @ 1.00	1.52	Fair
TP-13B	4-1/4	2,330	0.10	4,900 @ 1.00	1.49	Fair

Given the varying elevation of limestone bedrock present throughout the project site, we recommend the use of four (4) sets of composite LPILE soil parameters for use in design evaluation of the lateral capacity of driven steel posts with a maximum embedment depth of 8 feet. Plate No. 3, Capacity Area Plan, provides a pictorial that delineates the approximate limits of the four "Capacity Areas" relevant to the surrounding bedrock elevation. The transition between capacity areas may be more gradual than what is shown. It is critical to understand that if actual bedrock contact depth is deeper than anticipated for that capacity area, the post foundations will have reduced capacity and will be categorized accordingly up to Capacity Area 4 (no bedrock contact).

In the vicinity of test post location PD-3 and boring B-1 (Capacity Area 1), we recommend the use of the following composite LPILE soil parameters:

Location	Depth (ft)	LPILE Soil Type	Phi (deg)	k (pci)	Cohesion (psf)	ε_{50} / Strain Factor	Uniaxial Compressive Strength (psi)	Initial Modulus of Rock Mass (psi)	RQD (%)	Unit Weight (pcf)
Capacity Area 1	0 to 2	Stiff Clay w/o FW	--	--	500	0.0200	--	--	--	115
	2 to 8	Weak Rock	--	--	--	0.0005	150	100,000	0	150

In the vicinity of test post locations TP-3, TP-5, TP-9, TP-10, TP-12, TP-13, PD-1, PD-2, PD-5 and PD-6, and borings B-8, B-16 and B-20 (Capacity Area 2), we recommend the use of the following composite LPILE soil parameters:

Location	Depth (ft)	LPILE Soil Type	Phi (deg)	k (pci)	Cohesion (psf)	ε_{50} / Strain Factor	Uniaxial Compressive Strength (psi)	Initial Modulus of Rock Mass (psi)	RQD (%)	Unit Weight (pcf)
Capacity Area 2	0 to 2	Stiff Clay w/o FW	--	--	500	0.0200	--	--	--	115
	2 to 4	Stiff Clay w/o FW	--	--	2,500	0.0065	--	--	--	125
	4 to 8	Weak Rock	--	--	--	0.0005	500	100,000	0	150

In the vicinity of test post locations TP-1, TP-4, TP-6 and TP-7 and boring borings B-17 and B-19 (Capacity Area 3), we recommend the use of the following composite LPILE soil parameters:

Location	Depth (ft)	LPILE Soil Type	Phi (deg)	k (pci)	Cohesion (psf)	ε_{50} / Strain Factor	Uniaxial Compressive Strength (psi)	Initial Modulus of Rock Mass (psi)	RQD (%)	Unit Weight (pcf)
Capacity Area 3	0 to 2	Stiff Clay w/o FW	--	--	500	0.0200	--	--	--	115
	2 to 6	Stiff Clay w/o FW	--	--	2,500	0.0065	--	--	--	125
	6 to 8	Weak Rock	--	--	--	0.0005	500	100,000	0	150

In the vicinity of test post locations TP-2, TP-8, TP-11 and PD-4 and borings B-2 through B-4, B-6, B-9 through B-12, B-15 and B-18 (Capacity Area 4), we recommend the use of the following composite LPILE soil parameters:

Location	Depth (ft)	LPILE Soil Type	Phi (deg)	k (pci)	Cohesion (psf)	ε_{50} / Strain Factor	Uniaxial Compressive Strength (psi)	Initial Modulus of Rock Mass (psi)	RQD (%)	Unit Weight (pcf)
Capacity Area 4	0 to 2	Stiff Clay w/o FW	--	--	500	0.0200	--	--	--	115
	2 to 8	Stiff Clay w/o FW	--	--	2,500	0.0065	--	--	--	125

LPILE analyses were again performed using the composite soil parameters presented above for the relevant capacity areas. No axial load was applied in LPILE when performing the lateral capacity analyses. The LPILE analyses were also performed with an assumed cyclic loading frequency of 1,000 cycles. The calculated lateral capacities, based on an allowable deflection of 1/2 inch with the load applied 3 inches above ground surface, are presented below at various embedment lengths:

Ultimate Lateral Capacity for W6x9 Steel Posts (kips)				
Embedment (ft)	**Capacity Area 1**	**Capacity Area 2**	**Capacity Area 3**	**Capacity Area 4**
3	1.9*	--	--	--
4	7.3**	--	--	--
5	--	4.3*	2.0	2.0
6	--	4.7**	2.9	2.9
7	--	--	3.8*	3.5
> 8	--	--	3.8**	3.8

Note:* = post embedded 1-foot into bedrock.
**= post embedded 2-feet into bedrock.

The detailed LPILE analyses of the composite soil profiles are attached at the end of Appendix A. The presented lateral capacities are, as noted, ultimate capacities of W6x9 steel posts that do not include any calculated factor of safety reduction. Since the capacities were derived from direct static load tests and are limited by the indicated deflection criteria, no additional factor of safety needs to be applied in determining the design lateral capacities of the posts.

Concrete Drilled Pier Foundations

Based on the estimated loads and encountered subsurface conditions in the vicinity of the proposed substation and Gen-Tie, we recommend any proposed power distribution monopoles at the substation and along the Gen-Tie be supported on drilled cast-in-place concrete pier foundations extending through the native clay soils and bearing on or within the underlying weathered limestone bedrock. We recommend a net allowable soil bearing pressure of 15,000 pounds per square foot (psf) may be used for design of foundations bearing on the weathered limestone. Drilled pier foundations must extend to a minimum depth of 2 feet below finished grade elevations for protection against frost penetration.

Drilled pier foundations should be at least 18 inches in diameter. Adjacent piers should be spaced at least 3 pier diameters on center to prevent group interaction and bearing capacity reduction. Adjacent piers at different levels should be designed and constructed so the least lateral distance between them is equivalent to or more than the difference in their bearing levels. The upper 2 feet of soil below ground surface should be ignored in determining pier and pile vertical and lateral capacities to account for the effects of seasonal moisture variations and resultant soil shrinkage and swelling, disturbance during construction, and cyclic lateral loading.

We anticipate the shallow drilled piers may be augured neat within the cohesive soils. Once the drilled pier excavations have been completed to the design bearing depth, any standing water at the bottom of the excavation should be pumped dry, reinforcing steel should be set, and concrete placed. We recommend using a concrete mix design with a slump of 5 to 7 inches for free fall placement to reduce the potential for concrete arching and provide a workable material. We recommend using a temporary form, such as a Sonotube®, to form the top portion of the drilled pier. The use of this top form is a beneficial aid to the correct placement and orientation of the anchor bolts.

The uplift capacities of various pier sizes may be determined based on the proportional surface area of the pier. The presented capacities are based on the strength of the soils and weight of the concrete pier or concrete filled pipe pile; the actual pier or pile capacities may be limited to lower values based on the pier or pile section properties. The presented downward capacities have been reduced to account for the estimated weight of the pier concrete or concrete filled pipe pile. The presented upward capacities have been increased to account for the estimated weight of the pier concrete or concrete filled pipe pile. The recommended capacities may be increased by a factor of 1/3 when considering temporary wind and seismic load conditions. The following tables present net allowable design vertical upward and downward capacities in the vicinity of the proposed substation and Gen-Tie for four possible drilled concrete pier or steel pile diameters based on a factor of safety (FS) of 3:

Pier or Pile Diameter	Concrete Pier or Steel Pile Bearing on Limestone Bedrock, Downward Capacity (kips)
1-1/2 feet	22
2 feet	40
2-1/2 feet	62
3 feet	90

Depth	Concrete Pier Upward Capacity (kips)				Steel Pile Upward Capacity (kips)			
	1.5-foot Diam.	2-foot Diam.	2.5-foot Diam.	3-foot Diam.	1.5-foot Diam.	2-foot Diam.	2.5-foot Diam.	3-foot Diam.
4 feet	4	6	8	10	3	5	7	9
6 feet	8	11	14	18	6	9	12	15
8 feet	11	16	21	26	9	13	17	22
10 feet	15	21	27	34	12	17	22	29
15 feet	23	33	43	55	19	27	36	45
20 feet	32	45	59	75	26	37	49	62

If the recommendations outlined in this report are adhered to, total and differential settlements for the completed structures should be within 1 inch and 1/2 inch, respectively. We expect settlements of these magnitudes are within tolerable limits for the type of structures proposed.

Shallow Concrete Foundations for Auxiliary Systems and Structures

Mat Foundations

Thickened monolithic concrete slabs or mat foundations for equipment pads and precast enclosures may be supported on a properly prepared subgrade as recommended in the Earthwork section of this report. Mat foundations should bear at a minimum depth of 5 feet below the final adjacent grade. Mat foundations constructed on granular engineered fill may be designed using an average modulus of subgrade reaction (k_1) of up to 75 pounds per cubic inch (pci).

The recommended k_1 modulus values are based on an assumed 1-foot square plate loading surface. For determination of the allowable subgrade modulus values (k_s) for actual mat foundation dimensions of mats bearing on sand soils, we recommend the use of the following relationship:

$$k_s = k_1[(B+1)/2B]^2$$

where B equals the least mat foundation width.

Spread Footing Foundations

Shallow spread footing foundations bearing on the native undisturbed clay soils or any of the recommended engineered fill types may be designed based on a net allowable soil bearing pressure of 2,500 psf. Spread footing foundations bearing on native weathered limestone bedrock may be designed based on a net allowable soil bearing pressure of 15,000 psf.

Exterior footings should bear at a minimum depth of 2 feet below finished grade for protection against frost heave. Interior foundations can bear at shallower depths provided foundations are protected from frost during construction. Continuous wall or strip foundations should be at least 16 inches in width and isolated column spread foundations should be at least 30 inches in their least dimension. We recommend all foundations be suitably reinforced to minimize the effects of differential settlements associated with local variations in subgrade conditions. If the recommendations outlined in this report are adhered to, total settlement of individual spread footing foundations and differential settlement between adjacent spread footing foundations should be less than 1 inch and 1/2 inch, respectively.

Lateral Earth Pressures

Lateral loads on shallow spread footing and mat foundations may be resisted by the combined passive resistance of the adjacent soils and the soil frictional resistance beneath the foundations. The allowable passive resistance of undisturbed native soils or engineered fill may be assumed to be equal to the pressure developed by a fluid with a density of 250 pounds per cubic foot (pcf) up to a maximum of 2,500 psf.

An allowable frictional resistance factor of 0.4 may be used along the bottoms of shallow spread footing or mat foundations. A one-third increase in the passive resistance values may be used for temporary wind or seismic loads. Uplift loads on spread footing foundations may be resisted by the foundation concrete weight plus the weight of the soil backfill placed over the spread footing foundation.

Access and Maintenance Roads

General

We understand that permanent access roads will be aggregate surfaced. We also understand that it is desired to allow permanent maintenance roads to consist of prepared native subgrade soils where possible. It is expected that the most severe traffic conditions will occur during the construction phase, including heavy construction equipment and construction material delivery vehicles. After construction, site traffic is expected to consist of lighter-duty service trucks.

Following completion of site and subgrade preparation operations as described in the Earthwork section of this report, the exposed subgrade will primarily consist of engineered fill or native lean to fat clay. During and following precipitation events, the native clay soils will become unstable. Under these conditions, any wheeled vehicle traffic will cause moderate to severe disturbance to the native soils, resulting in rutting and difficult passage for construction or service vehicles.

Temporary Construction Roads

If feasible, construction traffic should be limited to light-duty equipment and vehicles during and for a few days following precipitation events to minimize disturbance of the native subgrade soils. Where subgrade disturbance or rutting is experienced and continued construction traffic is expected, we recommend subgrade stabilization be performed to provide improved support for construction traffic.

Where ruts develop that are less than 2 inches deep, we recommend subgrade stabilization consist of placing a minimum 6-inch thick layer of 1-inch by 3-inch (1x3) crushed concrete or gravel over the exposed subgrade. Where ruts develop that are between 2 and 4 inches deep, we recommend subgrade stabilization consist of placing a minimum 9-inch thick layer of 1x3 crushed concrete or gravel over the exposed subgrade. Where ruts develop that are greater than 4 inches deep, we recommend subgrade stabilization consist of placing a layer of triaxial geogrid over the exposed subgrade, plus placing a minimum 9-inch thick layer of 1x3 crushed concrete or gravel over the geogrid. The geogrid may consist of Tensar TriAx TRX160, or approved equal. For all cases, the crushed 1x3 should be compacted to a stable and unyielding condition using a minimum 15-ton roller compactor.

If rutting continues after subgrade stabilization, any resulting ruts should be infilled with additional 1x3 crushed concrete or gravel as needed until rutting ceases. It is recommended that a stockpile of 1x3 crushed concrete or gravel and triaxial geogrid be maintained on site during construction to allow for rapid response and repair of any developing instability.

Permanent Roads

We recommend the final construction of all permanent access and maintenance roads be delayed until after construction of all other development features. No specific design information regarding the frequency of post-construction vehicles was made available. For purposes of our evaluation, we have estimated 20-year traffic loads of 3,000 equivalent single-axle 18 kip loads (ESALs) for site access roads, and less than 1,000 ESALs for maintenance roads after construction is complete.

In accordance with AASHTO pavement design criteria for aggregate-surfaced roads, we have assumed an Allowable Serviceability Loss of 2.5 (ΔPSI), and an Elastic Modulus of Aggregate Base (E_{BS}) of 35,000 psi. The California Bearing Ratio (CBR) values of samples obtained from on-site soils were determined in accordance with the ASTM D1883 method of testing and are presented in Appendix A, Figure Nos. 137 and 138. The tested CBR values range from 3.3 to 6.5 at 95 percent compaction and 2.4 to 4.5 at 90 percent compaction. Based on these results, we recommend an effective CBR value of 3.5 for use in pavement design. A CBR value of 2.5 is approximately equivalent to a Resilient Modulus (M_R) of 4,000 psi.

We performed pavement design analyses for the proposed aggregate-surfaced roads in accordance with the AASHTO design procedures for aggregate-surfaced roads. Based on our analyses we recommend the following pavement section:

Access Roads	Thickness
Aggregate Pavement	
KTC Dense Graded Aggregate (DGB) or Crushed Stone Base (CSB)	6 inches

Maintenance roads consisting of properly prepared native subgrade soils will generally be acceptable; however, such roads will become unstable and slippery during and following precipitation events. It is recommended that more frequently traveled maintenance roads and any portion of maintenance roads that dip below the surrounding grade (low sections) be covered with a minimum of 4 inches of compacted aggregate base to minimize instability and allow consistent access.

Where prior construction phase subgrade stabilization was performed, the recommended aggregate base for permanent aggregate-surfaced roads may be placed directly over the 1x3 crushed concrete or gravel. Prior to placement of the aggregate base, the 1x3 surface should be graded level and re-compacted to an unyielding condition.

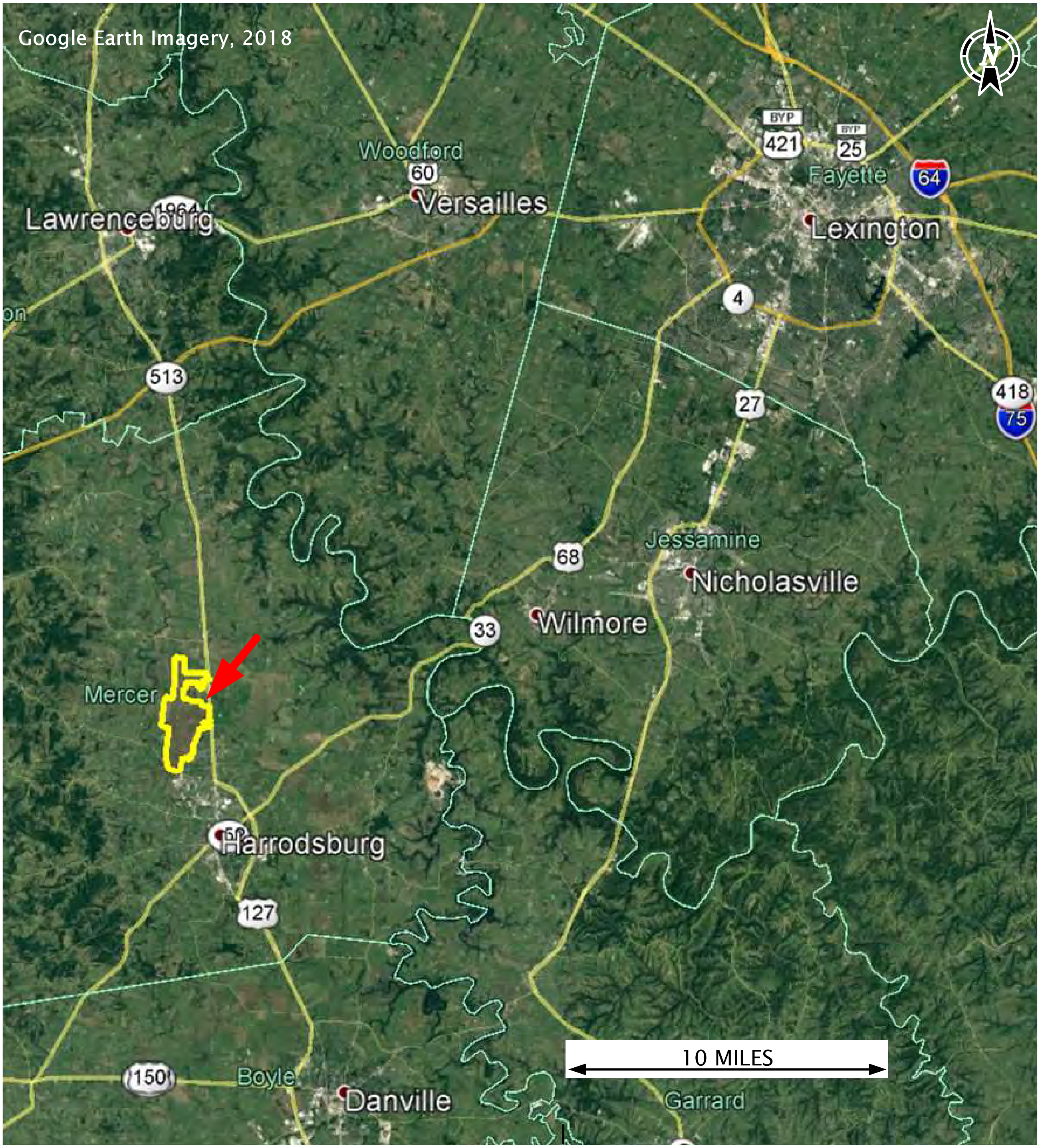
GENERAL COMMENTS

G2 has formulated the evaluations and recommendations presented in this report relative to site preparation and foundations on the basis of data provided to them relating to the location, type, and grade for the proposed site. Any significant change in this data should be brought to G2's attention for review and evaluation with respect to the prevailing subsurface conditions.

The scope of the present investigation was limited to evaluation of subsurface conditions for the support of the proposed structures and pavements and other related aspects of the development. No environmental or hydrogeological testing or analyses were included in the scope of this investigation. If changes occur in the design, location, or concept of the project, the conclusions and recommendations contained in this report are not valid unless G2 Consulting Group, LLC reviews the changes. G2 Consulting Group, LLC will then confirm the recommendations presented herein or make changes in writing.

G2 has based the analyses and recommendations submitted in this report upon the data from test pits and post load tests performed at the approximate locations shown on the Geotechnical Test Location Plan, Plate No. 2. This report does not reflect variations that may occur between the actual test locations and the actual structure locations. The nature and extent of any such variations may not become clear until the time of construction. If significant variations then become evident, it may be necessary for G2 to re-evaluate the report recommendations.

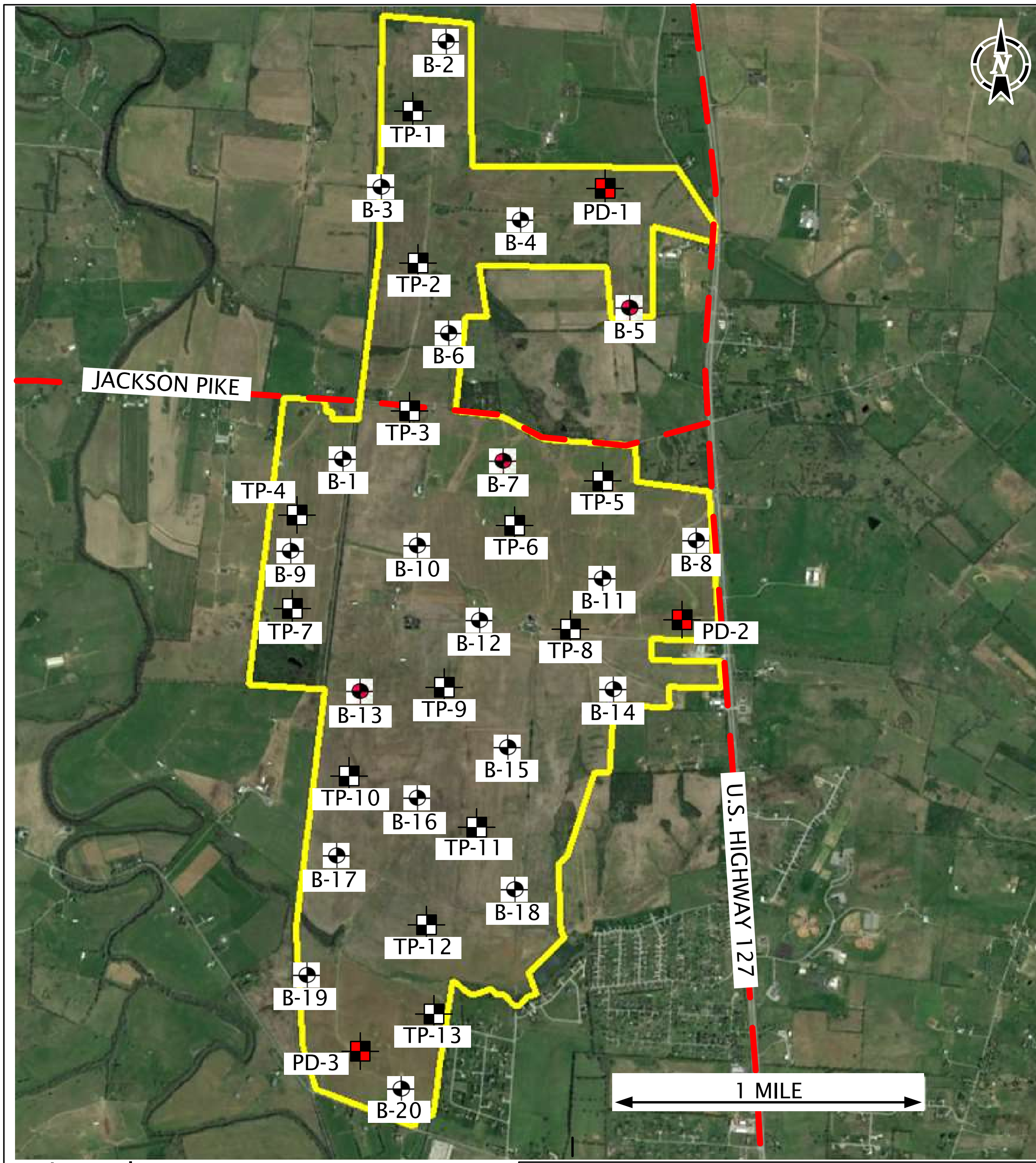
Soil conditions at the site could vary from those generalized on the basis of tests performed at specific locations. It is, therefore, recommended that G2 Consulting Group, LLC be retained to provide geotechnical engineering services during the site preparation, excavation, and foundation construction phases of the proposed project. This is to observe compliance with the design concepts, specifications, and recommendations. Also, this allows design changes to be made in the event that subsurface conditions differ from those anticipated prior to the start of construction.



Legend

Project Site Location

Site Vicinity Map		
West of U.S. Highway 127 (US-127) Disjoined by Jackson Pike Harrodsburg, Mercer County, Kentucky		
2G CONSULTING GROUP	Project No. 193508	
	Drawn by: JDC	
	Date: 12-15-19	Plate No. 1
	Scale: NTS	



Legend

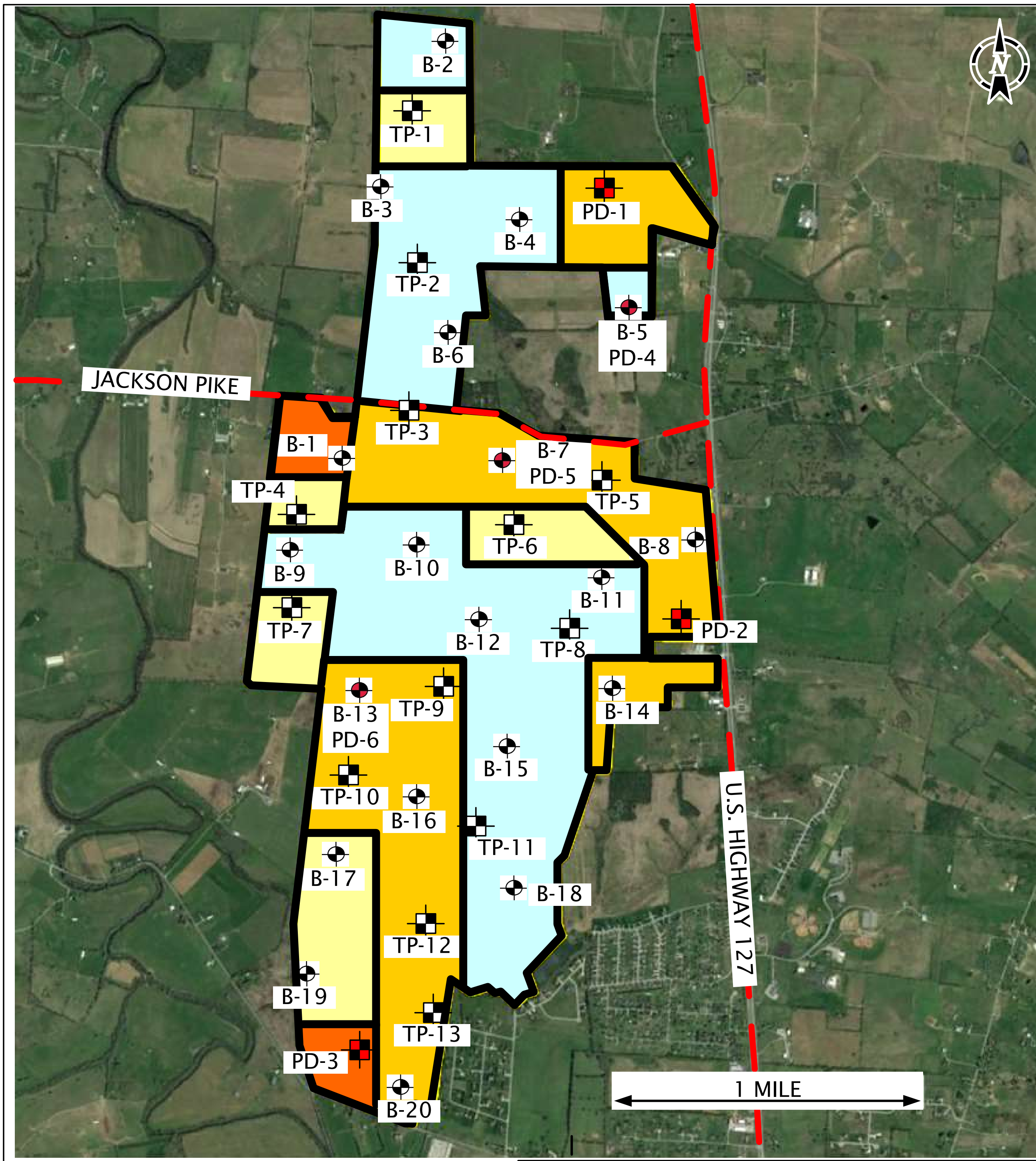
- Soil Borings performed by Strata Group, LLC on November 11 through 14, 2019
- Supplemental pile testing with pilot-hole performed by G2 Consulting Group, LLC on November 15 through 20, 2019
- Test pits and pile testing performed by G2 Consulting Group, LLC on November 15 through 20, 2019
- Pile testing with pilot-hole performed by G2 Consulting Group, LLC on November 15 through 20, 2019
- Approximate Project Site Boundary

Geotechnical Test Location Plan

West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 CONSULTING GROUP

Project No. 193508	
Drawn by: JDC	
Date: 12-15-19	Plate No. 2
Scale: NTS	



Generalized Capacity Area Nos. 1 through 4

1 Bedrock at 2 feet or shallower

2 Bedrock between 2 and 4-½ feet

3 Bedrock between 4-½ and 6 feet

4 Bedrock at 6 feet or deeper

The intent of Plate No. 3 is to provide a pictorial that delineates the approximate limits of the four "Capacity Areas" relevant to the surrounding bedrock elevation. The transition between capacity areas may be more gradual than what is shown.

Capacity Area Plan

West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

2G CONSULTING GROUP

Project No. 193508	
Drawn by: JDC	
Date: 12-15-19	Plate No. 3
Scale: NTS	

APPENDIX A

Geotechnical Data

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.82212° Longitude: -84.87150°

Soil Boring No. B-01

G2 CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 851.0 ft	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (6 inches)	0.5						
		Very Stiff Brown Lean Clay with trace sand and gravel	1.3	S-1	12 50/1"	---			5000*
846.0		Moderately Strong Gray Faintly Weathered Limestone Recovery = 80% RQD = 48% 1-1/2 to 6-1/2 feet Coring Rate: 0.08 to 0.10 in/sec	5 6.5	RC-2 5 feet					
841.0		Moderately Strong Gray Faintly Weathered Limestone Recovery: 100% RQD: 92% 6-1/2 to 11-1/2 feet Coring Rate: 0.10 to 0.12 in/sec	10 11.5	RC-3 5 feet				167	
836.0		End of Boring @ 11.5 ft	15						
831.0			20						
826.0			25						
821.0			30						

Total Depth: 11.5 ft
Drilling Date: November 13, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
0 to 1-1/2 feet: 4-inch diameter solid-stem auger
1-1/2 to 11-1/2 feet: 2-inch dia. core-barrel

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 1

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.84183° Longitude: -84.86532°

Soil Boring No. B-02

G2 CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 866.0 ft	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (5 inches) — 0.4							
		Very Stiff Mottled Brown and Gray Lean Clay with trace sand, gravel and organic matter (Organic Content = 2.9 to 3.3%) (LL=32, PI=11)		S-1	3 3 4	7	20.7		4500*
861.0		— 5.5	5	S-2	4 10 12	22	17.7	113	4850
		Hard Mottled Brown and Gray Lean Clay with trace sand and gravel — 8.3		S-3	5 10 11	21	17.2		9000*
		End of Boring @ 8.3 ft, Auger Refusal							
856.0			10						
851.0			15						
846.0			20						
841.0			25						
836.0			30						

Total Depth: 8.3 ft
Drilling Date: November 12, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
4-inch diameter solid-stem auger

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 2

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.83497° Longitude: -84.86917°

Soil Boring No. B-03

G2 CONSULTING GROUP

SUBSURFACE PROFILE / SOIL SAMPLE DATA

GROUND SURFACE ELEVATION: 818.0 ft

ELEV. (ft)	DEPTH (ft)	DESCRIPTION	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
	0.6	Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (7 inches)						
		Very Stiff to Hard Brown Fat Clay (Finer than No. 200 Sieve = 99.1%)	S-1	3 2 3	5	32.1		4500*
813.0	5		S-2	4 5 7	12			9000*
	8.5		S-3	4 7 8	15			9000*
		End of Boring @ 8.5 ft, Auger Refusal						
808.0	10							
803.0	15							
798.0	20							
793.0	25							
788.0	30							

Total Depth: 8.5 ft
Drilling Date: November 12, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
4-inch diameter solid-stem auger

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 3

SOIL / PAVEMENT BORING 193508.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 12/26/19

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.83340° Longitude: -84.86087°

Soil Boring No. B-04

G2 CONSULTING GROUP

SUBSURFACE PROFILE / SOIL SAMPLE DATA

GROUND SURFACE ELEVATION: 872.0 ft

ELEV. (ft)	DEPTH (ft)	DESCRIPTION	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
	0.3	Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (4 inches)						
	6.0	Stiff to Very Stiff Brown Lean Clay with trace sand, gravel and organic matter (Organic Content = 3.1 to 3.8%)	S-1	3 4 3	7	22.1		4000*
867.0	5		S-2	5 5 6	11	21.0	109	3740
	9.5	Hard Brown Lean Clay with trace sand and gravel	S-3	4 4 6	10	27.1		9000*
862.0	10		S-4	5 7 10	17	23.9		9000*
	13.8	Hard Mottled Brown and Gray Lean Clay with trace sand and gravel						
857.0	15							
	18.8	Moderately Strong Gray Faintly Weathered Limestone Recovery = 93% RQD = 60% Unconfined Compressive Strength = 18,000 psi 13-3/4 to 18-3/4 feet Coring Rate: 0.08 to 0.10 in/sec	RC-5 5 feet				160	
852.0	20	End of Boring @ 18.8 ft						
847.0	25							
842.0	30							

Total Depth: 18.8 ft
Drilling Date: November 13, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
0 to 13-3/4 feet: 4-inch diameter solid-stem auger
13-3/4 to 18-3/4 feet: 2-inch dia. core-barrel

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 4

SOIL / PAVEMENT BORING 193508.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 12/26/19

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.82924° Longitude: -84.85437°

Soil Boring No. B-05

G2 CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 865.0 ft	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (4 inches)	0.3						
		Stiff Brown Fat Clay with trace sand and gravel		S-1	4 4 4	8	30.4	95	2260
			4.3	S-2	50/1"	---			
860.0		End of Boring @ 4.3 ft, Auger Refusal	5						
855.0			10						
850.0			15						
845.0			20						
840.0			25						
835.0			30						

Total Depth: 4.3 ft
Drilling Date: November 12, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Water Level Observation:
Dry during and upon completion of drilling operations

Excavation Backfilling Procedure:
Auger Cuttings

Drilling Method:
4-inch diameter solid-stem auger

Figure No. 5

SOIL / PAVEMENT BORING 193508.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 12/26/19

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.82808° Longitude: -84.86518°

Soil Boring No. B-06

G2 CONSULTING GROUP

SUBSURFACE PROFILE / SOIL SAMPLE DATA

GROUND SURFACE ELEVATION: 858.0 ft

ELEV. (ft)	DEPTH (ft)	Description	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
	0.3	Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (4 inches)						
	4.0	Very Stiff Brown Fat Clay with trace sand and gravel	S-1	3 5 6	11	21.9		7500*
853.0	5		S-2	3 4 6	10	23.6		7500*
	8.3	Stiff to Very Stiff Mottled Brown and Gray Fat Clay with trace sand (LL=62, PI=36) (Finer than No. 200 Sieve = 97.8%)	S-3	3 4 5	9	25.3	106	3620
		End of Boring @ 8.3 ft, Auger Refusal						
848.0	10							
843.0	15							
838.0	20							
833.0	25							
828.0	30							

Total Depth: 8.3 ft
Drilling Date: November 12, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
4-inch diameter solid-stem auger

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 6

SOIL / PAVEMENT BORING 193508.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 12/26/19

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.82207° Longitude: -84.86181°

Soil Boring No. B-07

G2 CONSULTING GROUP

SUBSURFACE PROFILE / SOIL SAMPLE DATA

GROUND SURFACE ELEVATION: 879.0 ft

ELEV. (ft)	DESCRIPTION	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
	Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (7 inches)	0.6						
	Very Stiff Brown Fat Clay with trace sand and gravel	3.0	S-1	5 6 7	13	27.5	95	4600
	End of Boring @ 3 ft, Auger Refusal							
874.0		5						
869.0		10						
864.0		15						
859.0		20						
854.0		25						
849.0		30						

Total Depth: 3 ft
Drilling Date: November 11, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
4-inch diameter solid-stem auger

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 7

SOIL / PAVEMENT BORING 193508.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 12/26/19

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.81841° Longitude: -84.85048°

Soil Boring No. B-08

CONSULTING GROUP

SUBSURFACE PROFILE / SOIL SAMPLE DATA

GROUND SURFACE ELEVATION: 890.0 ft

ELEV. (ft)	DEPTH (ft)	DESCRIPTION	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
	0.3	Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (4 inches)						
		Very Stiff to Hard Brown Fat Clay with trace sand and gravel	S-1	4 4 7	11	30.6	92	4250
	4.3		S-2	50/1"	---			8500*
885.0	5	Moderately Strong Gray Faintly Weathered Limestone Recovery = 88% RQD = 30% Unconfined Compressive Strength = 13,100 psi 4-1/4 to 9-1/4 feet Coring Rate: 0.08 to 0.10 in/sec	RC-3 5 feet				166	
	9.3							
880.0	10	End of Boring @ 9.3 ft						
875.0	15							
870.0	20							
865.0	25							
860.0	30							

Total Depth: 9.3 ft
Drilling Date: November 13, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
0 to 4-1/4 feet: 4-inch diameter solid-stem auger
4-1/4 to 9-1/4 feet: 2-inch dia. core-barrel

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 8

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.81777° Longitude: -84.87469°

Soil Boring No. B-09

CONSULTING GROUP

SUBSURFACE PROFILE / SOIL SAMPLE DATA

GROUND SURFACE ELEVATION: 819.0 ft

ELEV. (ft)	DESCRIPTION	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
	Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (5 inches)	0.4						
	Very Stiff Brown Lean Clay with trace sand (LL=33, PI=15) (Finer than No. 200 Sieve = 89.3%)		S-1	3 4 3	7	23.1		4500*
814.0		5	S-2	4 5 7	12	20.8		6500*
		7.0						
	Stiff to Very Stiff Brown Fat Clay with trace sand and gravel, faint black staining		S-3	5 7 7	14	20.0		6500*
809.0		9.8 / 10	S-4	5 50/1"	---	33.9	91	3750
	End of Boring @ 9.8 ft, Auger Refusal							
804.0		15						
799.0		20						
794.0		25						
789.0		30						

Total Depth: 9.8 ft
Drilling Date: November 13, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
4-inch diameter solid-stem auger

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 9

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.81812° Longitude: -84.86702°

Soil Boring No. B-10

G2 CONSULTING GROUP

SUBSURFACE PROFILE / SOIL SAMPLE DATA

GROUND SURFACE ELEVATION: 836.0 ft

ELEV. (ft)	DESCRIPTION	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
	Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (5 inches)	0.4						
	Very Stiff Brown Fat Clay with trace sand and gravel	4.0	S-1	3 3 6	9	22.1		5000*
831.0	Stiff to Very Stiff Brown Fat Clay with trace sand and gravel, occasional limestone fragments	5	S-2	8 7 6	13			4500*
		8.0	S-3	3 5 13	18	34.8	87	3820
826.0	End of Boring @ 8 ft, Auger Refusal	10						
821.0		15						
816.0		20						
811.0		25						
806.0		30						

Total Depth: 8 ft
Drilling Date: November 11, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
4-inch diameter solid-stem auger

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 10

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.81657° Longitude: -84.85607°

Soil Boring No. B-11

G2 CONSULTING GROUP

SUBSURFACE PROFILE / SOIL SAMPLE DATA

GROUND SURFACE ELEVATION: 868.0 ft

ELEV. (ft)	DESCRIPTION	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
	Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (9 inches)	0.8						
	Very Stiff to Hard Brown Fat Clay with trace sand and gravel		S-1	3 2 4	6			4000*
863.0		5	S-2	3 4 4	8			5500*
		8.5	S-3	5 7 8	15			9000*
	End of Boring @ 8.5 ft, Auger Refusal							
858.0		10						
853.0		15						
848.0		20						
843.0		25						
838.0		30						

Total Depth: 8.5 ft
Drilling Date: November 11, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
4-inch diameter solid-stem auger

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 11

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.81458° Longitude: -84.86324°

Soil Boring No. B-12

G2 CONSULTING GROUP

SUBSURFACE PROFILE / SOIL SAMPLE DATA

GROUND SURFACE ELEVATION: 843.0 ft

ELEV. (ft)	DESCRIPTION	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
	Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (5 inches)	0.4						
	Medium Brown Fat Clay with trace sand and gravel	4.0	S-1	3 3 4	7	23.4	96	1670
838.0		5						
	Very Stiff Brown Fat Clay with trace sand and gravel	8.5	S-2	3 4 5	9			6500*
			S-3	3 4 5	9	41.2		6500*
833.0		10						
	Moderately Strong Gray Faintly Weathered Limestone Recovery = 82% RQD = 58% Unconfined Compressive Strength = 26,100 psi 8-1/2 to 13-1/2 feet Coring Rate: 0.09 to 0.11 in/sec	13.5	RC-4 5 feet				166	
828.0	End of Boring @ 13.5 ft	15						
823.0		20						
818.0		25						
813.0		30						

Total Depth: 13.5 ft
Drilling Date: November 12, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
0 to 8-1/2 feet: 4-inch diameter solid-stem auger
8-1/2 to 13-1/2 feet: 2-inch dia. core-barrel

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 12

SOIL / PAVEMENT BORING 193508.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 12/26/19

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.81122° Longitude: -84.87051°

Soil Boring No. B-13

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 853.0 ft	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (6 inches)	0.5						
		Very Stiff Brown Fat Clay with trace sand and gravel	2.0	S-1	13 50/1"	---	24.3		7500*
		End of Boring @ 2 ft, Auger Refusal							
848.0			5						
843.0			10						
838.0			15						
833.0			20						
828.0			25						
823.0			30						

Total Depth: 2 ft
Drilling Date: November 11, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
4-inch diameter solid-stem auger

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 13

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.81134˚ Longitude: -84.85532˚

Soil Boring No. B-14

G2 CONSULTING GROUP

SUBSURFACE PROFILE / SOIL SAMPLE DATA

GROUND SURFACE ELEVATION: 863.0 ft

ELEV. (ft)	DEPTH (ft)	DESCRIPTION	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
	0.5	Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (6 inches)						
	3.5	Stiff Mottled Brown and Gray Fat Clay with trace sand and gravel	S-1	3 3 3	6	25.0	100	2470
		End of Boring @ 3.5 ft, Auger Refusal						
858.0	5							
853.0	10							
848.0	15							
843.0	20							
838.0	25							
833.0	30							

Total Depth: 3.5 ft
Drilling Date: November 11, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
4-inch diameter solid-stem auger

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 14

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.80865° Longitude: -84.86158°

Soil Boring No. B-15

CONSULTING GROUP

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: 859.0 ft

ELEV. (ft)	DEPTH (ft)	DESCRIPTION
	0.6	Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (7 inches)
854.0	5	
		Stiff to Very Stiff Brown Lean Clay with trace sand and gravel
849.0	10	
	13.5	End of Boring @ 13.5 ft, Auger Refusal
844.0	15	
839.0	20	
834.0	25	
829.0	30	

SOIL SAMPLE DATA

SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
S-1	2 3 2	5	28.3		4500*
S-2	2 3 6	9	20.9	102	2010
S-3	2 3 1	4	20.2		6500*
S-4	0 0 2	2	21.0		3000*

Total Depth: 13.5 ft
Drilling Date: November 11, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
4-inch diameter solid-stem auger

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 15

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.80632° Longitude: -84.86706°

Soil Boring No. B-16

G2 CONSULTING GROUP

SUBSURFACE PROFILE / SOIL SAMPLE DATA

GROUND SURFACE ELEVATION: 862.0 ft

ELEV. (ft)	DESCRIPTION	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
	Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (4 inches)	0.3						
	Very Stiff Brown Lean Clay with trace sand and gravel		S-1	3 2 4	6	22.7		4500*
		4.3	S-2	50/2"	---			6500*
857.0	End of Boring @ 4.3 ft, Auger Refusal	5						
852.0		10						
847.0		15						
842.0		20						
837.0		25						
832.0		30						

Total Depth: 4.3 ft
Drilling Date: November 14, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
4-inch diameter solid-stem auger

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 16

Soil Boring No. B-17

CONSULTING GROUP

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.80352°   Longitude: -84.87190°

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: 846.0 ft

Depth to bottom (ft)	Description
0.4	Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (5 inches)
2.3	Stiff Brown Fat Clay with trace sand and gravel
5.5	Brown Fat Clay with trace sand and gravel, frequent limestone fragments
10.5	Strong Gray Slightly Weathered Limestone Recovery = 100% RQD = 77% Unconfined Compressive Strength = 18,860 psi 5-1/2 to 10-1/2 feet Coring Rate: 0.16 to 0.18 in/sec

End of Boring @ 10.5 ft

ELEV. (ft)	DEPTH (ft)
841.0	5
836.0	10
831.0	15
826.0	20
821.0	25
816.0	30

SOIL SAMPLE DATA

SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
S-1	4 50/2"	---	39.8	81	2450
RC-2 5 feet				166	

Total Depth: 10.5 ft
Drilling Date: November 11, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Water Level Observation:
Dry during and upon completion of drilling operations

Excavation Backfilling Procedure:
Auger Cuttings

Drilling Method:
0 to 5-1/2 feet: 4-inch diameter solid-stem auger

Figure No. 17

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.80190° Longitude: -84.86122°

Soil Boring No. B-18

G2 CONSULTING GROUP

SUBSURFACE PROFILE / SOIL SAMPLE DATA

GROUND SURFACE ELEVATION: 883.0 ft

ELEV. (ft)	DESCRIPTION	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
	Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (5 inches)	0.4						
			S-1	4 3 4	7	24.0		6500*
878.0		5	S-2	4 3 6	9	23.3	99	3730
			S-3	4 2 3	5	32.4		4500*
873.0	Stiff to Very Stiff Brown Fat Clay with trace sand and gravel	10	S-4	3 3 5	8	33.7		4000*
868.0		15	S-5	3 4 6	10	27.3		6000*
		19.5						
863.0	Brown Lean Clay with trace sand, frequent wet clayey sand layers (Finer than No. 200 Sieve = 95.2%)	20	S-6	1 0 1	1			
	End of Boring @ 20.5 ft	20.5						
858.0		25						
853.0		30						

Total Depth: 20.5 ft
Drilling Date: November 11, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
4-inch diameter solid-stem auger

Water Level Observation:
19-1/2 feet during and upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 18

SOIL / PAVEMENT BORING 193508.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 12/26/19

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.79787° Longitude: -84.87361°

Soil Boring No. B-19

G2 CONSULTING GROUP

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: 826.0 ft

ELEV. (ft)	DESCRIPTION	DEPTH (ft)
	Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (4 inches)	0.3
	Medium Brown Fat Clay with trace sand and gravel	4.0
821.0	Very Stiff Brown Fat Clay with trace sand and gravel, occasional sand seams	5 / 5.3
	End of Boring @ 5.3 ft, Auger Refusal	
816.0		10
811.0		15
806.0		20
801.0		25
796.0		30

SOIL SAMPLE DATA

SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
S-1	2 2 5	7	31.1	90	1330
S-2	4 4 50/1"	---			4500*

Total Depth: 5.3 ft
Drilling Date: November 11, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
4-inch diameter solid-stem auger

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 19

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.79241° Longitude: -84.86794°

Soil Boring No. B-20

CONSULTING GROUP

SUBSURFACE PROFILE / SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 869.0 ft	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (6 inches)	0.5						
		Very Stiff Brown Fat Clay with trace sand and gravel	2.8	S-1	3 4 50/3"	---	26.1	103	3070
864.0		Moderately Strong Gray Faintly Weathered Limestone Recovery = 89% RQD = 58% 2-3/4 to 7-3/4 feet Coring Rate: 0.08 to 0.10 in/sec	5 7.8	RC-2 5 feet				161	
859.0		End of Boring @ 7.8 ft, Auger Refusal	10						
854.0			15						
849.0			20						
844.0			25						
839.0			30						

Total Depth: 7.8 ft
Drilling Date: November 11, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
0 to 2-3/4 feet: 4-inch diameter solid-stem auger
2-3/4 to 7-3/4 feet: 2-inch dia. core-barrel

Water Level Observation:
Dry during and upon completion of drilling operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 20

SOIL / PAVEMENT BORING 193508.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 12/26/19

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.83506° Longitude: -84.85579°

Soil Boring No. PD-01

G2 CONSULTING GROUP

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: 881.0 ft

ELEV. (ft)	DEPTH (ft)	Description
	0.5	Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (6 inches)
	4.0	Brown Lean to Fat Clay with trace sand and gravel, frequent limestone fragments
876.0	5	
	8.0	Weathered Limestone
		End of Boring @ 8 ft
871.0	10	
866.0	15	
861.0	20	
856.0	25	
851.0	30	

SOIL SAMPLE DATA

SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)

Total Depth: 8 ft
Drilling Date: November 14, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
4-inch diameter air rotary drill

Water Level Observation:
Dry during and upon completion of excavation operations

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 21

SOIL / PAVEMENT BORING 193508.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 12/26/19

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.81468° Longitude: -84.85126°

Soil Boring No. PD-02

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 855.0 ft	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (6 inches)	0.5						
		Brown Lean to Fat Clay with trace sand and gravel, frequent limestone fragments	3.0						
850.0		Weathered Limestone	5 / 8.0						
845.0		End of Boring @ 8 ft	10						
840.0			15						
835.0			20						
830.0			25						
825.0			30						

Total Depth: 8 ft
Drilling Date: November 14, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
4-inch diameter air rotary drill

Water Level Observation:
Dry during and upon completion of excavation operations

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 22

SOIL / PAVEMENT BORING 193508.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 12/26/19

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.79432° Longitude: -84.87050°

Soil Boring No. PD-03

G2 CONSULTING GROUP

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: 873.0 ft

ELEV. (ft)	PRO-FILE	DESCRIPTION	DEPTH (ft)
		Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (4 inches)	0.3
868.0		Weathered Limestone	5
			8.0
863.0		End of Boring @ 8 ft	10
858.0			15
853.0			20
848.0			25
843.0			30

SOIL SAMPLE DATA

SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)

Total Depth: 8 ft
Drilling Date: November 14, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
4-inch diameter air rotary drill

Water Level Observation:
Dry during and upon completion of excavation operations

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 23

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.82924° Longitude: -87.85437°

Soil Boring No. PD-04

CONSULTING GROUP

SUBSURFACE PROFILE / SOIL SAMPLE DATA

GROUND SURFACE ELEVATION: 865.0 ft

ELEV. (ft)	DESCRIPTION	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
	Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (6 inches)	0.5						
	Brown Lean to Fat Clay with trace sand and gravel							
860.0		5						
		6.0						
	Weathered Limestone							
		8.0						
	End of Boring @ 8 ft							
855.0		10						
850.0		15						
845.0		20						
840.0		25						
835.0		30						

Total Depth: 8 ft
Drilling Date: November 14, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
4-inch diameter air rotary drill

Water Level Observation:
Dry during and upon completion of excavation operations

Notes:
PD-4 within 50 feet of soil boring B-5

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 24

SOIL / PAVEMENT BORING 193508.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 12/27/19

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.82207° Longitude: -87.86181°

Soil Boring No. PD-05

G2 CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 879.0 ft	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (6 inches)	0.5						
		Brown Lean to Fat Clay with trace sand and gravel	3.5						
874.0			5						
		Weathered Limestone	8.0						
		End of Boring @ 8 ft							
869.0			10						
864.0			15						
859.0			20						
854.0			25						
849.0			30						

Total Depth: 8 ft
Drilling Date: November 14, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
4-inch diameter air rotary drill

Water Level Observation:
Dry during and upon completion of excavation operations

Notes:
PD-5 within 50 feet of soil boring B-7

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 25

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.81122° Longitude: -84.87051°

Soil Boring No. PD-06

G2 CONSULTING GROUP

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: 853.0 ft

ELEV. (ft)	DEPTH (ft)	Description
	0.5	Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (6 inches)
	3.5	Brown Lean to Fat Clay with trace sand and gravel
848.0	5	
	8.0	Weathered Limestone
		End of Boring @ 8 ft
843.0	10	
838.0	15	
833.0	20	
828.0	25	
823.0	30	

SOIL SAMPLE DATA

SAMPLE TYPE-NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)

Total Depth: 8 ft
Drilling Date: November 14, 2019
Inspector: K. Crow
Contractor: Strata Group, LLC
Driller: Cody

Drilling Method:
4-inch diameter air rotary drill

Water Level Observation:
Dry during and upon completion of excavation operations

Notes:
PD-6 within 50 feet of soil boring B-13

Excavation Backfilling Procedure:
Auger Cuttings

Figure No. 26

SOIL / PAVEMENT BORING 193508.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 12/26/19

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.83833° Longitude: -84.86703°

2G CONSULTING GROUP

Test Pit No. TP-01

SUBSURFACE PROFILE / SOIL SAMPLE DATA

GROUND SURFACE ELEVATION: 841.0 ft

ELEV. (ft)	MATERIAL DESCRIPTION	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
	Tilled Earth: Stiff Dark Brown Lean to Fat Clay with trace sand (4 inches) (Organic Content = 6.5%) (Finer than No. 200 Sieve = 90.2%)	0.3	BS-1		32.3		2000*
	Stiff Brown Fat Clay with trace sand and gravel	3.0	BS-2		23.8		2000*
	Very Stiff Brown Fat Clay with trace sand and gravel	4.0	BS-3		24.9		4000*
836.0	Very Stiff Brown Fat Clay with trace sand and gravel, frequent limestone fragments	5.0	BS-4				4500*
	End of Test Pit @ 5 ft						
831.0		10					
826.0		15					
821.0		20					
816.0		25					
811.0		30					

Total Depth: 5 ft
Excavation Date: November 17, 2019
Inspector: K. Crow
Contractor: G2 Consulting Group, LLC
Operator: J. Crow

Excavation Equipment:
John Deere 310K Backhoe

Water Level Observation:
Dry during and upon completion of excavation operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated Soil

Figure No. 27

TEST PIT 193508.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 12/26/19

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.83145° Longitude: -84.86695°

Test Pit No. TP-02

2G CONSULTING GROUP

SUBSURFACE PROFILE / SOIL SAMPLE DATA

GROUND SURFACE ELEVATION: 873.0 ft

ELEV. (ft)	DESCRIPTION	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
	Tilled Earth: Very Stiff Dark Brown Lean to Fat Clay with trace sand (8 inches) (Organic Content = 4.4%)	0.7	BS-1				4500*
	Very Stiff Brown Fat Clay with trace sand and gravel						
868.0		5.0	BS-2		27.2		6000*
	Very Stiff Brown Fat Clay with trace sand and gravel, frequent limestone fragments (LL=53, PI=29)	6.0	BS-3		22.2		6500*
	End of Test Pit @ 6 ft						
863.0		10					
858.0		15					
853.0		20					
848.0		25					
843.0		30					

Total Depth: 6 ft
Excavation Date: November 17, 2019
Inspector: K. Crow
Contractor: G2 Consulting Group, LLC
Operator: J. Crow

Excavation Equipment:
John Deere 310K Backhoe

Water Level Observation:
Dry during and upon completion of excavation operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated Soil

Figure No. 28

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.82429° Longitude: -84.86747°

CONSULTING GROUP

Test Pit No. TP-03

SUBSURFACE PROFILE / SOIL SAMPLE DATA

GROUND SURFACE ELEVATION: 869.0 ft

ELEV. (ft)	DESCRIPTION	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
	Tilled Earth: Dark Brown Lean to Fat Clay with trace sand (8 inches)	0.7	BS-1				
	Very Stiff Brown Fat Clay with trace sand and gravel, occasional limestone fragments	2.0	BS-2				5000*
	Very Stiff Brown Fat Clay with trace sand and gravel, frequent limestone fragments	2.8	BS-3				6000*
864.0	End of Test Pit @ 2.8 ft	5					
859.0		10					
854.0		15					
849.0		20					
844.0		25					
839.0		30					

Total Depth: 2.8 ft
Excavation Date: November 16, 2019
Inspector: K. Crow
Contractor: G2 Consulting Group, LLC
Operator: J. Crow

Excavation Equipment:
John Deere 310K Backhoe

Water Level Observation:
Dry during and upon completion of excavation operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated Soil

Figure No. 29

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.81960° Longitude: -84.87423°

Test Pit No. TP-04

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA				
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 831.0 ft	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Stiff Dark Brown Lean to Fat Clay with trace sand (6 inches) (Organic Content = 6.1%)	0.5	BS-1		25.1		3500*
826.0		Very Stiff Brown Lean Clay with trace sand and gravel, frequent limestone fragments	5.3	BS-2		23.7		5000*
		End of Test Pit @ 5.3 ft	5					
821.0			10					
816.0			15					
811.0			20					
806.0			25					
801.0			30					

Total Depth: 5.3 ft
Excavation Date: November 17, 2019
Inspector: K. Crow
Contractor: G2 Consulting Group, LLC
Operator: J. Crow

Excavation Equipment:
John Deere 310K Backhoe

Water Level Observation:
Dry during and upon completion of excavation operations

Notes:
Rock outcrop present 350 feet north of TP-4
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated Soil

Figure No. 30

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.81913° Longitude: -84.86133°

Test Pit No. TP-05

CONSULTING GROUP

SUBSURFACE PROFILE					SOIL SAMPLE DATA				
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 862.0 ft		DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Very Stiff Dark Brown Lean to Fat Clay with trace sand (6 inches) (Organic Content = 4.4%)	0.5		BS-1				4500*
		Very Stiff Brown Fat Clay with trace sand and gravel	2.5		BS-2		24.4		5500*
		Very Stiff Brown Fat Clay with trace sand and gravel, frequent limestone fragments	4.5		BS-3		24.9		6500*
857.0		Very Weak Gray Completely Weathered Limestone	5.0	5	BS-4				
		End of Test Pit @ 5 ft							
852.0				10					
847.0				15					
842.0				20					
837.0				25					
832.0				30					

Total Depth: 5 ft
Excavation Date: November 16, 2019
Inspector: K. Crow
Contractor: G2 Consulting Group, LLC
Operator: J. Crow

Excavation Equipment:
John Deere 310K Backhoe

Water Level Observation:
Dry during and upon completion of excavation operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated Soil

Figure No. 31

TEST PIT 193508.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 12/26/19

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.81512° Longitude: -84.87457°

Test Pit No. TP-06

G2 CONSULTING GROUP

SUBSURFACE PROFILE / SOIL SAMPLE DATA

GROUND SURFACE ELEVATION: 855.0 ft

ELEV. (ft)	DESCRIPTION	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
	Tilled Earth: Very Stiff Dark Brown Lean to Fat Clay with trace sand (12 inches) (Organic Content = 7.5%)	1.0	BS-1				4500*
	Very Stiff Brown Fat Clay with trace sand and gravel	2.0	BS-2		31.5		6500*
850.0	Very Stiff Brown Fat Clay with trace sand and gravel, occasional limestone fragments (LL=77, PI=45)	5.3	BS-3		12.7		7500*
	Very Weak Gray Completely Weathered Limestone	5.5	BS-4				
	End of Test Pit @ 5.5 ft						

Elevation scale: 850.0, 845.0, 840.0, 835.0, 830.0, 825.0; Depth scale: 5, 10, 15, 20, 25, 30

Total Depth: 5.5 ft
Excavation Date: November 16, 2019
Inspector: K. Crow
Contractor: G2 Consulting Group, LLC
Operator: J. Crow

Excavation Equipment:
John Deere 310K Backhoe

Water Level Observation:
Dry during and upon completion of excavation operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated Soil

Figure No. 32

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.81412° Longitude: -84.85789°

Test Pit No. TP-07

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA				
ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 838.0 ft	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Very Stiff Dark Brown Lean to Fat Clay with trace sand (12 inches) (Organic Content = 5.8%) — 1.0		BS-1				5500*
		Very Stiff Brown Fat Clay with trace sand (Finer than No. 200 Sieve = 93.9%) — 3.5		BS-2		35.6		7000*
833.0		Very Stiff Brown Fat Clay with trace sand and gravel, frequent limestone fragments — 5.5	5	BS-3		35.1		7500*
		End of Test Pit @ 5.5 ft						
828.0			10					
823.0			15					
818.0			20					
813.0			25					
808.0			30					

Total Depth: 5.5 ft
Excavation Date: November 17, 2019
Inspector: K. Crow
Contractor: G2 Consulting Group, LLC
Operator: J. Crow

Excavation Equipment:
John Deere 310K Backhoe

Water Level Observation:
Dry during and upon completion of excavation operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated Soil

Figure No. 33

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.81039˚ Longitude: -84.86537˚

Test Pit No. TP-08

G2 CONSULTING GROUP

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: 852.0 ft

ELEV. (ft)	DEPTH (ft)	Description
	0.4	Tilled Earth: Very Stiff Dark Brown Lean to Fat Clay with trace sand (5 inches) (Organic Content = 5.3%)
	2.0	Very Stiff Brown Lean Clay with trace sand and gravel
847.0	5	
	8.0	Very Stiff Brown Fat Clay with trace sand and gravel, frequent limestone fragments
		End of Test Pit @ 8 ft
842.0	10	
837.0	15	
832.0	20	
827.0	25	
822.0	30	

SOIL SAMPLE DATA

SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
BS-1				5000*
BS-2		23.8		7500*
BS-3		36.9		7500*

Total Depth: 8 ft
Excavation Date: November 15, 2019
Inspector: K. Crow
Contractor: G2 Consulting Group, LLC
Operator: J. Crow

Excavation Equipment:
John Deere 310K Backhoe

Water Level Observation:
Dry during and upon completion of excavation operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated Soil

Figure No. 34

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.80730° Longitude: -84.87122°

Test Pit No. TP-09

G2 CONSULTING GROUP

SUBSURFACE PROFILE / SOIL SAMPLE DATA

ELEV. (ft)	PRO-FILE	GROUND SURFACE ELEVATION: 884.0 ft	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Tilled Earth: Very Stiff Dark Brown Lean to Fat Clay with trace sand (8 inches) (Organic Content = 5.1%)	0.7	BS-1				4000*
		Very Stiff Brown Fat Clay with trace sand and gravel	2.8	BS-2		28.9		4500*
		Very Weak Gray Completely Weathered Limestone	3.0	BS-3				
879.0		End of Test Pit @ 3 ft	5					
874.0			10					
869.0			15					
864.0			20					
859.0			25					
854.0			30					

Total Depth: 3 ft
Excavation Date: November 19, 2019
Inspector: K. Crow
Contractor: G2 Consulting Group, LLC
Operator: J. Crow

Excavation Equipment:
John Deere 310K Backhoe

Water Level Observation:
Dry during and upon completion of excavation operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated Soil

Figure No. 35

TEST PIT 193508.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 12/26/19

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.80486° Longitude: -84.86358°

Test Pit No. TP-10

G2 CONSULTING GROUP

SUBSURFACE PROFILE / SOIL SAMPLE DATA

GROUND SURFACE ELEVATION: 832.0 ft

ELEV. (ft)	DESCRIPTION	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
	Tilled Earth: Very Stiff Dark Brown Lean to Fat Clay with trace sand (5 inches) (Organic Content = 4.4%)	0.4	BS-1				4000*
	Very Stiff Brown Lean Clay with trace sand and gravel	2.0	BS-2		14.8		6500*
	Very Stiff Brown Fat Clay with trace sand and gravel, frequent limestone fragments	4.0	BS-3		32.3		7500*
	Very Weak Gray Completely Weathered Limestone	4.3	BS-4				
827.0		5					
	End of Test Pit @ 4.3 ft						
822.0		10					
817.0		15					
812.0		20					
807.0		25					
802.0		30					

Total Depth: 4.3 ft
Excavation Date: November 19, 2019
Inspector: K. Crow
Contractor: G2 Consulting Group, LLC
Operator: J. Crow

Excavation Equipment:
John Deere 310K Backhoe

Water Level Observation:
Dry during and upon completion of excavation operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated Soil

Figure No. 36

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.80012° Longitude: -84.86641°

Test Pit No. TP-11

G2 CONSULTING GROUP

SUBSURFACE PROFILE / SOIL SAMPLE DATA

GROUND SURFACE ELEVATION: 868.0 ft

ELEV. (ft)	DESCRIPTION	DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
	Tilled Earth: Very Stiff Dark Brown Lean to Fat Clay with trace sand (13 inches) (Organic Content = 4.8%)	1.1	BS-1		29.3		4500*
863.0	Very Stiff Brown Fat Clay with trace sand and gravel (LL=57, PI=32)	5					
		6.0	BS-2		26.2		6000*
	Very Stiff Brown Fat Clay with trace sand, frequent limestone fragments (Finer than No. 200 Sieve = 95.3%)	8.0	BS-3		40.4		6000*
	End of Test Pit @ 8 ft						
858.0		10					
853.0		15					
848.0		20					
843.0		25					
838.0		30					

Total Depth: 8 ft
Excavation Date: November 19, 2019
Inspector: K. Crow
Contractor: G2 Consulting Group, LLC
Operator: J. Crow

Excavation Equipment:
John Deere 310K Backhoe

Water Level Observation:
Dry during and upon completion of excavation operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated Soil

Figure No. 37

TEST PIT 193508.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 12/26/19

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.80012° Longitude: -84.86641°

Test Pit No. TP-12

G2 CONSULTING GROUP

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: 850.0 ft

ELEV. (ft)	DEPTH (ft)	Description
	0.4	Tilled Earth: Stiff Dark Brown Lean to Fat Clay with trace sand (5 inches) (Organic Content = 5.2%)
	1.5	Very Stiff Brown Fat Clay with trace sand and gravel
	4.3	Very Stiff Brown Fat Clay with trace sand and gravel, frequent limestone fragments
	4.5	Very Weak Gray Completely Weathered Limestone
845.0	5	
840.0	10	
835.0	15	
830.0	20	
825.0	25	
820.0	30	

End of Test Pit @ 4.5 ft

SOIL SAMPLE DATA

SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
BS-1				3500*
BS-2				4500*
BS-3		32.5		5500*
BS-4				

Total Depth: 4.5 ft
Excavation Date: November 20, 2019
Inspector: K. Crow
Contractor: G2 Consulting Group, LLC
Operator: J. Crow

Excavation Equipment:
John Deere 310K Backhoe

Water Level Observation:
Dry during and upon completion of excavation operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated Soil

Figure No. 38

TEST PIT 193508.GPJ 20150116 G2 CONSULTING DATA TEMPLATE.GDT 12/26/19

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No. 193508

Latitude: 37.79610° Longitude: -84.86605°

Test Pit No. TP-13

CONSULTING GROUP

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: 844.0 ft

ELEV. (ft)	DESCRIPTION	DEPTH (ft)
	Tilled Earth: Very Stiff Dark Brown Lean to Fat Clay with trace sand (4 inches) (Organic Content = 5.8%)	0.3
	Very Stiff Brown Fat Clay with trace sand	2.5
	Very Stiff Brown Fat Clay with trace sand, frequent limestone fragments	4.3
839.0	End of Test Pit @ 4.3 ft	5
834.0		10
829.0		15
824.0		20
819.0		25
814.0		30

SOIL SAMPLE DATA

SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
BS-1				4000*
BS-2		33.1		5500*
BS-3		22.4		6000*

Total Depth: 4.3 ft
Excavation Date: November 20, 2019
Inspector: K. Crow
Contractor: G2 Consulting Group, LLC
Operator: J. Crow

Excavation Equipment:
John Deere 310K Backhoe

Water Level Observation:
Dry during and upon completion of excavation operations

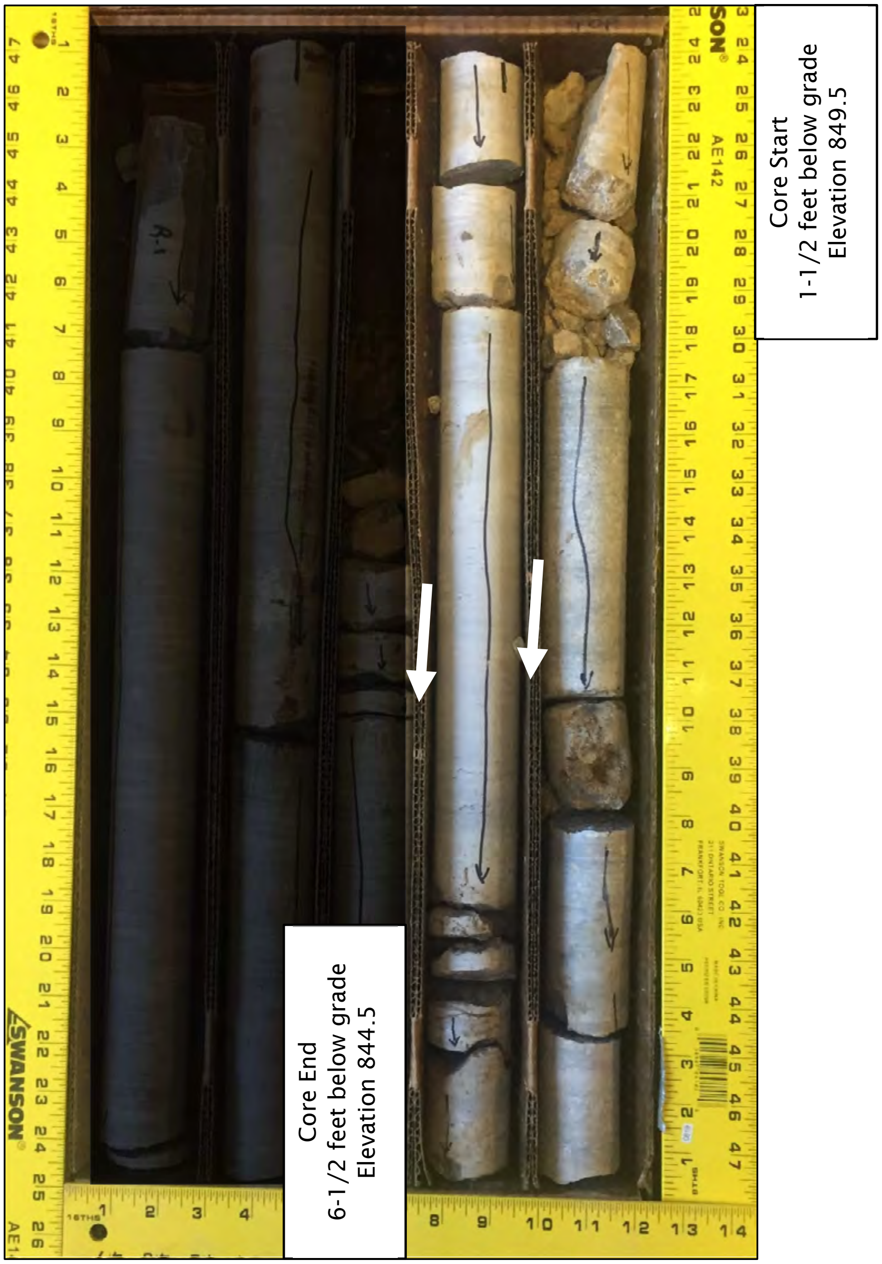
Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavated Soil

Figure No. 39

CONSULTING GROUP

Rock Core Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

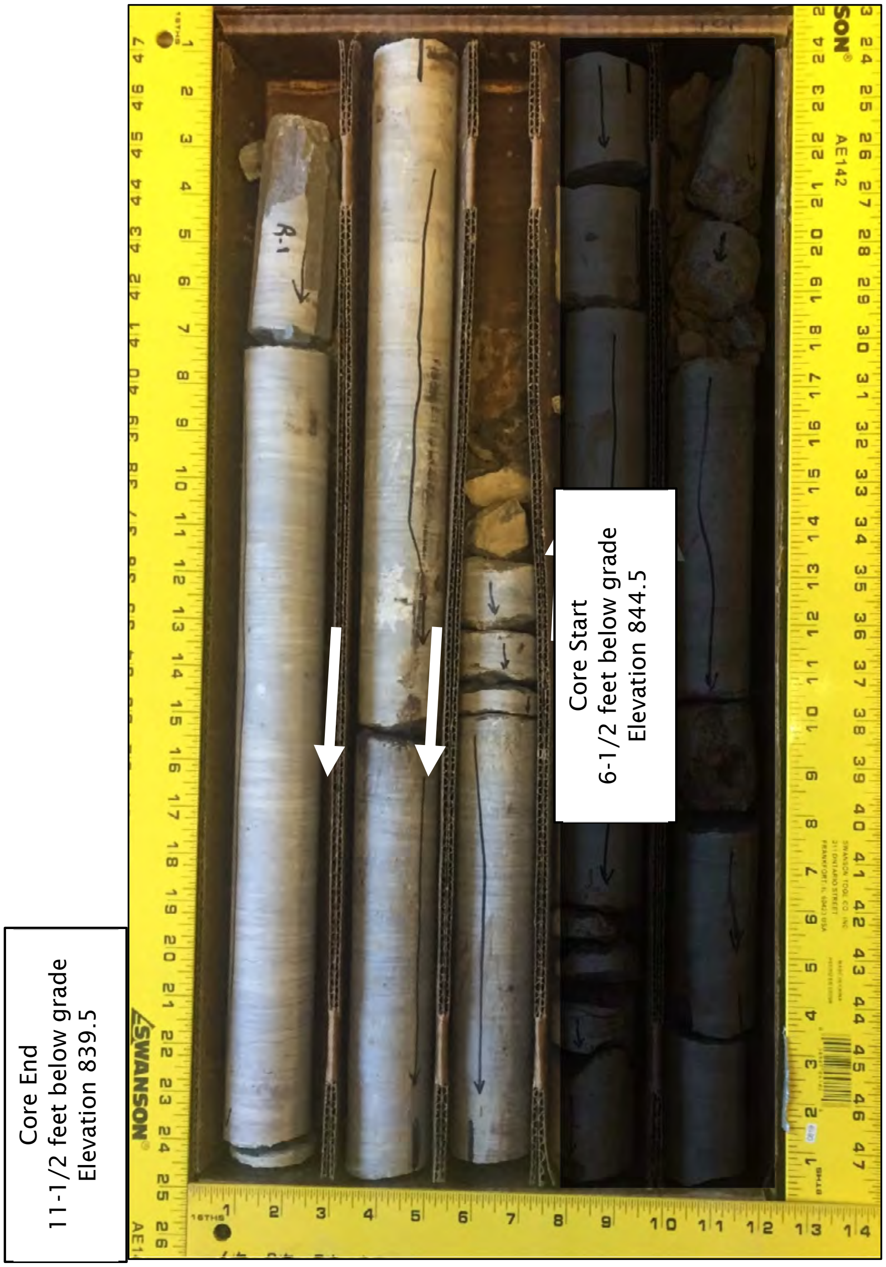


Rock Core B-1 RC-2 (5 Feet)
1-1/2 feet to 6-1/2 feet below grade (El. 849.5 to El. 844.5)
Moderately Strong Gray Faintly Weathered Limestone
Recovery: 80%
RQD: 48%
Coring Rate: 0.08 to 0.10 in/sec

Figure No. 40

CONSULTING GROUP

Rock Core Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508



Rock Core B-1 RC-3 (5 Feet)
6-1/2 feet to 11-1/2 feet below grade (El. 844.5 to El. 839.5)
Moderately Strong Gray Faintly Weathered Limestone
Recovery: 100%
RQD: 92%
Coring Rate: 0.10 to 0.12 in/sec

Figure No. 41

CONSULTING GROUP

Rock Core Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

Core End
18-3/4 feet below grade
Elevation 853.25

Rock Core B-4 RC-5 (5 Feet)
13-3/4 feet to 18-3/4 feet below grade (El. 858.25 to El. 853.25)
Moderately Strong Gray Faintly Weathered Limestone
Recovery: 93%
RQD: 60%
Coring Rate: 0.08 to 0.10 in/sec

Figure No. 42

Rock Core Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

Rock Core B-8 RC-3 (5 Feet)
4-1/4 feet to 9-1/4 feet below grade (El. 885.75 to El. 880.75)
Moderately Strong Gray Faintly Weathered Limestone
Recovery: 88%
RQD: 30%
Coring Rate: 0.08 to 0.10 in/sec

Figure No. 43

Rock Core Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

Rock Core B-12 RC-4 (5 Feet)
8-1/2 feet to 13-1/2 feet below grade (El. 834.5 to El. 829.5)
Moderately Strong Gray Faintly Weathered Limestone
Recovery: 82%
RQD: 58%
Coring Rate: 0.09 to 0.11 in/sec

Figure No. 44

Rock Core Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

Rock Core B-17 RC-2 (5 Feet)
5-1/2 feet to 10-1/2 feet below grade (El. 840.5 to El. 835.5)
Strong Gray Faintly Weathered Limestone
Recovery: 100%
RQD: 77%
Coring Rate: 0.16 to 0.18 in/sec

Figure No. 45

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Rock Core Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

Core Start
2-3/4 feet below grade
Elevation 866.25

Rock Core B-20 RC-2 (5 Feet)
2-3/4 feet to 7-3/4 feet below grade (El. 866.25 to El. 861.25)
Moderately Strong Gray Faintly Weathered Limestone
Recovery: 89%
RQD: 58%
Coring Rate: 0.08 to 0.10 in/sec

Figure No. 46

Terrain Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508


TP-1 - Looking North


TP-1 - Looking East


TP-1 - Looking West

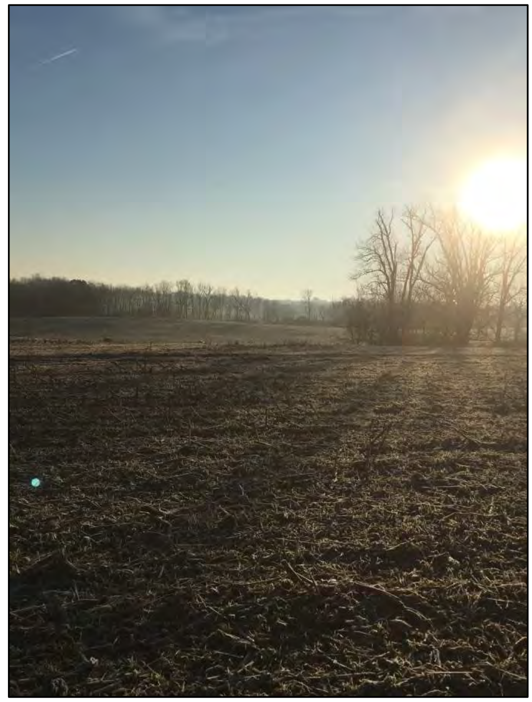

TP-1 - Looking South

Figure No. 47

CONSULTING GROUP

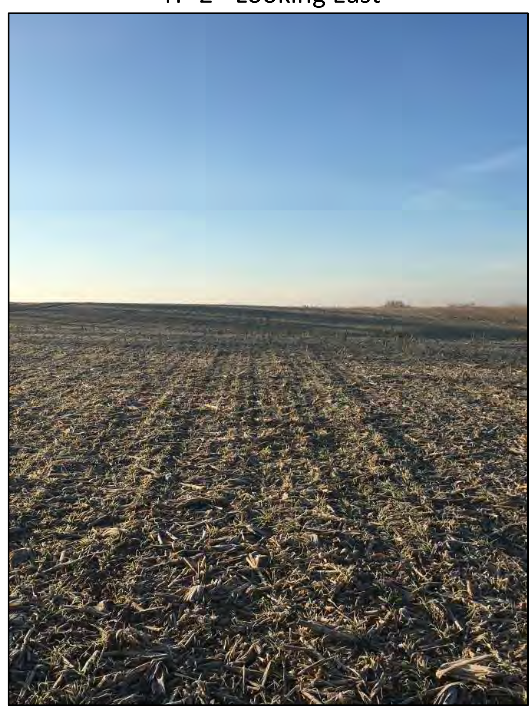
Terrain Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

TP-2 - Looking North



TP-2 - Looking East

TP-2 - Looking West



TP-2 - Looking South

CONSULTING GROUP

Terrain Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

TP-3 - Looking North

TP-3 - Looking East

TP-3 - Looking West

TP-3 - Looking South

Figure No. 49

Terrain Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

TP-4 - Looking North

TP-4 - Looking East

TP-4 - Looking West

TP-4 - Looking South

Figure No. 50

Terrain Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

TP-5 - Looking North

TP-5 - Looking East

TP-5 - Looking West

TP-5 - Looking South

Figure No. 51

Terrain Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508


TP-6 - Looking North


TP-6 - Looking East


TP-6 - Looking West

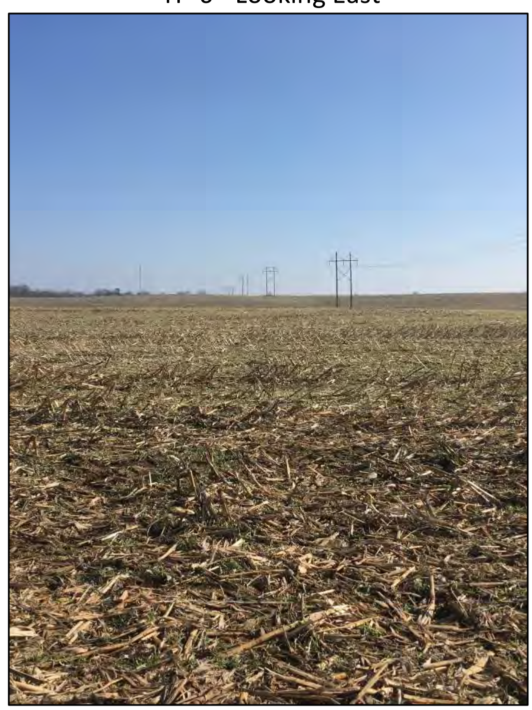

TP-6 - Looking South

Figure No. 52

CONSULTING GROUP

Terrain Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

TP-7 - Looking North

TP-7 - Looking East

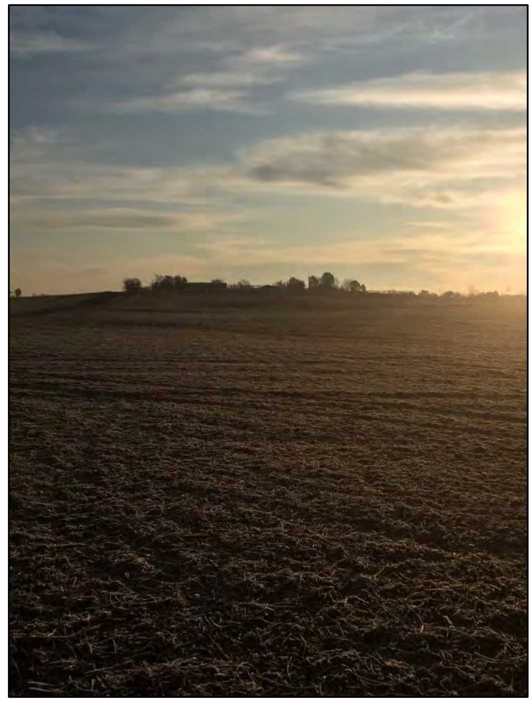
TP-7 - Looking West

TP-7 - Looking South

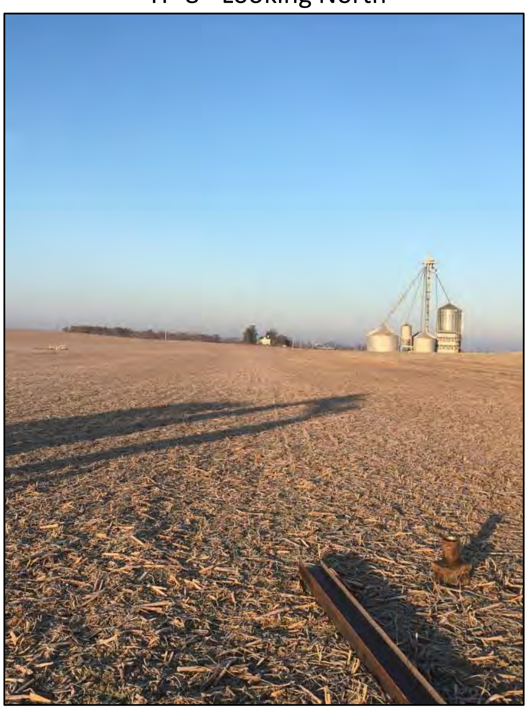
CONSULTING GROUP

Terrain Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

TP-8 - Looking North



TP-8 - Looking East



TP-8 - Looking West

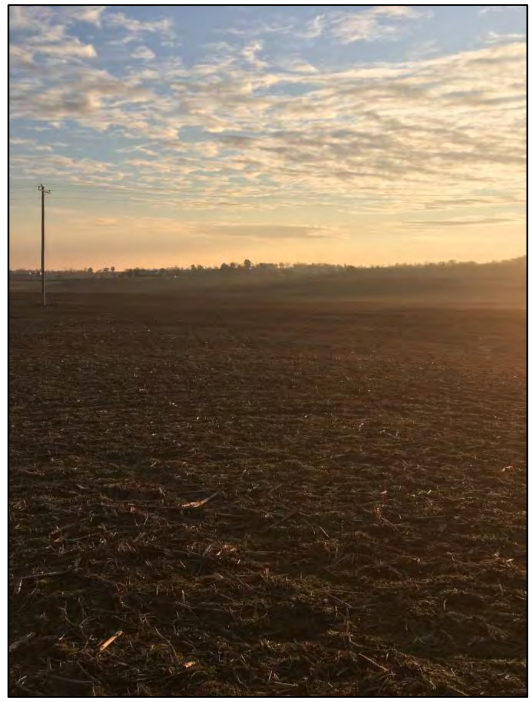
TP-8 - Looking South

Figure No. 54

CONSULTING GROUP

Terrain Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

TP-9 - Looking North



TP-9 - Looking East

TP-9 - Looking West

TP-9 - Looking South

Figure No. 55

Terrain Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508


TP-10 - Looking North


TP-10 - Looking East


TP-10 - Looking West


TP-10 - Looking South

Figure No. 56

Terrain Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508


TP-11 - Looking North


TP-11 - Looking East


TP-11 - Looking West


TP-11 - Looking South

Figure No. 57

CONSULTING GROUP

Terrain Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

TP-12 - Looking North

TP-12 - Looking East

TP-12 - Looking West

TP-12 - Looking South

Figure No. 58

CONSULTING GROUP

Terrain Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

TP-13 - Looking North

TP-13 - Looking East

TP-13 - Looking West

TP-13 - Looking South

Figure No. 59

CONSULTING GROUP

Terrain Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

PD-1 - Looking North

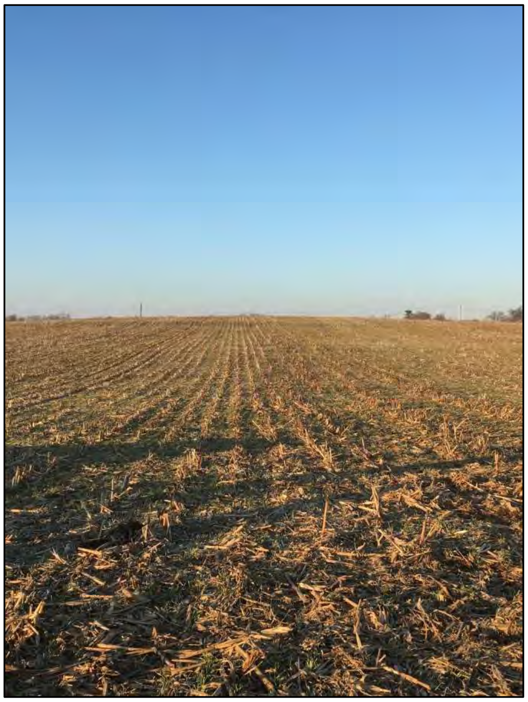
PD-1 - Looking East

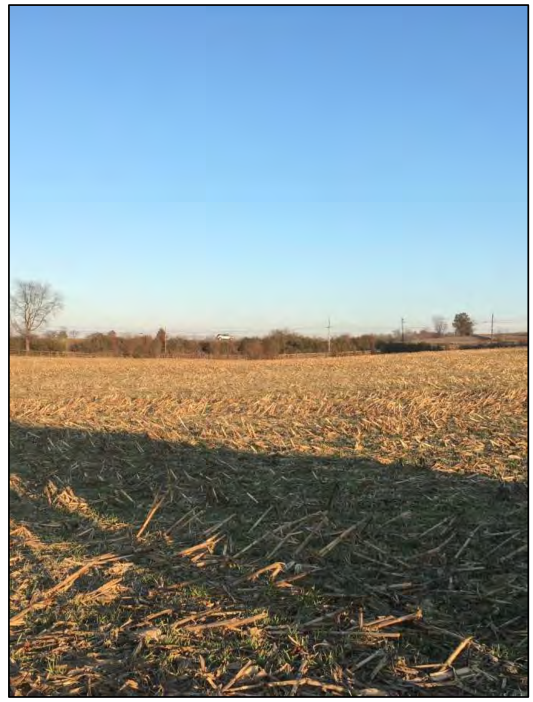
PD-1 - Looking West

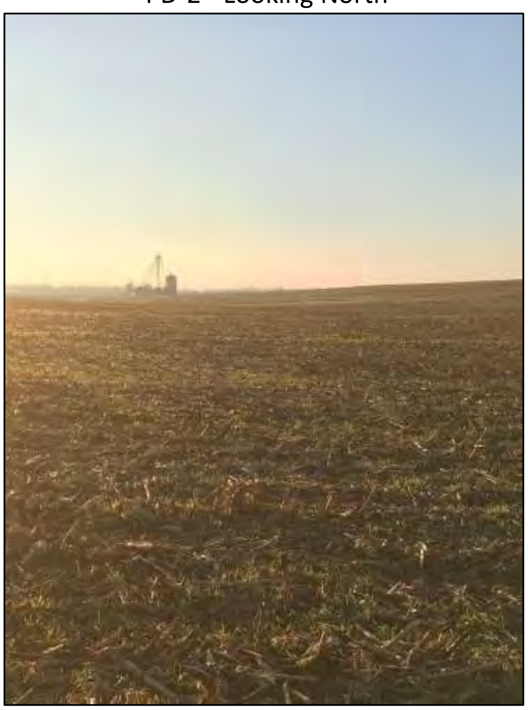
PD-1 - Looking South

Figure No. 60

Terrain Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508


PD-2 - Looking North


PD-2 - Looking East


PD-2 - Looking West


PD-2 - Looking South

Figure No. 61

CONSULTING GROUP

Terrain Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508


PD-3 - Looking North


PD-3 - Looking East


PD-3 - Looking West

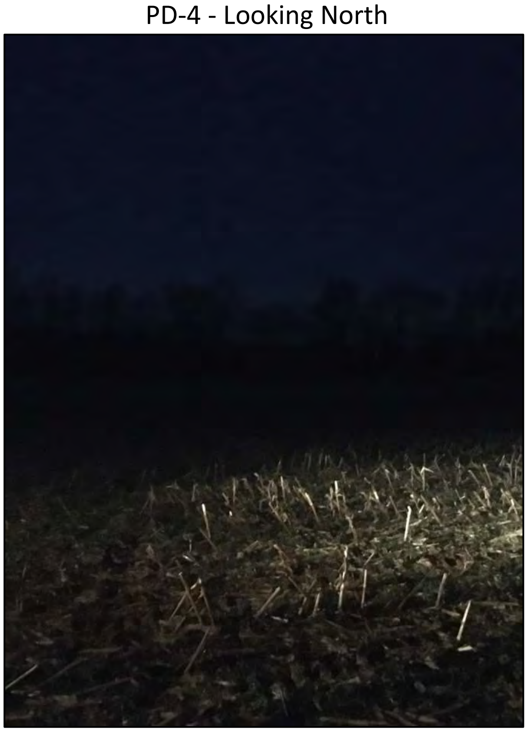

PD-3 - Looking South

Figure No. 62

Terrain Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

PD-4 - Looking North

PD-4 - Looking East



PD-4 - Looking West

PD-4 - Looking South

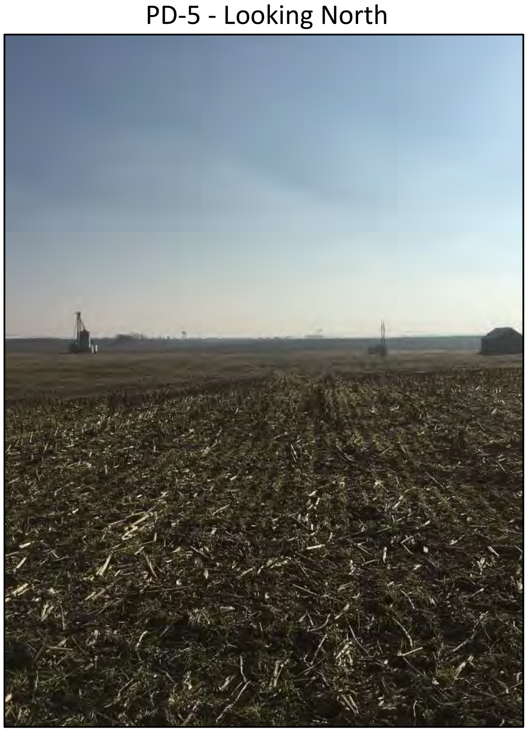
Figure No. 63

CONSULTING GROUP

Terrain Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

PD-5 - Looking North

PD-5 - Looking East



PD-5 - Looking West

PD-5 - Looking South

Figure No. 64

CONSULTING GROUP

Terrain Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508


PD-6 - Looking North


PD-6 - Looking East


PD-6 - Looking West

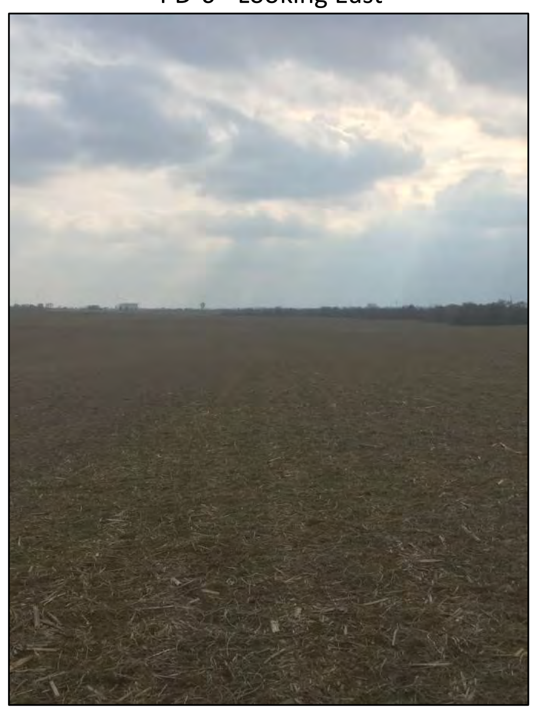

PD-6 - Looking South

Figure No. 65

Test Pit Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

Test Pit ID:	TP-1
Test Pit Depth:	5 feet
Date:	November 17, 2019
Field Engineer(s):	Jeff Crow Kathryn Crow

Figure No. 66

Test Pit Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

Test Pit ID: TP-2
Test Pit Depth: 6 feet
Date: November 17, 2019
Field Engineer(s): Jeff Crow
Kathryn Crow

Figure No. 67

Test Pit Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

Test Pit ID:	TP-3
Test Pit Depth:	2 feet (Refusal)
Date:	November 16, 2019
Field Engineer(s):	Jeff Crow Kathryn Crow

Figure No. 68

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Test Pit Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

Test Pit ID:	TP-4
Test Pit Depth:	5 feet (Refusal)
Date:	November 17, 2019
Field Engineer(s):	Jeff Crow Kathryn Crow

Figure No. 69

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Test Pit Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

Test Pit ID:	TP-5
Test Pit Depth:	5 feet
Date:	November 16, 2019
Field Engineer(s):	Jeff Crow Kathryn Crow

CONSULTING GROUP

Test Pit Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

Test Pit ID:	TP-6
Test Pit Depth:	6 feet
Date:	November 16, 2019
Field Engineer(s):	Jeff Crow Kathryn Crow

Figure No. 71

Test Pit Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

Test Pit ID:	TP-7
Test Pit Depth:	5-1/2 feet
Date:	November 17, 2019
Field Engineer(s):	Jeff Crow Kathryn Crow

Figure No. 72

CONSULTING GROUP

Test Pit Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

Test Pit ID:	TP-8
Test Pit Depth:	8 feet
Date:	November 15, 2019
Field Engineer(s):	Jeff Crow
	Kathryn Crow

Figure No. 73

Test Pit Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

Test Pit ID:	TP-9
Test Pit Depth:	3 feet
Date:	November 19, 2019
Field Engineer(s):	Jeff Crow Kathryn Crow

Figure No. 74

Test Pit Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

Test Pit ID: TP-10
Test Pit Depth: 4-1/4 feet
Date: November 19, 2019
Field Engineer(s): Jeff Crow
Kathryn Crow

Test Pit Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

Test Pit ID: TP-11
Test Pit Depth: 8 feet
Date: November 19, 2019
Field Engineer(s): Jeff Crow
Kathryn Crow

Figure No. 76

Test Pit Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

Test Pit ID: TP-12
Test Pit Depth: 4 feet (Refusal)
Date: November 20, 2019
Field Engineer(s): Jeff Crow
Kathryn Crow

Figure No. 77

Test Pit Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

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Test Pit ID: TP-13
Test Pit Depth: 4 feet (Refusal)
Date: November 20, 2019
Field Engineer(s): Jeff Crow
Kathryn Crow

Figure No. 78

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Post Head Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508


TP-1A (Top)


TP-1A (Bottom)


TP-1B (Top)


TP-1B (Bottom)

Figure No. 79

Post Head Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

TP-2A (Top)

TP-2A (Bottom)

TP-2B (Top)

TP-2B (Bottom)

Figure No. 80

Post Head Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

TP-3A (Top)

TP-3A (Bottom)

TP-3B (Top)

TP-3B (Bottom)

Figure No. 81

Post Head Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508


TP-4A (Top)


TP-4A (Bottom)

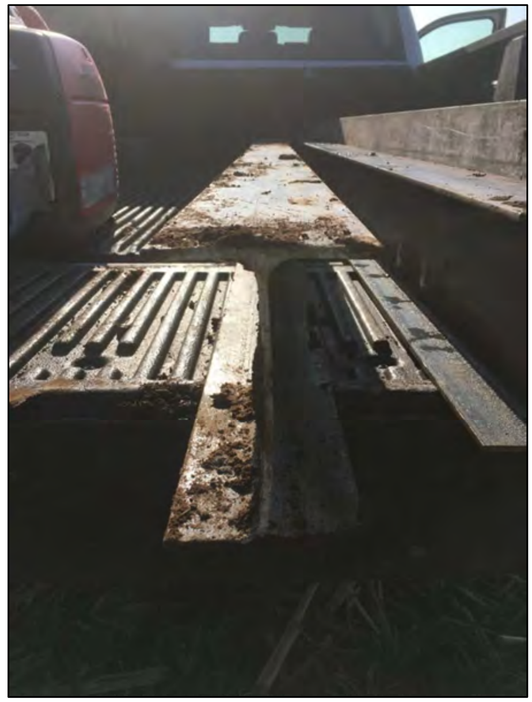

TP-4B (Top)


TP-4B (Bottom)

Figure No. 82

Post Head Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508


TP-5A (Top)


TP-5A (Bottom)


TP-5B (Top)


TP-5B (Bottom)

Figure No. 83

Post Head Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508


TP-6A (Top)


TP-6A (Bottom)


TP-6B (Top)


TP-6B (Bottom)

Figure No. 84

CONSULTING GROUP

Post Head Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508


TP-7A (Top)


TP-7A (Bottom)

TP-7B (Top)


TP-7B (Bottom)

Figure No. 85

Post Head Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508


TP-8A (Top)


TP-8A (Bottom)


TP-8B (Top)

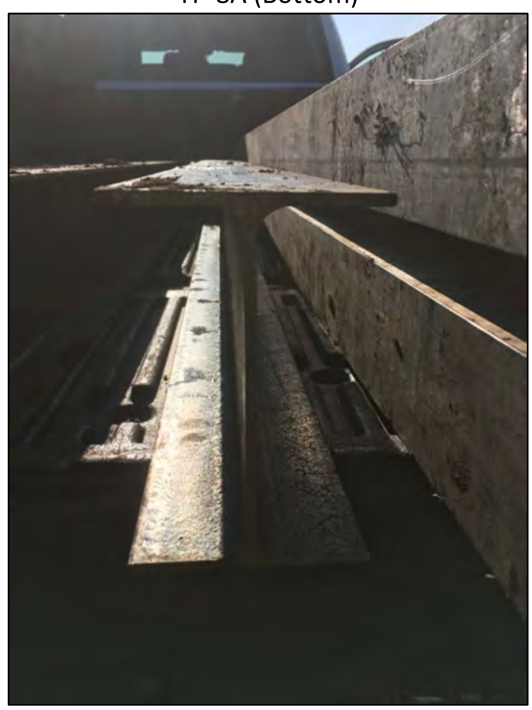

TP-8B (Bottom)

Figure No. 86

Post Head Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508


TP-9A (Top)


TP-9A (Bottom)


TP-9B (Top)


TP-9B (Bottom)

Figure No. 87

Post Head Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508


TP-10A (Top)


TP-10A (Bottom)


TP-10B (Top)


TP-10B (Bottom)

Figure No. 88

Post Head Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

TP-11A (Top)

TP-11A (Bottom)

TP-11B (Top)

TP-11B (Bottom)

Figure No. 89

Post Head Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508


TP-12A (Top)


TP-12A (Bottom)


TP-12B (Top)


TP-12B (Bottom)

Figure No. 90

Post Head Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508


TP-13A (Top)


TP-13A (Bottom)


TP-13B (Top)


TP-13B (Bottom)

Figure No. 91

Post Head Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508


PD-1 (Top)


PD-2 (Top)


PD-3 (Top)


PD-4 (Top)

Figure No. 92

Post Head Photographic Documentation
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508


PD-5 (Top)


PD-6 (Top)

Figure No. 93

C2G CONSULTING GROUP

GENERAL NOTES TERMINOLOGY

Unless otherwise noted, all terms herein refer to the Standard Definitions presented in ASTM 653.

PARTICLE SIZE

Boulders		- greater than 12 inches
Cobbles		- 3 inches to 12 inches
Gravel	- Coarse	- 3/4 inches to 3 inches
	- Fine	- No. 4 to 3/4 inches
Sand	- Coarse	- No. 10 to No. 4
	- Medium	- No. 40 to No. 10
	- Fine	- No. 200 to No. 40
Silt		- 0.005mm to 0.074mm
Clay		- Less than 0.005mm

CLASSIFICATION

The major soil constituent is the principal noun, i.e. clay, silt, sand, gravel. The second major soil constituent and other minor constituents are reported as follows:

Second Major Constituent (percent by weight)	Minor Constituent (percent by weight)
Trace - 1 to 12%	Trace - 1 to 12%
Adjective - 12 to 35%	Little - 12 to 23%
And - over 35%	Some - 23 to 33%

COHESIVE SOILS

If clay content is sufficient so that clay dominates soil properties, clay becomes the principal noun with the other major soil constituent as modifier, i.e. sandy clay. Other minor soil constituents may be included in accordance with the classification breakdown for cohesionless soils, i.e. silty clay, trace sand, little gravel.

Consistency	Unconfined Compressive Strength (psf)	Approximate Range of (N)
Very Soft	Below 500	0 - 2
Soft	500 - 1,000	3 - 4
Medium	1,000 - 2,000	5 - 8
Stiff	2,000 - 4,000	9 - 15
Very Stiff	4,000 - 8,000	16 - 30
Hard	8,000 - 16,000	31 - 50
Very Hard	Over 16,000	Over 50

Consistency of cohesive soils is based upon an evaluation of the observed resistance to deformation under load and not upon the Standard Penetration Resistance (N).

COHESIONLESS SOILS

Density Classification	Relative Density %	Approximate Range of (N)
Very Loose	0 - 15	0 - 4
Loose	16 - 35	5 - 10
Medium Compact	36 - 65	11 - 30
Compact	66 - 85	31 - 50
Very Compact	86 - 100	Over 50

Relative Density of cohesionless soils is based upon the evaluation of the Standard Penetration Resistance (N), modified as required for depth effects, sampling effects, etc.

SAMPLE DESIGNATIONS

AS - Auger Sample – Cuttings directly from auger flight
BS - Bottle or Bag Samples
S - Split Spoon Sample - ASTM D 1586
LS - Liner Sample with liner insert 3 inches in length
ST - Shelby Tube sample - 3 inch diameter unless otherwise noted
PS - Piston Sample - 3 inch diameter unless otherwise noted
RC - Rock Core - NX core unless otherwise noted

STANDARD PENETRATION TEST (ASTM D 1586) - A 2.0 inch outside-diameter, 1-3/8 inch inside-diameter split barrel sampler is driven into undisturbed soil by means of a 140-pound weight falling freely through a vertical distance of 30 inches. The sampler is normally driven three successive 6-inch increments. The total number of blows required for the final 12 inches of penetration is the Standard Penetration Resistance (N).

CONSULTING GROUP

Post Load Test Results

Test Location:	1A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	2 feet	Project Number:	193508
GPS Test Coordinates:	37.83863°, -84.86728°	Test Date:	11/17/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	565	0.007	0.001	0.004	2	1	549	0.349	0.213	0.281
3	1	1045	0.038	0.018	0.028	3	1	860	0.592	0.459	0.525
4	1	916	0.316	0.252	0.284	4	1	0	0.290	0.163	0.226
5	1	0	0.304	0.249	0.276	5	1	1346	1.080	0.979	1.029
6	5	462	1.067	0.998	1.032	6	1	0	0.619	0.441	0.530
7	1	0	1.057	0.994	1.025						
Reset Gauges to Zero											
8	1	0	0.000	0.000	0.000						
9	1	489	0.556	0.485	0.521						
10	1	0	0.549	0.482	0.515						

Figure No. 95A

Tension Post Load Test Results

Test Location:	1A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	2 feet	Project Number:	193508
GPS Test Coordinates:	37.83863°, -84.86728°	Test Date:	11/17/2019

Figure No. 95B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	1A			
Post Size:	W6x9		Project Name:	Mercer County Solar Power Plant
Depth Driven:	2 feet		Project Number:	193508
GPS Test Coordinates:	37.83863°, -84.86728°		Test Date:	11/17/2019

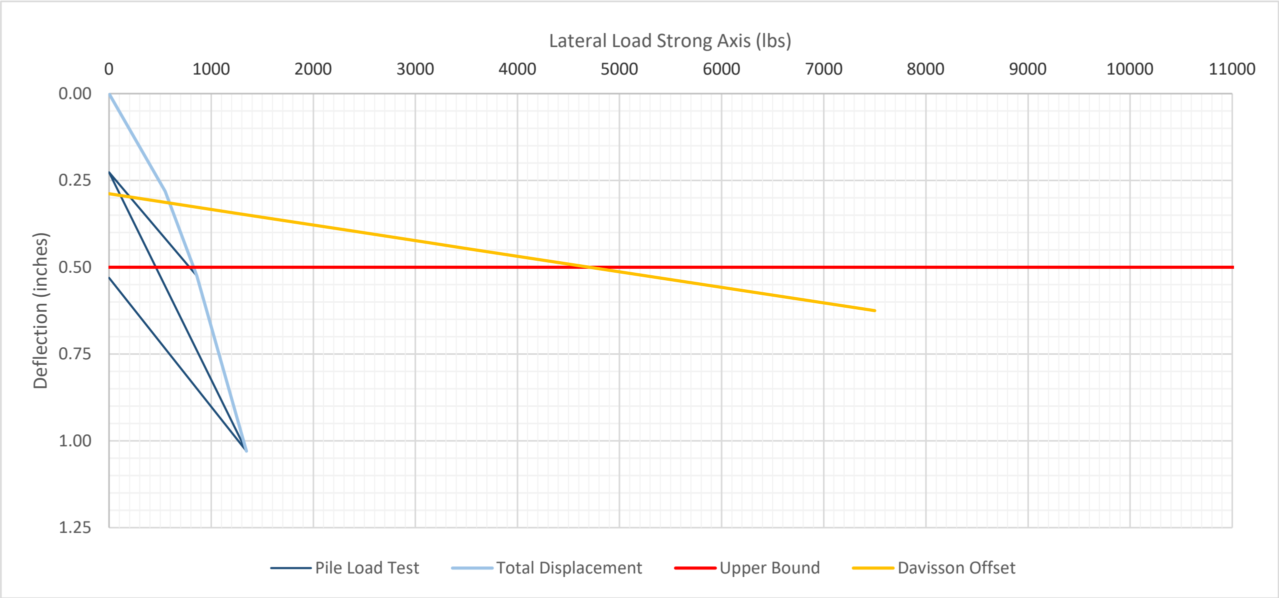


Figure No. 95C

CONSULTING GROUP

Post Load Test Results

Test Location:	1B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	4-1/4 feet	Project Number:	193508
GPS Test Coordinates:	37.83833°, -84.86703°	Test Date:	11/17/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	596	0.002	0.002	0.002	2	1	648	0.056	0.052	0.054
3	1	1100	0.005	0.005	0.005	3	1	1154	0.106	0.106	0.106
4	1	1582	0.018	0.021	0.019	4	1	0	0.033	0.032	0.032
5	1	2059	0.250	0.275	0.262	5	1	1011	0.114	0.127	0.120
6	5	0	0.238	0.259	0.248	6	1	1641	0.180	0.197	0.188
7	1	2464	0.976	1.037	1.007	7	1	0	0.058	0.057	0.057
8	1	0	0.941	1.000	0.970	8	1	1598	0.199	0.216	0.207
Reset Gauges to Zero						9	1	2076	0.239	0.295	0.267
9	1	0	0.000	0.000	0.000	10	1	0	0.089	0.096	0.092
10	1	2489	0.490	0.572	0.531	11	1	2126	0.294	0.365	0.330
11	1	0	0.448	0.531	0.490	12	1	2412	0.504	0.574	0.539
						13	1	0	0.270	0.281	0.275
						14	1	3037	0.998	1.048	1.023
						15	1	0	0.622	0.624	0.623

Figure No. 96A

Tension Post Load Test Results

Test Location:	1B
Post Size:	W6x9
Depth Driven:	4-1/4 feet
GPS Test Coordinates:	37.83833°, -84.86703°

Project Name:	Mercer County Solar Power Plant
Project Number:	193508
Test Date:	11/17/2019

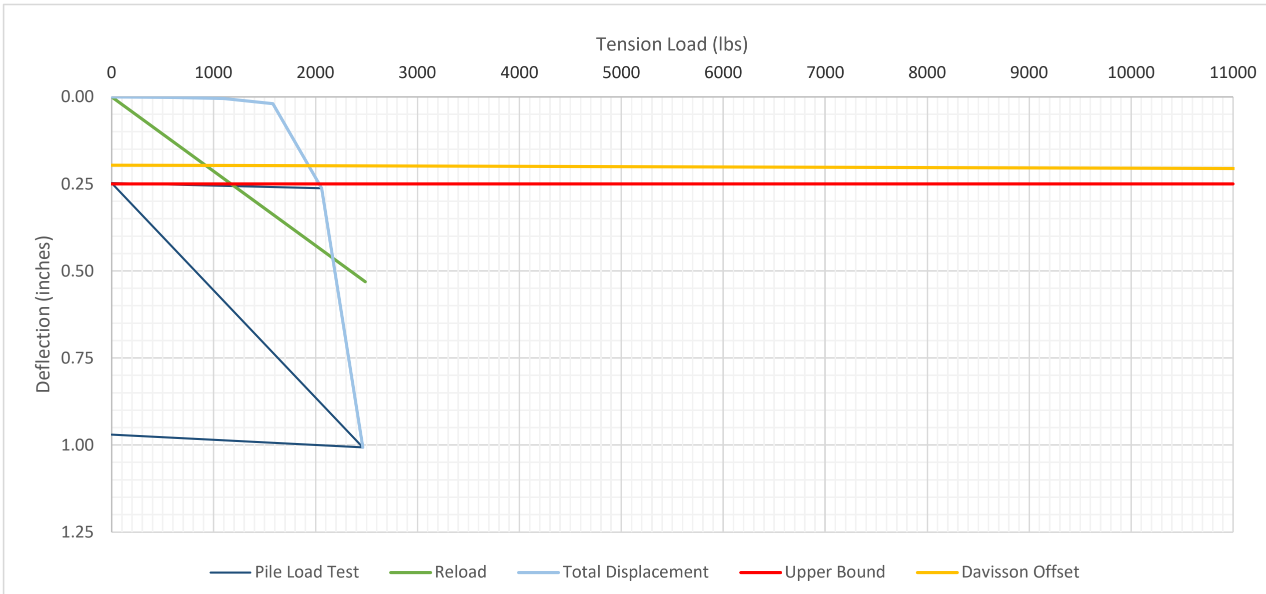


Figure No. 96B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	1B
Post Size:	W6x9
Depth Driven:	4-1/4 feet
GPS Test Coordinates:	37.83833°, -84.86703°

Project Name:	Mercer County Solar Power Plant
Project Number:	193508
Test Date:	11/17/2019

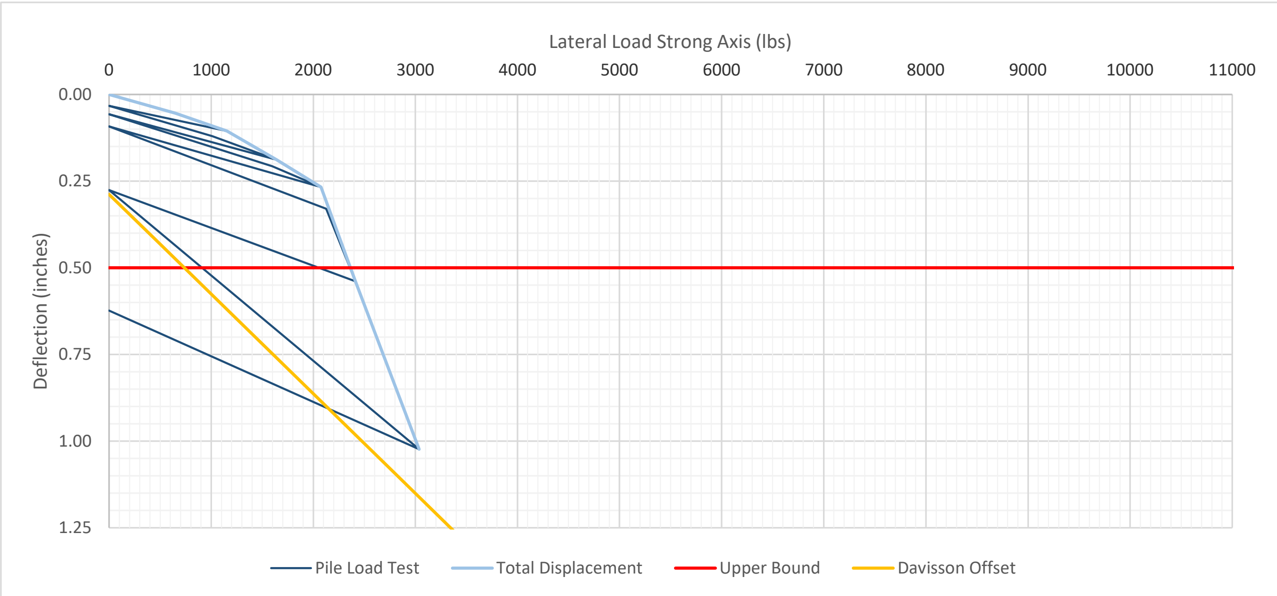


Figure No. 96C

CONSULTING GROUP

Post Load Test Results

Test Location:	2A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	4 feet	Project Number:	193508
GPS Test Coordinates:	37.83145°, -84.86695°	Test Date:	11/17/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	641	0.002	0.000	0.001	2	1	762	0.019	0.078	0.030
3	1	1109	0.003	0.003	0.003	3	1	1266	0.008	0.113	0.060
4	1	1579	0.005	0.005	0.005	4	1	0	0.006	0.011	0.008
5	1	2206	0.009	0.011	0.010	5	1	1139	0.016	0.094	0.055
6	5	2080	0.015	0.017	0.016	6	1	1689	0.055	0.151	0.103
7	1	0	0.016	0.015	0.016	7	1	0	0.020	0.015	0.018
8	1	2195	0.015	0.018	0.017	8	1	1512	0.098	0.090	0.094
9	1	5454	0.255	0.299	0.277	9	1	2161	0.146	0.130	0.138
10	1	0	0.243	0.267	0.255	10	1	0	0.044	0.014	0.029
11	1	4118	0.993	1.045	1.019	11	1	2105	0.153	0.136	0.144
12	1	0	0.982	1.019	1.000	12	1	2528	0.219	0.199	0.209
Reset Gauges to Zero						13	1	0	0.072	0.032	0.052
13	1	0	0.000	0.000	0.000	14	1	2730	0.264	0.232	0.248
14	1	3783	0.478	0.535	0.506	15	1	3142	0.357	0.329	0.343
15	1	0	0.471	0.513	0.492	16	1	0	0.136	0.080	0.108
						17	1	3145	0.374	0.332	0.353
						18	1	3428	0.554	0.513	0.533
						19	1	0	0.250	0.185	0.217
						20	1	4008	1.022	1.003	1.013
						21	1	0	0.555	0.491	0.523

Figure No. 97A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	2A			
Post Size:	W6x9		Project Name:	Mercer County Solar Power Plant
Depth Driven:	4 feet		Project Number:	193508
GPS Test Coordinates:	37.83145°, -84.86695°		Test Date:	11/17/2019

Figure No. 97B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	2A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	4 feet	Project Number:	193508
GPS Test Coordinates:	37.83145°, -84.86695°	Test Date:	11/17/2019

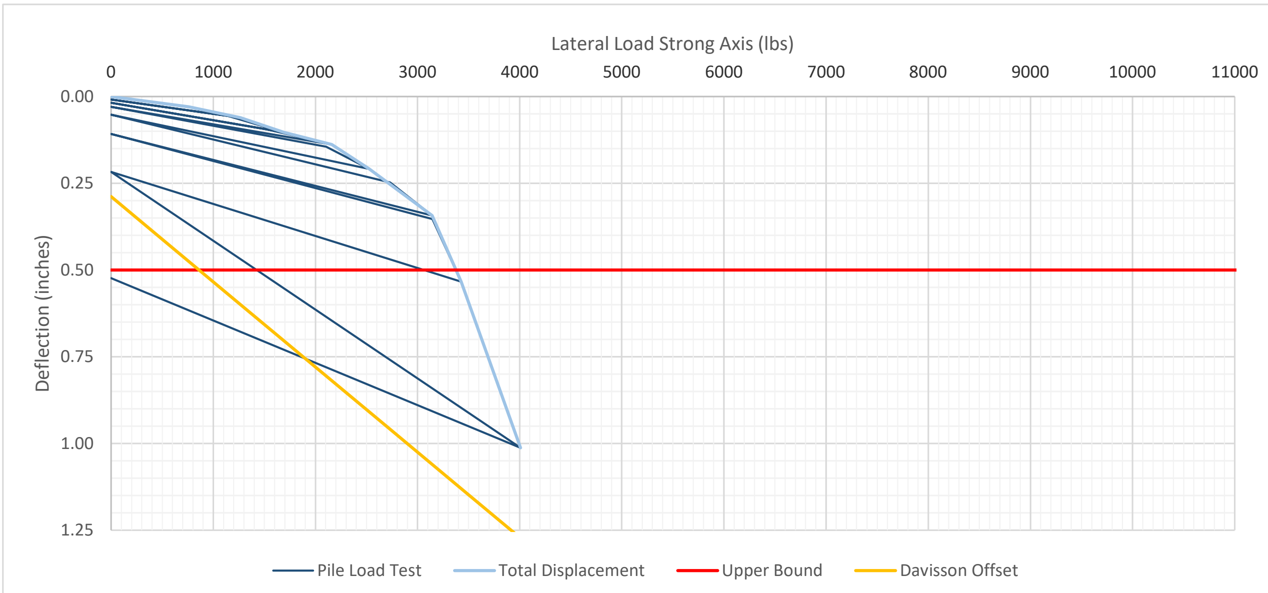


Figure No. 97C

CONSULTING GROUP

Post Load Test Results

Test Location:	2B
Post Size:	W6x9
Depth Driven:	6 feet
GPS Test Coordinates:	37.83145°, -84.86695°
Project Name:	Mercer County Solar Power Plant
Project Number:	193508
Test Date:	11/17/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	566	0.000	0.000	0.000	2	1	604	0.002	0.055	0.029
3	1	1040	0.000	0.007	0.004	3	1	1140	0.007	0.115	0.061
4	1	1596	0.000	0.009	0.005	4	1	0	0.002	0.022	0.012
5	1	2104	0.001	0.013	0.007	5	1	1317	0.025	0.120	0.072
6	5	2284	0.006	0.019	0.012	6	1	1623	0.033	0.158	0.095
7	1	0	0.005	0.015	0.010	7	1	0	0.006	0.019	0.012
8	1	2360	0.015	0.020	0.017	8	1	1610	0.041	0.165	0.103
9	1	5911	0.250	0.294	0.272	9	1	2078	0.056	0.210	0.133
10	1	0	0.244	0.258	0.251	10	1	0	0.015	0.018	0.016
11	1	5339	1.021	1.062	1.041	11	1	2080	0.106	0.146	0.126
12	1	0	0.993	0.997	0.995	12	1	2651	0.150	0.203	0.176
Reset Gauges to Zero						13	1	0	0.042	0.016	0.029
13	1	0	0.000	0.000	0.000	14	1	2864	0.177	0.225	0.201
14	1	4637	0.516	0.497	0.506	15	1	3092	0.203	0.256	0.229
15	1	0	0.489	0.496	0.493	16	1	0	0.058	0.021	0.040
						17	1	3046	0.210	0.246	0.228
						18	1	4751	0.520	0.505	0.512
						19	1	0	0.173	0.113	0.143
						20	1	6209	1.075	1.001	1.038
						21	1	0	0.474	0.412	0.443

Figure No. 98A

Tension Post Load Test Results

Test Location:	2B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	6 feet	Project Number:	193508
GPS Test Coordinates:	37.83145°, -84.86695°	Test Date:	11/17/2019

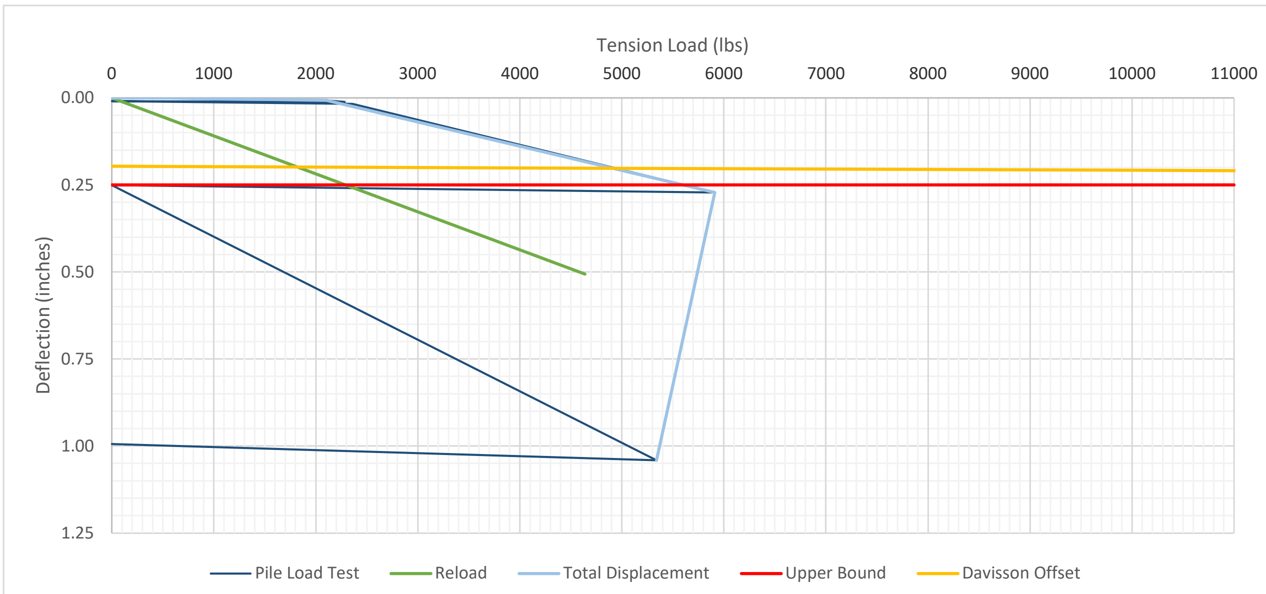


Figure No. 98B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	2B
Post Size:	W6x9
Depth Driven:	6 feet
GPS Test Coordinates:	37.83145°, -84.86695°

Project Name:	Mercer County Solar Power Plant
Project Number:	193508
Test Date:	11/17/2019

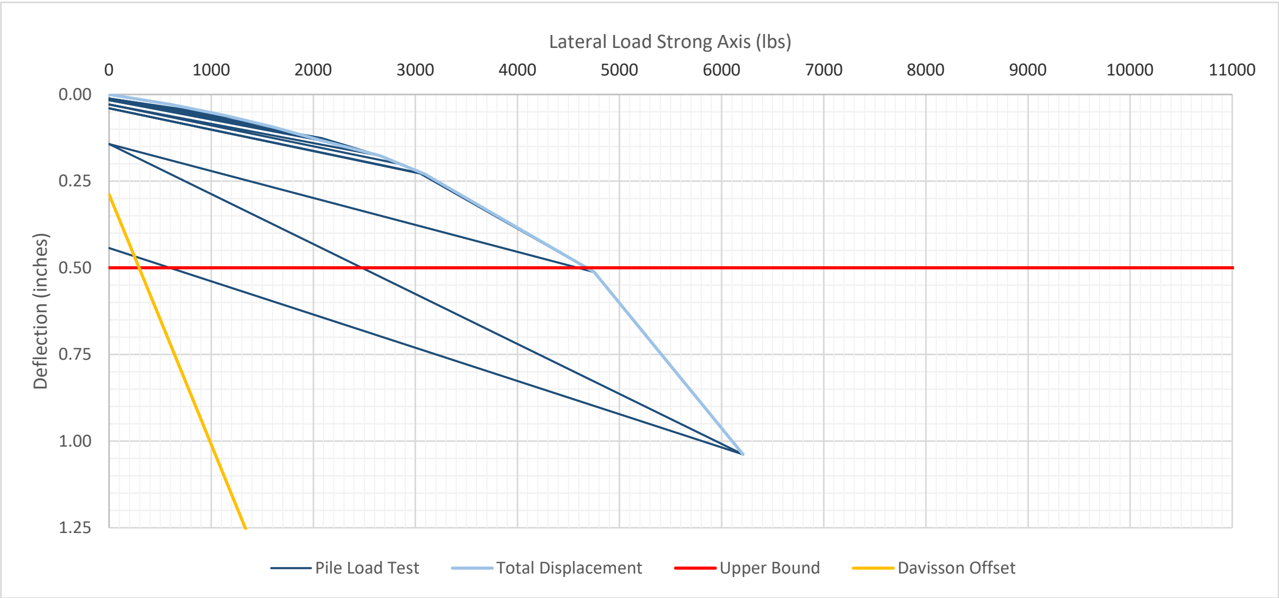


Figure No. 98C

CONSULTING GROUP

Post Load Test Results

Test Location: 3A
Post Size: W6x9
Depth Driven: 2-1/2 feet
GPS Test Coordinates: 37.82429°, -84.86747°

Project Name: Mercer County Solar Power Plant
Project Number: 193508
Test Date: 11/16/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	881	0.003	0.003	0.003	2	1	770	0.000	0.040	0.020
3	1	1112	0.041	0.050	0.046	3	1	1105	0.091	0.100	0.096
4	1	1588	0.099	0.121	0.110	4	1	0	0.020	0.071	0.026
5	1	1972	0.245	0.270	0.257	5	1	1353	0.175	0.175	0.175
6	1	0	0.225	0.239	0.232	6	1	1685	0.328	0.295	0.312
7	1	2996	1.016	1.042	1.029	7	1	0	0.116	0.174	0.145
8	1	0	0.831	0.983	0.907	8	1	2400	0.632	0.418	0.525
Reset Gauges to Zero						9	1	0	0.109	0.348	0.228
10	1	0	0.000	0.000	0.000	10	1	3610	1.003	1.042	1.023
11	1	3196	0.506	0.530	0.518	11	1	0	0.984	0.992	0.988
12	1	0	0.476	0.461	0.468						

Figure No. 99A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	3A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	2-1/2 feet	Project Number:	193508
GPS Test Coordinates:	37.82429°, -84.86747°	Test Date:	11/16/2019

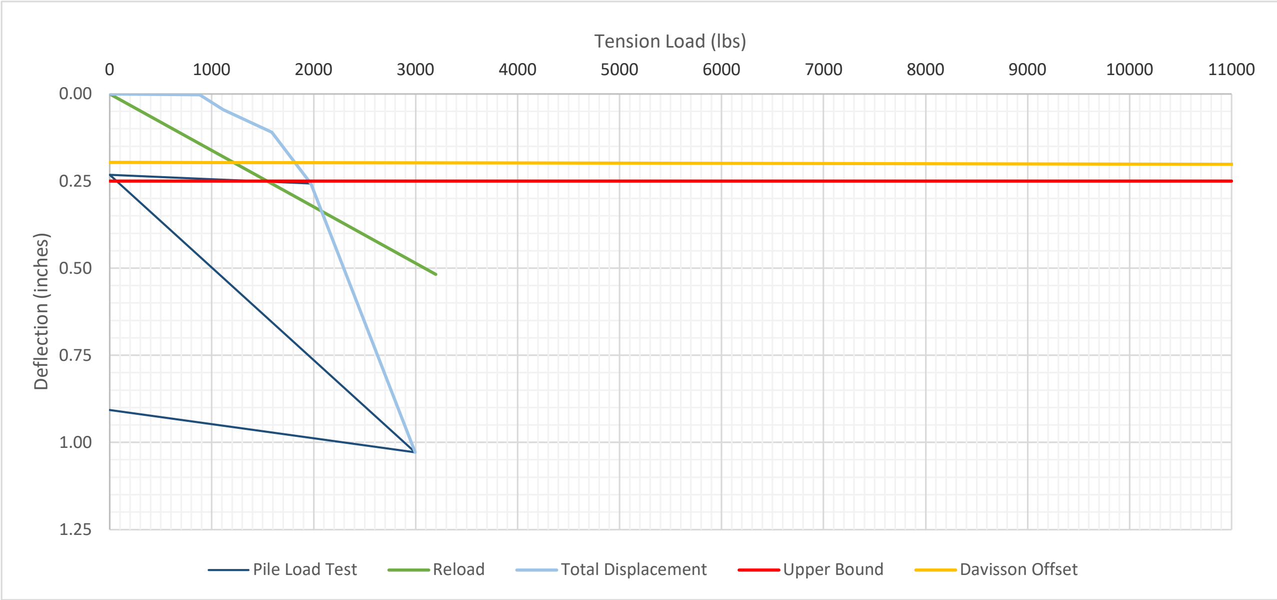


Figure No. 99B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	3A
Post Size:	W6x9
Depth Driven:	2-1/2 feet
GPS Test Coordinates:	37.82429°, -84.86747°

Project Name:	Mercer County Solar Power Plant
Project Number:	193508
Test Date:	11/16/2019

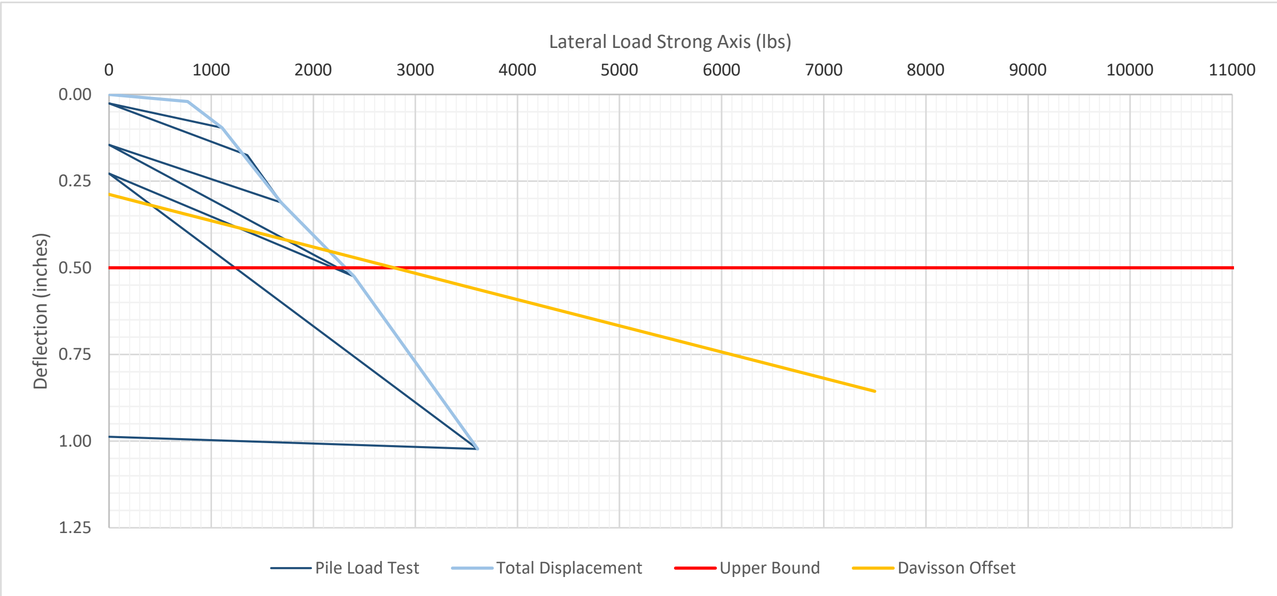


Figure No. 99C

CONSULTING GROUP

Post Load Test Results

Test Location:	3B
Post Size:	W6x9
Depth Driven:	3 feet
GPS Test Coordinates:	37.82429°, -84.86747°
Project Name:	Mercer County Solar Power Plant
Project Number:	193508
Test Date:	11/16/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	623	0.001	0.000	0.000	2	1	758	0.026	0.078	0.052
3	1	1044	0.002	0.000	0.001	3	1	1196	0.076	0.179	0.127
4	1	1773	0.006	0.000	0.003	4	1	0	0.051	0.039	0.045
5	1	2093	0.008	0.000	0.004	5	1	1144	0.128	0.229	0.178
6	5	2001	0.013	0.001	0.007	6	1	1612	0.189	0.327	0.258
7	1	0	0.011	0.001	0.006	7	1	0	0.108	0.085	0.096
8	1	2365	0.015	0.002	0.008	8	1	1843	0.236	0.378	0.307
9	1	5703	0.253	0.260	0.256	9	1	2163	0.301	0.467	0.384
10	1	0	0.206	0.227	0.216	10	1	0	0.174	0.142	0.158
11	1	7318	1.039	1.015	1.027	11	1	2112	0.330	0.488	0.409
12	1	0	0.699	0.694	0.696	12	1	2683	0.370	0.531	0.450
Reset Gauges to Zero						13	1	0	0.233	0.222	0.227
13	1	0	0.000	0.000	0.000	14	1	2860	0.428	0.596	0.512
14	1	6792	0.547	0.501	0.524	15	1	0	0.265	0.240	0.253
15	1	0	0.130	0.090	0.110	16	1	4050	0.810	1.192	1.001
						17	1	0	0.539	0.509	0.524

Figure No. 100A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	3B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	3 feet	Project Number:	193508
GPS Test Coordinates:	37.82429°, -84.86747°	Test Date:	11/16/2019

Figure No. 100B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	3B			
Post Size:	W6x9		Project Name:	Mercer County Solar Power Plant
Depth Driven:	3 feet		Project Number:	193508
GPS Test Coordinates:	37.82429°, -84.86747°		Test Date:	11/16/2019

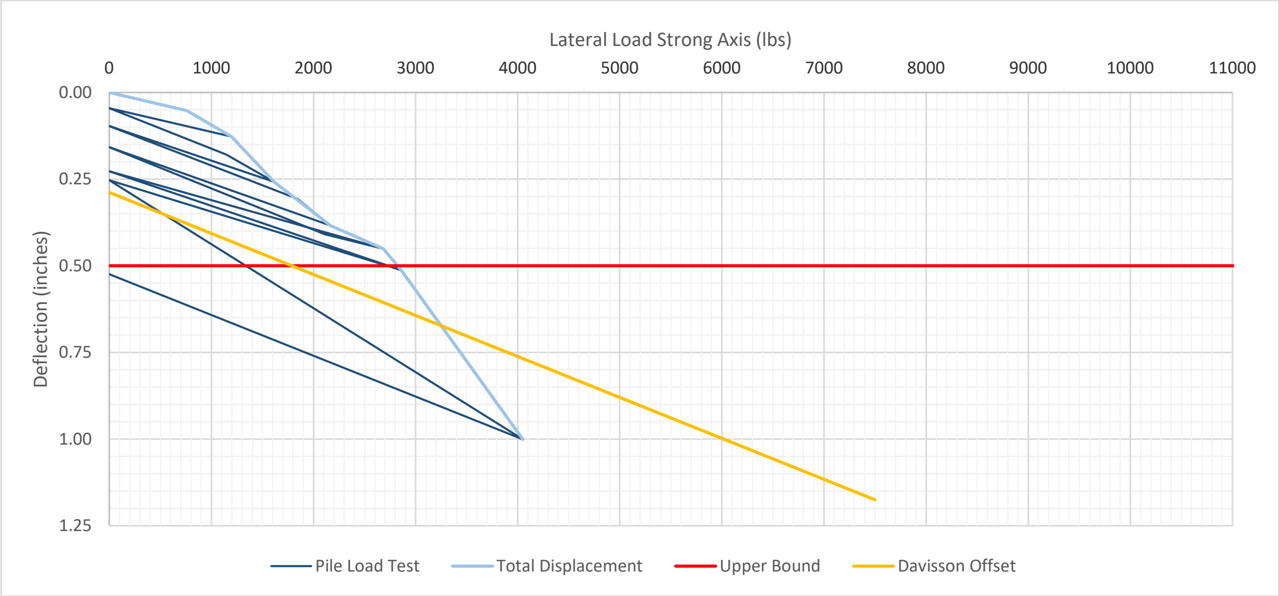


Figure No. 100C

CONSULTING GROUP

Post Load Test Results

Test Location:	4A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	4 feet	Project Number:	193508
GPS Test Coordinates:	37.81960°, -84.87423°	Test Date:	11/18/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	526	0.001	0.001	0.001	2	1	719	0.007	0.049	0.028
3	1	1203	0.004	0.002	0.003	3	1	1079	0.040	0.091	0.065
4	1	1605	0.008	0.007	0.007	4	1	0	0.012	0.018	0.015
5	1	2088	0.073	0.072	0.073	5	1	1090	0.032	0.088	0.060
6	1	2137	0.100	0.098	0.099	6	1	1759	0.098	0.154	0.126
7	1	0	0.096	0.096	0.096	7	1	0	0.036	0.037	0.036
8	1	2115	0.106	0.105	0.106	8	1	1606	0.102	0.159	0.131
9	1	2605	0.366	0.363	0.364	9	1	2326	0.155	0.213	0.184
10	1	0	0.358	0.357	0.357	10	1	0	0.055	0.057	0.056
11	1	3267	1.019	1.017	1.018	11	1	2124	0.165	0.218	0.191
12	1	0	1.005	0.998	1.001	12	1	2510	0.212	0.267	0.239
Reset Gauges to Zero						13	1	0	0.084	0.084	0.084
13	1	0	0.000	0.000	0.000	14	1	2754	0.278	0.328	0.303
14	1	3332	0.528	0.525	0.526	15	1	3466	0.366	0.416	0.391
15	1	0	0.509	0.507	0.508	16	1	0	0.166	0.161	0.163
						17	1	3110	0.432	0.468	0.450
						18	1	3650	0.506	0.542	0.524
						19	1	0	0.270	0.258	0.264
						20	1	4426	0.975	1.045	1.010
						21	1	0	0.643	0.625	0.634

Figure No. 101A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	4A			
Post Size:	W6x9		Project Name:	Mercer County Solar Power Plant
Depth Driven:	4 feet		Project Number:	193508
GPS Test Coordinates:	37.81960°, -84.87423°		Test Date:	11/18/2019

Figure No. 101B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	4A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	4 feet	Project Number:	193508
GPS Test Coordinates:	37.81960°, -84.87423°	Test Date:	11/18/2019

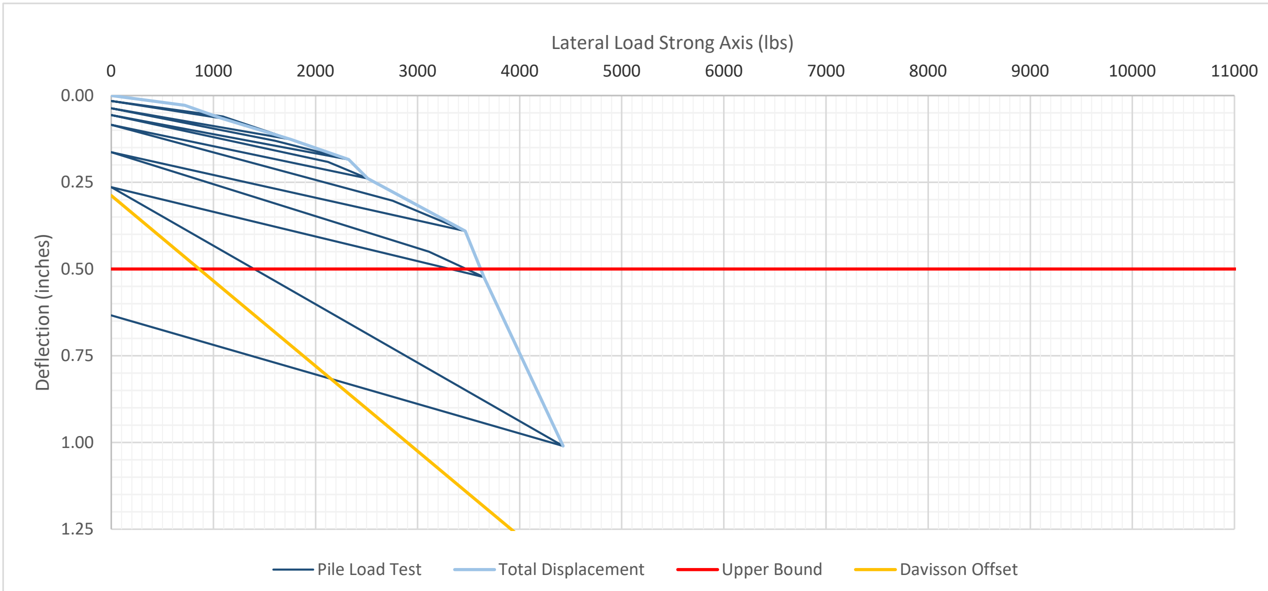


Figure No. 101C

CONSULTING GROUP

Post Load Test Results

Test Location:	4B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	5-1/4 feet	Project Number:	193508
GPS Test Coordinates:	37.81960°, -84.87423°	Test Date:	11/18/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	668	0.000	0.000	0.000	2	1	957	0.038	0.074	0.056
3	1	1036	0.000	0.000	0.000	3	1	1156	0.048	0.084	0.066
4	1	1595	0.000	0.000	0.000	4	1	0	0.013	0.017	0.015
5	1	2120	0.000	0.000	0.000	5	1	1316	0.058	0.086	0.072
6	1	2053	0.012	0.001	0.007	6	1	1784	0.096	0.126	0.111
7	1	0	0.012	0.002	0.007	7	1	0	0.025	0.018	0.022
8	1	2080	0.012	0.002	0.007	8	1	1934	0.121	0.145	0.133
9	1	4126	0.255	0.268	0.261	9	1	2166	0.139	0.164	0.152
10	1	0	0.245	0.271	0.258	10	1	0	0.039	0.019	0.029
11	1	3901	0.986	1.106	1.046	11	1	2130	0.142	0.162	0.152
12	1	0	0.987	1.102	1.044	12	1	2729	0.189	0.212	0.200
Reset Gauges to Zero						13	1	0	0.056	0.023	0.039
13	1	0	0.000	0.000	0.000	14	1	2773	0.222	0.240	0.231
14	1	4268	0.678	0.530	0.604	15	1	3209	0.255	0.274	0.265
15	1	0	0.678	0.528	0.603	16	1	0	0.079	0.041	0.060
						17	1	3652	0.296	0.311	0.303
						18	1	4804	0.494	0.528	0.511
						19	1	0	0.200	0.134	0.167
						20	1	6789	1.213	0.810	1.011
						21	1	0	0.733	0.575	0.654

Figure No. 102A

Tension Post Load Test Results

Test Location:	4B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	5-1/4 feet	Project Number:	193508
GPS Test Coordinates:	37.81960°, -84.87423°	Test Date:	11/18/2019

Figure No. 102B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	4B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	5-1/4 feet	Project Number:	193508
GPS Test Coordinates:	37.81960°, -84.87423°	Test Date:	11/18/2019

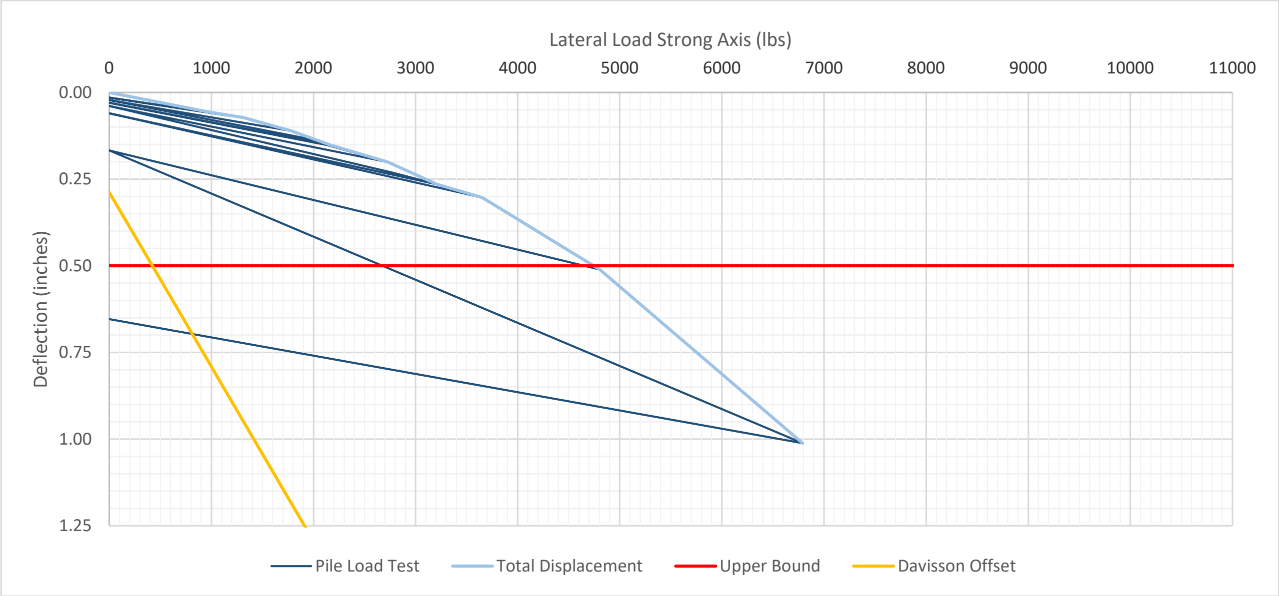


Figure No. 102C

CONSULTING GROUP

Post Load Test Results

Test Location:	5A
Post Size:	W6x9
Depth Driven:	5 feet
GPS Test Coordinates:	37.82113°, -84.85611°
Project Name:	Mercer County Solar Power Plant
Project Number:	193508
Test Date:	11/16/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	524	0.000	0.000	0.000	2	1	684	0.004	0.074	0.039
3	1	1043	0.000	0.000	0.000	3	1	1158	0.015	0.143	0.079
4	1	1506	0.000	0.000	0.000	4	1	0	0.006	0.027	0.010
5	1	2151	0.000	0.000	0.000	5	1	1381	0.034	0.154	0.094
6	1	2046	0.001	0.001	0.001	6	1	1604	0.059	0.196	0.127
7	1	0	0.001	0.001	0.001	7	1	0	0.016	0.028	0.006
8	1	2010	0.002	0.001	0.001	8	1	1738	0.099	0.154	0.126
9	1	5940	0.318	0.302	0.310	9	1	2103	0.131	0.197	0.164
10	1	0	0.164	0.280	0.222	10	1	0	0.004	0.038	0.021
11	1	5458	1.019	1.026	1.022	11	1	2279	0.173	0.245	0.209
12	1	0	1.008	1.006	1.007	12	1	2929	0.204	0.284	0.244
Reset Gauges to Zero						13	1	0	0.008	0.048	0.028
13	1	0	0.000	0.000	0.000	14	1	3460	0.270	0.361	0.316
14	1	5080	0.535	0.525	0.530	15	1	0	0.016	0.069	0.043
15	1	0	0.483	0.494	0.488	16	1	3149	0.267	0.350	0.308
						17	1	5382	0.450	0.552	0.501
						18	1	0	0.041	0.086	0.064
						19	1	8053	0.835	1.004	0.919
						20	1	8614	0.918	1.101	1.009
						21	1	0	0.177	0.247	0.212

Figure No. 103A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	5A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	5 feet	Project Number:	193508
GPS Test Coordinates:	37.82113°, -84.85611°	Test Date:	11/16/2019

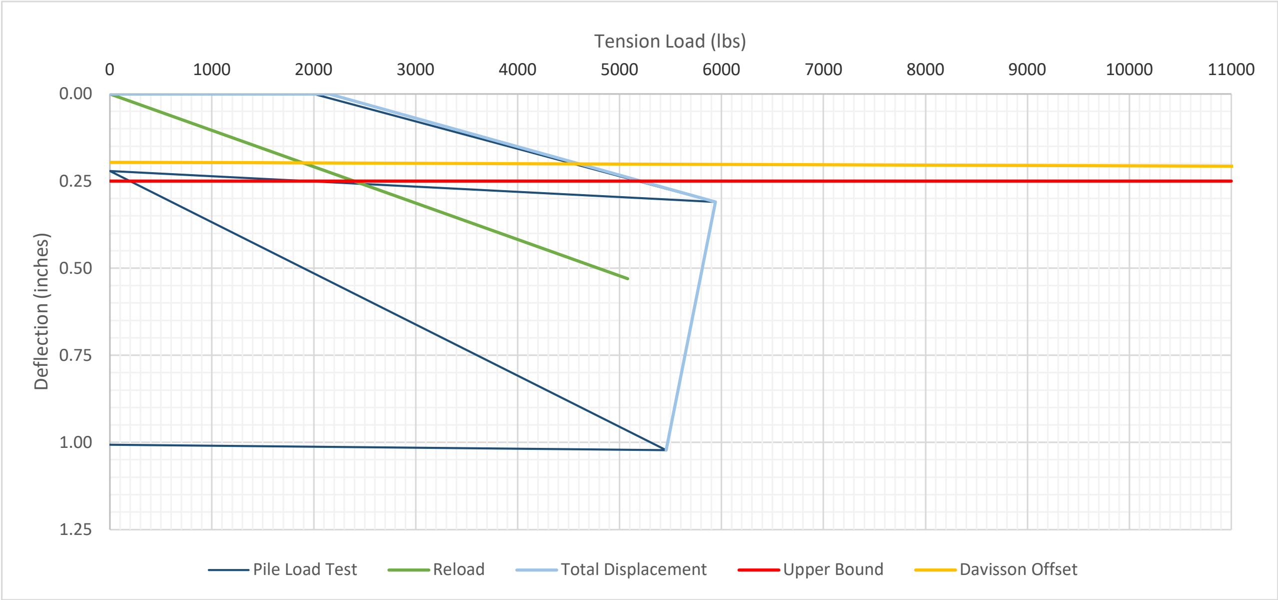


Figure No. 103B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	5A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	5 feet	Project Number:	193508
GPS Test Coordinates:	37.82113°, -84.85611°	Test Date:	11/16/2019

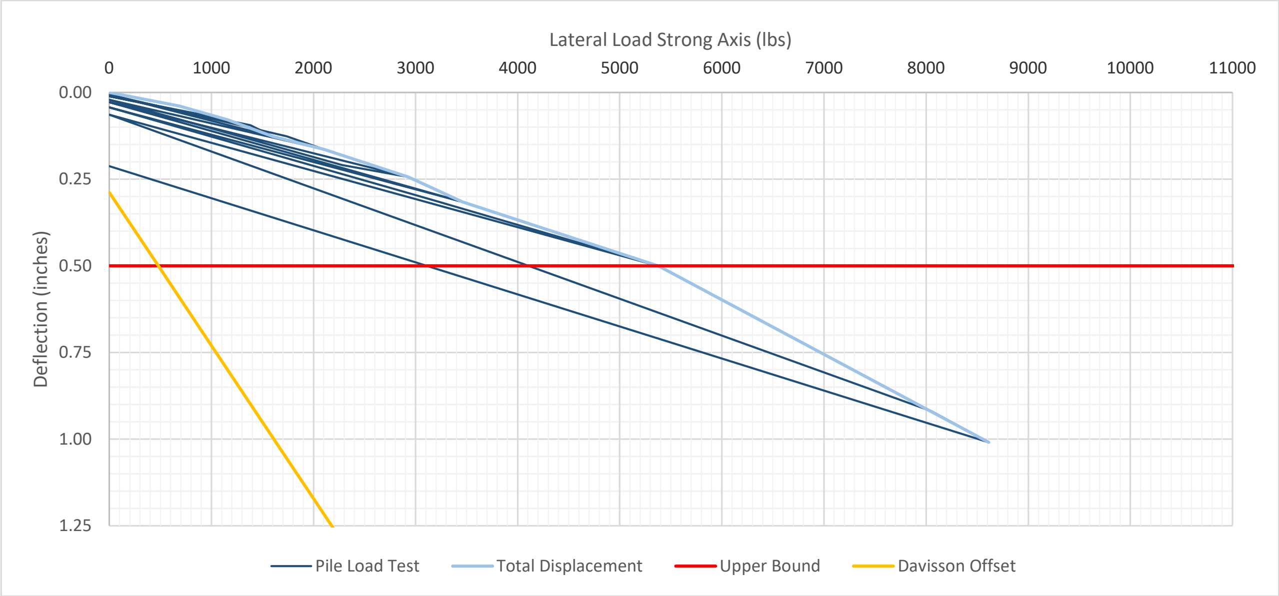


Figure No. 103C

CONSULTING GROUP

Post Load Test Results

Test Location: 5B
Post Size: W6x9
Depth Driven: 7 feet
GPS Test Coordinates: 37.82113°, -84.85611°

Project Name: Mercer County Solar Power Plant
Project Number: 193508
Test Date: 11/16/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	910	0.008	0.009	0.008	2	1	757	0.041	0.042	0.041
3	1	1330	0.010	0.015	0.012	3	1	1348	0.070	0.062	0.066
4	1	1902	0.020	0.021	0.020	4	1	0	0.057	0.007	0.032
5	1	2153	0.022	0.023	0.022	5	1	1856	0.129	0.083	0.106
6	5	2093	0.033	0.024	0.028	6	1	0	0.102	0.020	0.061
7	1	0	0.006	0.002	0.004	7	1	1790	0.148	0.075	0.111
8	1	2361	0.074	0.013	0.044	8	1	2005	0.167	0.100	0.133
9	1	8380	0.350	0.263	0.306	9	1	0	0.130	0.029	0.079
10	1	0	0.303	0.290	0.296	10	1	2513	0.222	0.111	0.167
11	1	8539	1.215	1.032	1.124	11	1	2573	0.235	0.120	0.177
12	1	0	1.063	1.045	1.054	12	1	0	0.170	0.043	0.106
Reset Gauges to Zero						13	1	3210	0.322	0.248	0.285
13	1	0	0.000	0.000	0.000	14	1	0	0.218	0.154	0.186
14	1	10084	0.590	0.460	0.525	15	1	3620	0.409	0.248	0.329
15	1	0	0.488	0.466	0.477	16	1	5466	0.565	0.446	0.505
						17	1	0	0.341	0.167	0.254
						18	1	8942	1.025	0.985	1.005
						19	1	0	0.144	0.141	0.142

Figure No. 104A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	5B			
Post Size:	W6x9		Project Name:	Mercer County Solar Power Plant
Depth Driven:	7 feet		Project Number:	193508
GPS Test Coordinates:	37.82113°, -84.85611°		Test Date:	11/16/2019

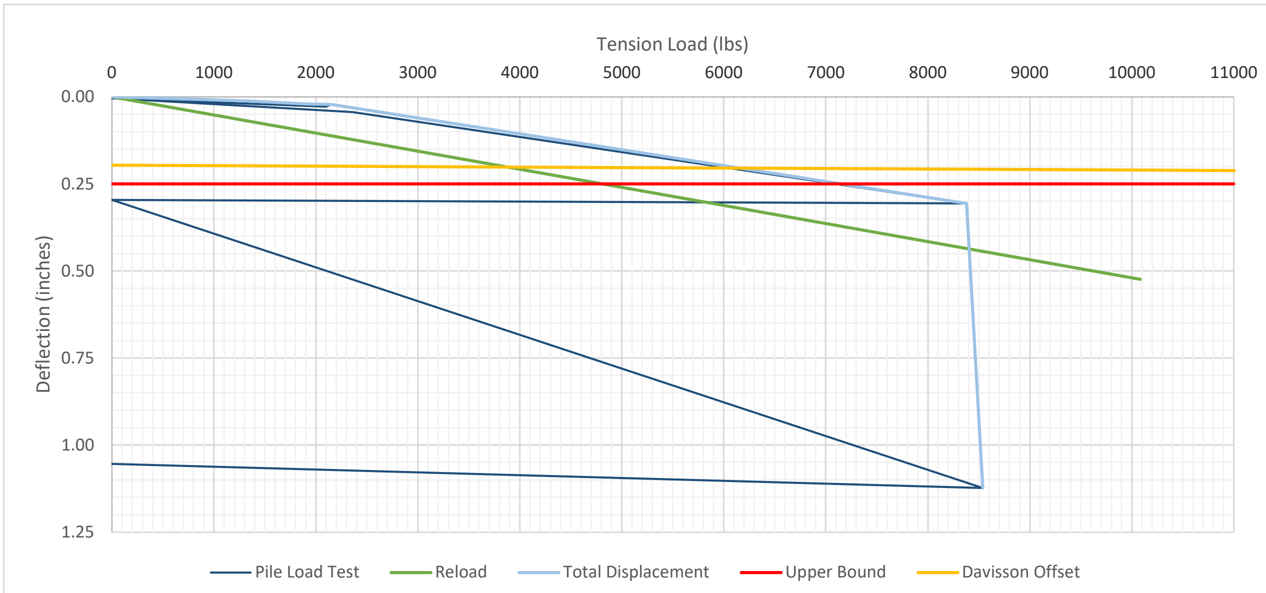


Figure No. 104B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	5B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	7 feet	Project Number:	193508
GPS Test Coordinates:	37.82113°, -84.85611°	Test Date:	11/16/2019

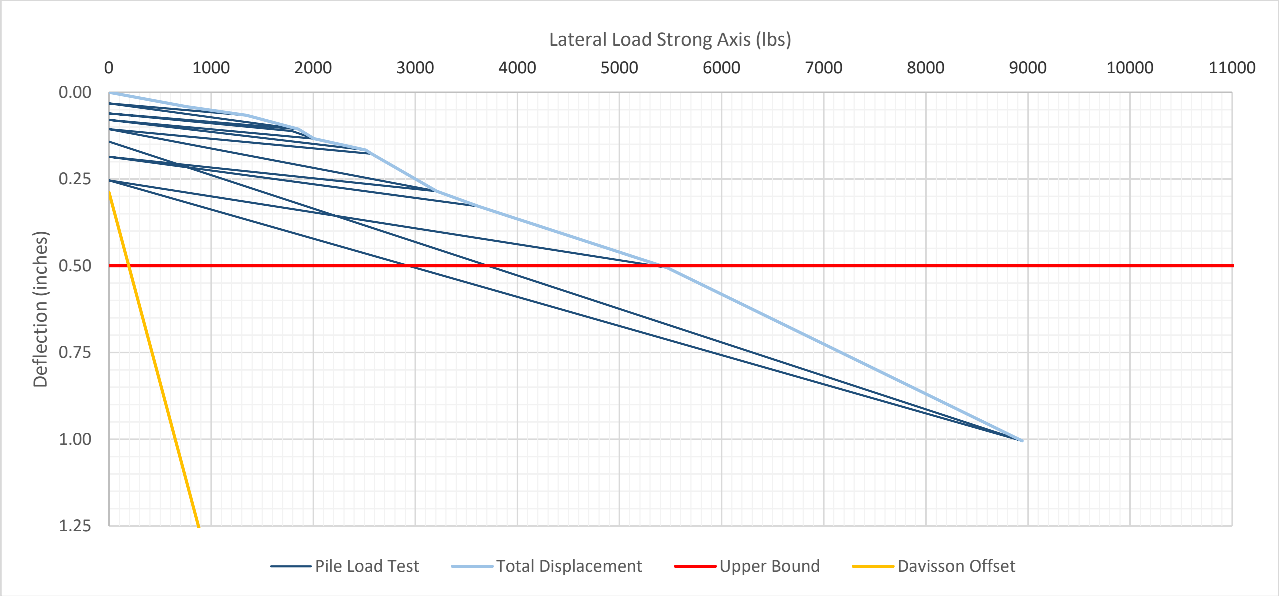


Figure No. 104C

CONSULTING GROUP

Post Load Test Results

Test Location:	6A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	4 feet	Project Number:	193508
GPS Test Coordinates:	37.81913°, -84.86133°	Test Date:	11/16/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	1146	0.000	0.003	0.001	2	1	587	0.029	0.065	0.018
3	1	1567	0.000	0.006	0.003	3	1	1178	0.001	0.109	0.055
4	1	2030	0.001	0.010	0.006	4	1	0	0.004	0.008	0.006
5	5	2115	0.003	0.018	0.010	5	1	1200	0.012	0.130	0.059
6	1	0	0.003	0.017	0.010	6	1	1505	0.002	0.141	0.070
7	1	2014	0.003	0.020	0.011	7	1	0	0.001	0.016	0.008
8	1	5219	0.233	0.280	0.257	8	1	1805	0.093	0.106	0.099
9	1	0	0.228	0.266	0.247	9	1	2097	0.117	0.145	0.131
10	1	4878	0.981	1.044	1.012	10	1	0	0.032	0.026	0.029
11	1	0	0.971	1.029	1.000	11	1	2073	0.130	0.151	0.140
Reset Gauges to Zero						12	1	2711	0.169	0.199	0.184
12	1	0	0.000	0.000	0.000	13	1	0	0.046	0.043	0.044
13	1	4063	0.476	0.546	0.511	14	1	2648	0.189	0.197	0.193
14	1	0	0.471	0.534	0.502	15	1	3151	0.225	0.231	0.228
						16	1	0	0.061	0.058	0.059
						17	1	3190	0.254	0.235	0.245
						18	1	4426	0.608	0.392	0.500
						19	1	0	0.201	0.167	0.184
						20	1	5545	1.014	0.639	0.826
						21	1	5915	1.225	0.817	1.021
						22	1	0	0.606	0.500	0.553

Figure No. 105A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	6A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	4 feet	Project Number:	193508
GPS Test Coordinates:	37.81913°, -84.86133°	Test Date:	11/16/2019

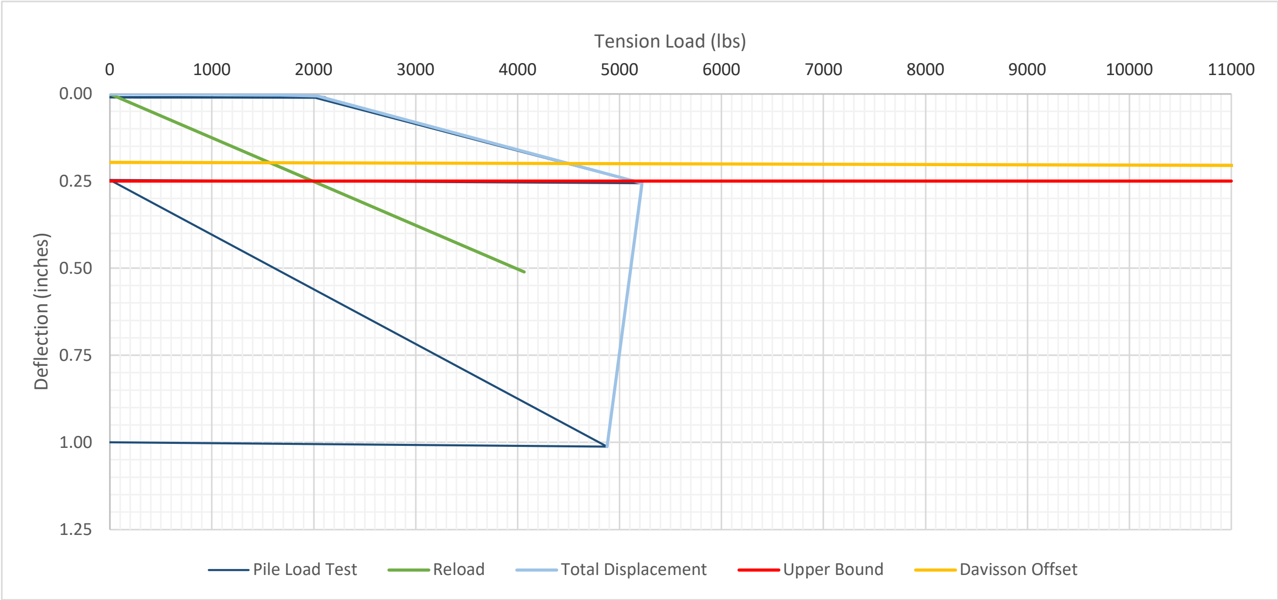


Figure No. 105B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	6A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	4 feet	Project Number:	193508
GPS Test Coordinates:	37.81913°, -84.86133°	Test Date:	11/16/2019

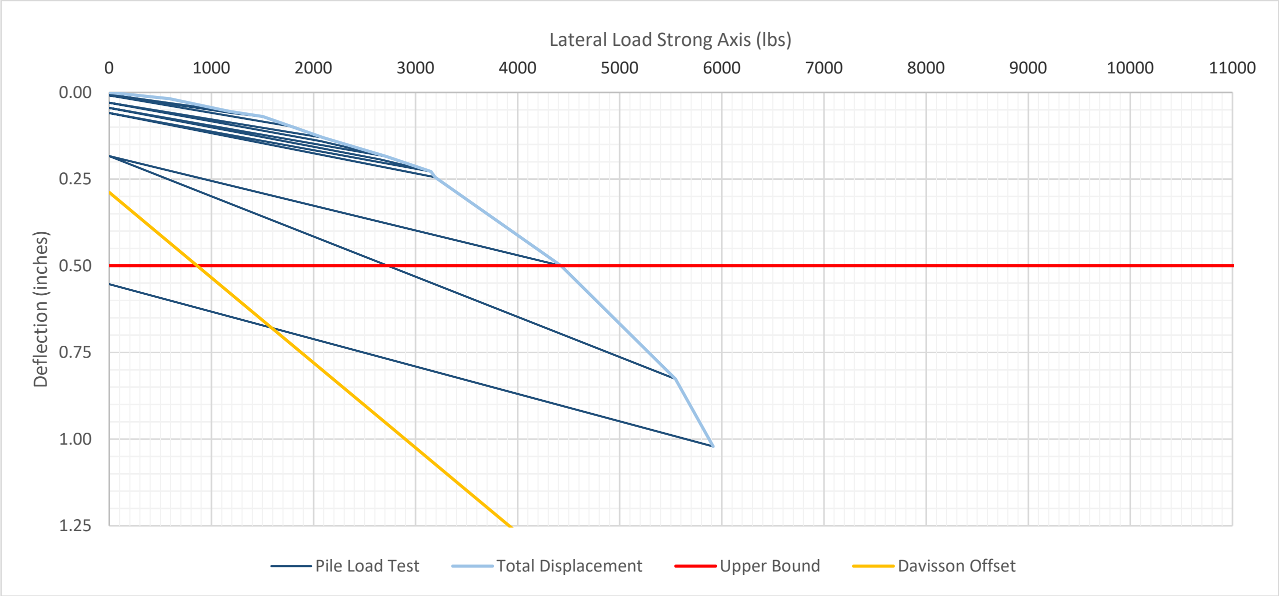


Figure No. 105C

CONSULTING GROUP

Post Load Test Results

Test Location: 6B
Post Size: W6x9
Depth Driven: 5-1/2 feet
GPS Test Coordinates: 37.81913°, -84.86133°

Project Name: Mercer County Solar Power Plant
Project Number: 193508
Test Date: 11/16/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	582	0.000	0.001	0.001	2	1	566	0.014	0.018	0.016
3	1	1125	0.000	0.001	0.001	3	1	1154	0.050	0.044	0.047
4	1	1583	0.001	0.003	0.002	4	1	0	0.005	0.007	0.006
5	5	2085	0.007	0.008	0.007	5	1	1005	0.045	0.043	0.044
6	1	2064	0.008	0.009	0.008	6	1	1709	0.091	0.074	0.082
7	1	0	0.008	0.008	0.008	7	1	0	0.011	0.010	0.010
8	1	2242	0.008	0.009	0.009	8	1	1544	0.083	0.073	0.078
9	1	10090	0.181	0.182	0.181	9	1	2017	0.120	0.104	0.112
10	1	0	0.142	0.143	0.142	10	1	0	0.013	0.013	0.013
						11	1	2090	0.125	0.109	0.117
						12	1	2604	0.157	0.136	0.147
						13	1	0	0.015	0.018	0.016
						14	1	2638	0.163	0.144	0.153
						15	1	3042	0.199	0.170	0.184
						16	1	0	0.020	0.025	0.022
						17	1	3409	0.231	0.193	0.212
						18	1	6336	0.617	0.393	0.505
						19	1	0	0.078	0.060	0.069
						20	1	8188	0.816	0.623	0.720
						21	1	10088	0.898	0.861	0.879
						22	1	0	0.367	0.143	0.255

Figure No. 106A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	6B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	5-1/2 feet	Project Number:	193508
GPS Test Coordinates:	37.81913°, -84.86133°	Test Date:	11/16/2019

Figure No. 106B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	6B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	5-1/2 feet	Project Number:	193508
GPS Test Coordinates:	37.81913°, -84.86133°	Test Date:	11/16/2019

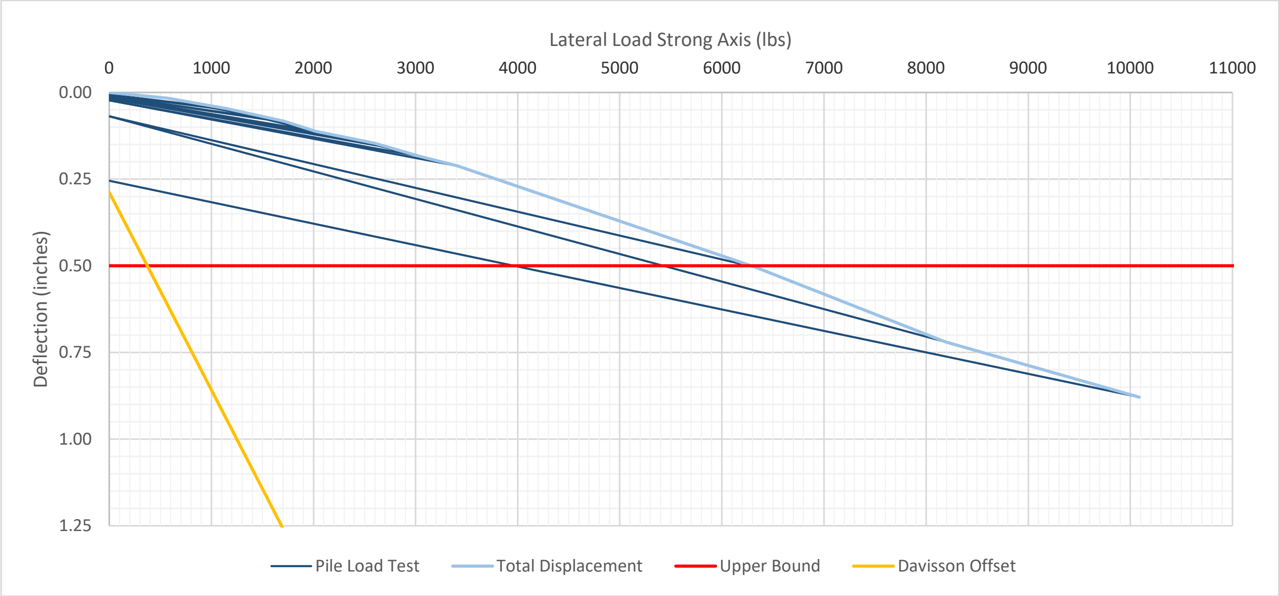


Figure No. 106C

CONSULTING GROUP

Post Load Test Results

Test Location:	7A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	4 feet	Project Number:	193508
GPS Test Coordinates:	37.81512°, -84.87457°	Test Date:	11/18/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	584	0.000	0.000	0.000	2	1	560	0.069	0.055	0.062
3	1	1007	0.001	0.005	0.003	3	1	1082	0.164	0.059	0.111
4	1	1570	0.003	0.007	0.005	4	1	0	0.038	0.023	0.030
5	1	2039	0.010	0.016	0.013	5	1	1452	0.206	0.098	0.152
6	5	2012	0.023	0.033	0.028	6	1	1784	0.237	0.129	0.183
7	1	0	0.023	0.033	0.028	7	1	0	0.067	0.048	0.057
8	1	2185	0.025	0.036	0.030	8	1	1871	0.233	0.151	0.192
9	1	2377	0.252	0.266	0.259	9	1	2044	0.267	0.182	0.225
10	1	0	0.248	0.262	0.255	10	1	0	0.075	0.072	0.073
10	1	2216	1.033	1.046	1.040	11	1	2028	0.286	0.216	0.251
10	1	0	1.027	1.042	1.034	12	1	2648	0.357	0.297	0.327
Reset Gauges to Zero						13	1	0	0.110	0.125	0.117
10	1	0	0.000	0.000	0.000	14	1	2873	0.396	0.363	0.380
10	1	2293	0.522	0.536	0.529	15	1	3166	0.452	0.436	0.444
10	1	0	0.515	0.529	0.522	16	1	0	0.152	0.197	0.174
						17	1	3305	0.488	0.483	0.485
						18	1	3410	0.524	0.526	0.525
						19	1	0	0.196	0.268	0.232
						20	1	3876	0.953	1.059	1.006
						21	1	0	0.470	0.629	0.549

Figure No. 107A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	7A			
Post Size:	W6x9		Project Name:	Mercer County Solar Power Plant
Depth Driven:	4 feet		Project Number:	193508
GPS Test Coordinates:	37.81512°, -84.87457°		Test Date:	11/18/2019

Figure No. 107B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	7A
Post Size:	W6x9
Depth Driven:	4 feet
GPS Test Coordinates:	37.81512°, -84.87457°
Project Name:	Mercer County Solar Power Plant
Project Number:	193508
Test Date:	11/18/2019

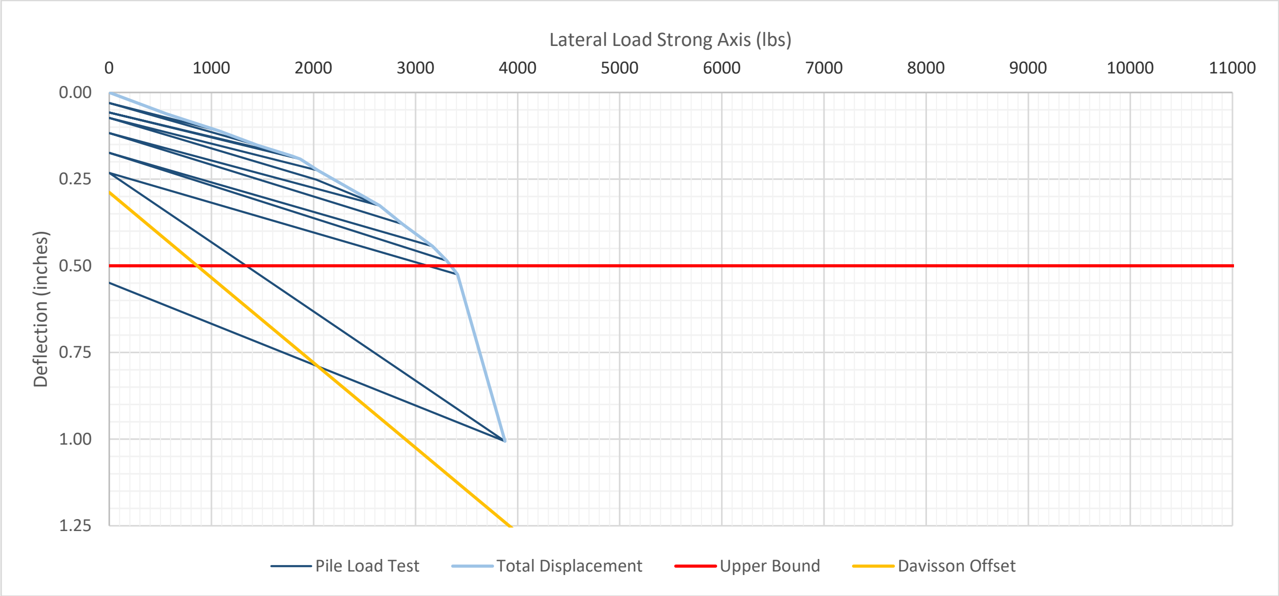


Figure No. 107C

CONSULTING GROUP

Post Load Test Results

Test Location: 7B
Post Size: W6x9
Depth Driven: 6 feet
GPS Test Coordinates: 37.81512°, -84.87457°

Project Name: Mercer County Solar Power Plant
Project Number: 193508
Test Date: 11/18/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	590	0.000	0.000	0.000	2	1	712	0.038	0.054	0.046
3	1	1383	0.000	0.000	0.000	3	1	1160	0.054	0.083	0.068
4	1	1663	0.000	0.000	0.000	4	1	0	0.008	0.010	0.009
5	1	2131	0.000	0.002	0.001	5	1	1164	0.124	0.068	0.096
6	5	2316	0.000	0.002	0.001	6	1	1650	0.151	0.084	0.117
7	1	0	0.000	0.004	0.002	7	1	0	0.030	0.006	0.018
8	1	2143	0.000	0.004	0.002	8	1	1827	0.152	0.087	0.119
9	1	7505	0.282	0.302	0.292	9	1	2088	0.165	0.096	0.131
10	1	0	0.283	0.291	0.287	10	1	0	0.034	0.008	0.021
11	1	6412	1.012	1.027	1.019	11	1	3470	0.243	0.180	0.211
12	1	0	1.012	1.021	1.016	12	1	5467	0.533	0.486	0.509
Reset Gauges to Zero						13	1	0	0.101	0.071	0.086
13	1	0	0.000	0.000	0.000	14	1	7793	1.046	0.991	1.018
14	1	6513	0.519	0.532	0.525	15	1	0	0.309	0.268	0.288
15	1	0	0.520	0.525	0.522						

Figure No. 108A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	7B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	6 feet	Project Number:	193508
GPS Test Coordinates:	37.81512°, -84.87457°	Test Date:	11/18/2019

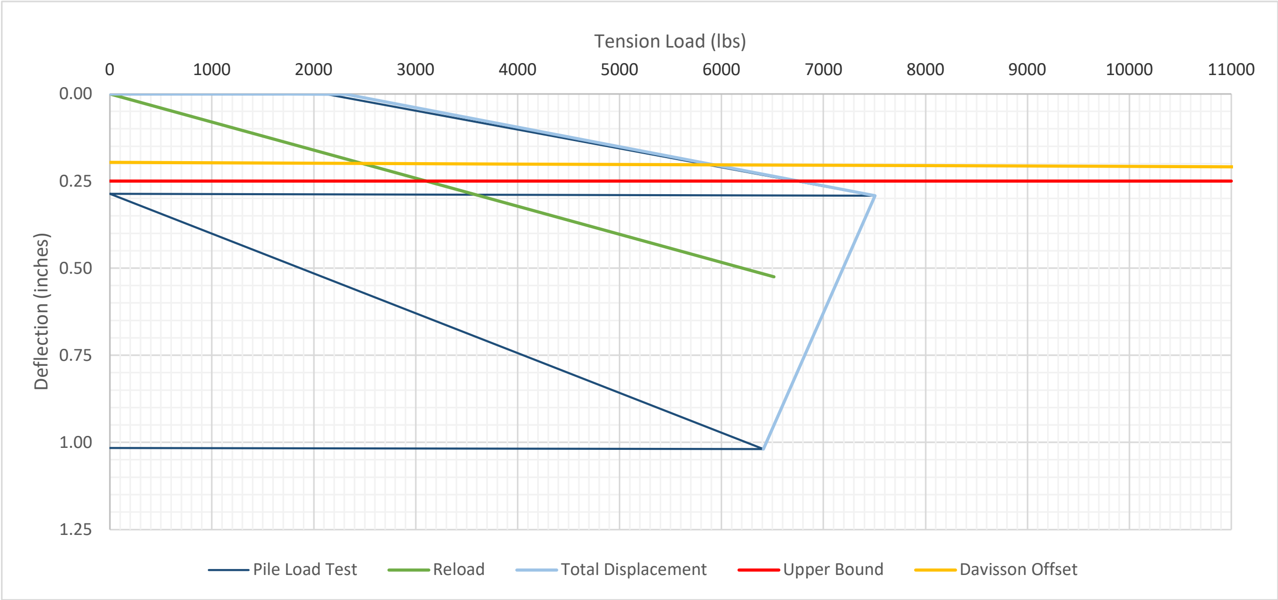


Figure No. 108B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	7B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	6 feet	Project Number:	193508
GPS Test Coordinates:	37.81512°, -84.87457°	Test Date:	11/18/2019

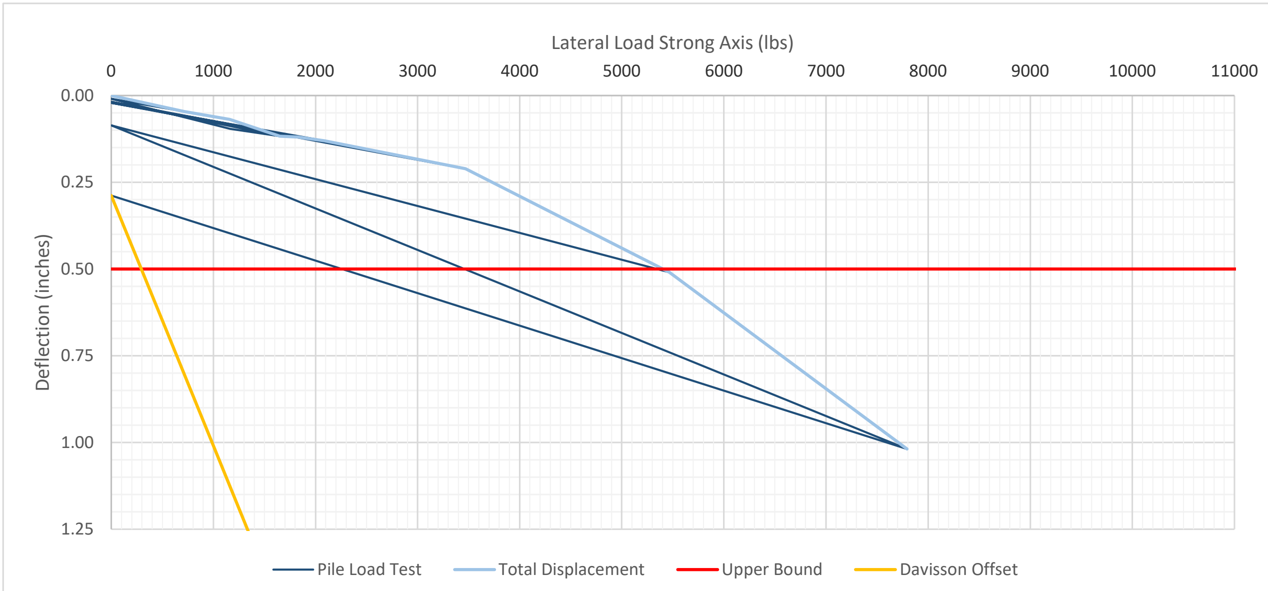


Figure No. 108C

CONSULTING GROUP

Post Load Test Results

Test Location: 8A
Post Size: W6x9
Depth Driven: 6 feet
GPS Test Coordinates: 37.81412°, -84.85789°

Project Name: Mercer County Solar Power Plant
Project Number: 193508
Test Date: 11/15/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	557	0.000	0.000	0.000	2	1	564	0.014	0.013	0.013
3	1	1103	0.000	0.000	0.000	3	1	1178	0.033	0.051	0.042
4	1	1821	0.000	0.000	0.000	4	1	0	0.009	0.021	0.015
5	1	2286	0.000	0.000	0.000	5	1	1396	0.044	0.064	0.054
6	5	2081	0.002	0.003	0.002	6	1	1761	0.055	0.080	0.067
7	1	0	0.002	0.003	0.002	7	1	0	0.011	0.025	0.018
8	1	2262	0.003	0.004	0.004	8	1	1574	0.054	0.076	0.065
9	1	6037	0.263	0.261	0.262	9	1	2099	0.069	0.097	0.083
10	1	0	0.256	0.257	0.256	10	1	0	0.014	0.030	0.022
11	1	7316	1.027	1.015	1.021	11	1	2245	0.081	0.109	0.095
12	1	0	1.017	1.009	1.013	12	1	2644	0.096	0.128	0.112
Reset Gauges to Zero						13	1	0	0.019	0.037	0.028
13	1	0	0.000	0.000	0.000	14	1	2885	0.110	0.133	0.122
14	1	7765	0.537	0.521	0.529	15	1	3887	0.150	0.180	0.165
15	1	0	0.524	0.513	0.518	16	1	0	0.030	0.047	0.039
						17	1	3706	0.177	0.187	0.182
						18	1	7035	0.490	0.520	0.505
						19	1	0	0.133	0.122	0.127
						20	1	10053	0.906	0.881	0.893
						21	1	0	0.288	0.258	0.273

Figure No. 109A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	8A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	6 feet	Project Number:	193508
GPS Test Coordinates:	37.81412°, -84.85789°	Test Date:	11/15/2019

Figure No. 109B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	8A
Post Size:	W6x9
Depth Driven:	6 feet
GPS Test Coordinates:	37.81412°, -84.85789°

Project Name:	Mercer County Solar Power Plant
Project Number:	193508
Test Date:	11/15/2019

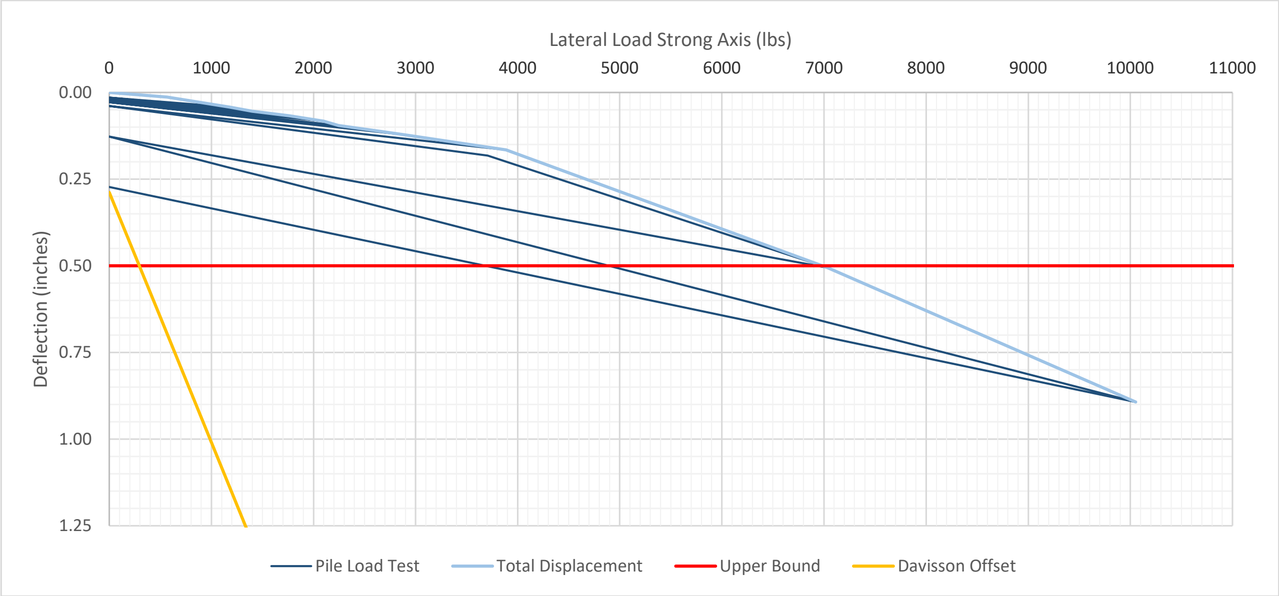


Figure No. 109C

CONSULTING GROUP

Post Load Test Results

Test Location:	8B			
Post Size:	W6x9		Project Name:	Mercer County Solar Power Plant
Depth Driven:	8 feet		Project Number:	193508
GPS Test Coordinates:	37.81412°, -84.85789°		Test Date:	11/15/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	739	0.000	0.003	0.001	2	1	573	0.003	0.004	0.004
3	1	1074	0.000	0.004	0.002	3	1	1431	0.007	0.009	0.008
4	1	1781	0.000	0.005	0.003	4	1	0	0.002	0.007	0.004
5	1	2195	0.000	0.007	0.003	5	1	1648	0.018	0.021	0.019
6	5	2001	0.007	0.010	0.008	6	1	2231	0.028	0.045	0.037
7	1	0	0.007	0.004	0.005	7	1	0	0.008	0.005	0.007
8	1	2292	0.007	0.007	0.007	8	1	2185	0.034	0.071	0.052
9	1	10747	0.064	0.046	0.055	9	1	2974	0.042	0.084	0.063
10	1	0	0.051	0.046	0.049	10	1	0	0.006	0.010	0.008
						11	1	2670	0.038	0.094	0.066
						12	1	3064	0.054	0.124	0.089
						13	1	0	0.011	0.021	0.005
						14	1	3769	0.105	0.190	0.147
						15	1	7500	0.488	0.523	0.505
						16	1	0	0.030	0.047	0.039
						17	1	10000	0.713	0.739	0.726
						18	1	0	0.113	0.128	0.120

Figure No. 110A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	8B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	8 feet	Project Number:	193508
GPS Test Coordinates:	37.81412°, -84.85789°	Test Date:	11/15/2019

Figure No. 110B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	8B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	8 feet	Project Number:	193508
GPS Test Coordinates:	37.81412°, -84.85789°	Test Date:	11/15/2019

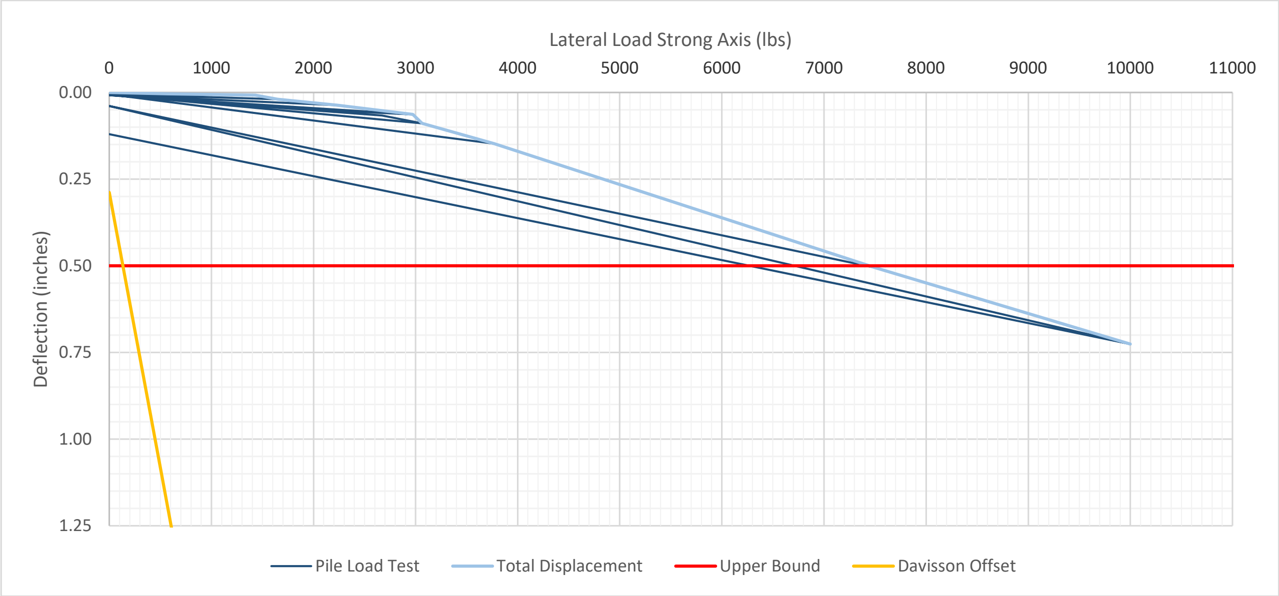


Figure No. 110C

CONSULTING GROUP

Post Load Test Results

Test Location: 9A
Post Size: W6x9
Depth Driven: 2-1/4 feet
GPS Test Coordinates: 37.81136°, -84.86544°

Project Name: Mercer County Solar Power Plant
Project Number: 193508
Test Date: 11/19/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	674	0.002	0.001	0.002	2	1	539	0.224	0.234	0.229
3	1	1359	0.057	0.024	0.040	3	1	1035	0.466	0.477	0.471
4	1	1558	0.118	0.060	0.089	4	1	1043	0.529	0.542	0.536
5	1	1803	0.327	0.220	0.273	5	1	0	0.270	0.292	0.281
6	1	0	0.272	0.174	0.223	6	1	2019	1.016	1.060	1.038
7	1	2009	1.160	0.978	1.069	7	1	0	0.596	0.644	0.620
8	1	0	1.053	0.868	0.961						
Reset Gauges to Zero											
9	1	0	0.000	0.000	0.000						
10	1	2193	0.621	0.400	0.510						
11	1	0	0.499	0.276	0.387						

Figure No. 111A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	9A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	2-1/4 feet	Project Number:	193508
GPS Test Coordinates:	37.81136°, -84.86544°	Test Date:	11/19/2019

Figure No. 111B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	9A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	2-1/4 feet	Project Number:	193508
GPS Test Coordinates:	37.81136°, -84.86544°	Test Date:	11/19/2019

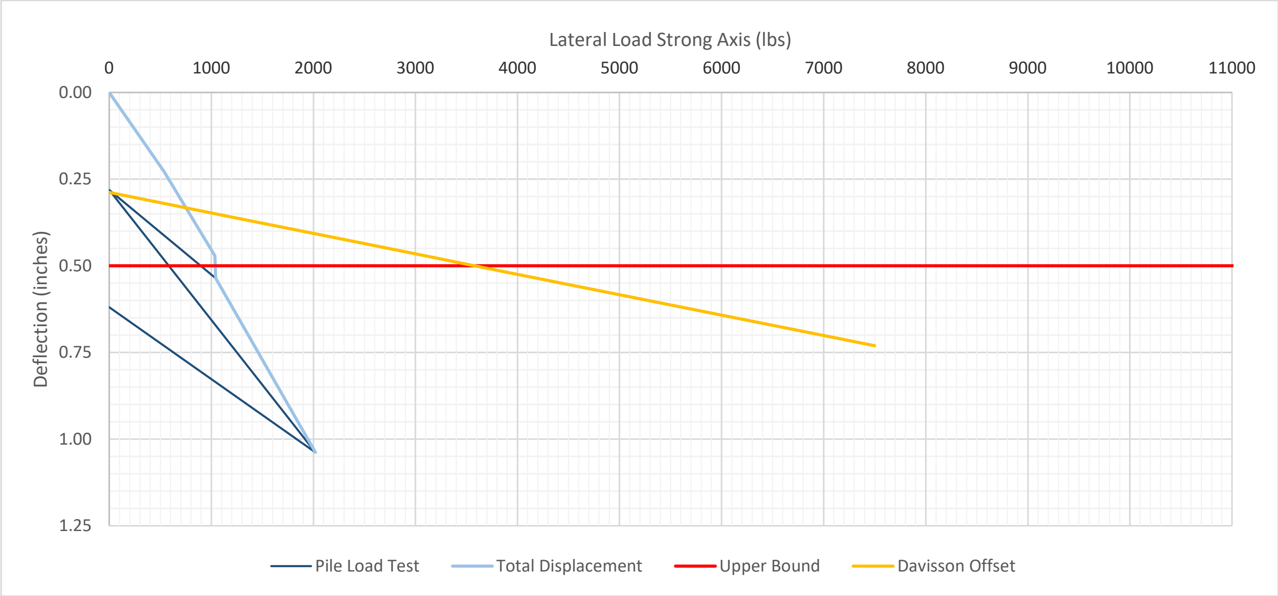


Figure No. 111C

CONSULTING GROUP

Post Load Test Results

Test Location: 9B
Post Size: W6x9
Depth Driven: 3 feet
GPS Test Coordinates: 37.81039°, -84.86537°

Project Name: Mercer County Solar Power Plant
Project Number: 193508
Test Date: 11/19/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	595	0.001	0.003	0.002	2	1	671	0.057	0.050	0.053
3	1	1235	0.006	0.029	0.017	3	1	1097	0.109	0.103	0.106
4	1	1665	0.068	0.121	0.095	4	1	0	0.029	0.033	0.031
5	1	1808	0.259	0.335	0.297	5	1	1346	0.131	0.126	0.129
6	1	0	0.242	0.299	0.270	6	1	1526	0.171	0.170	0.171
7	1	1310	1.022	1.098	1.060	7	1	0	0.044	0.054	0.049
8	1	0	1.011	1.072	1.041	8	1	1541	0.190	0.180	0.185
Reset Gauges to Zero						9	1	2062	0.259	0.250	0.255
9	1	0	0.000	0.000	0.000	10	1	0	0.080	0.085	0.083
10	1	1251	0.642	0.716	0.679	11	1	2121	0.286	0.262	0.274
11	1	0	0.636	0.696	0.666	12	1	2625	0.385	0.343	0.364
						13	1	0	0.137	0.131	0.134
						14	1	2650	0.437	0.362	0.399
						15	1	2980	0.570	0.480	0.525
						16	1	0	0.260	0.231	0.245
						17	1	3331	1.148	1.027	1.087
						18	1	0	0.688	0.621	0.654

Figure No. 112A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	9B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	3 feet	Project Number:	193508
GPS Test Coordinates:	37.81039°, -84.86537°	Test Date:	11/19/2019

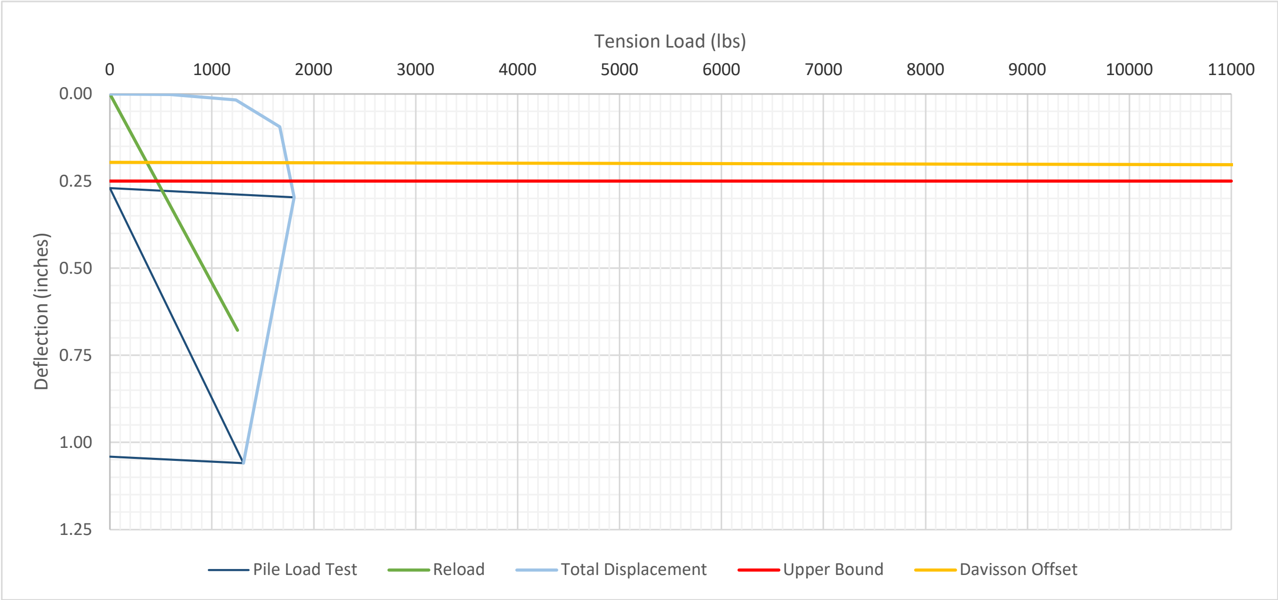


Figure No. 112B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	9B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	3 feet	Project Number:	193508
GPS Test Coordinates:	37.81039°, -84.86537°	Test Date:	11/19/2019

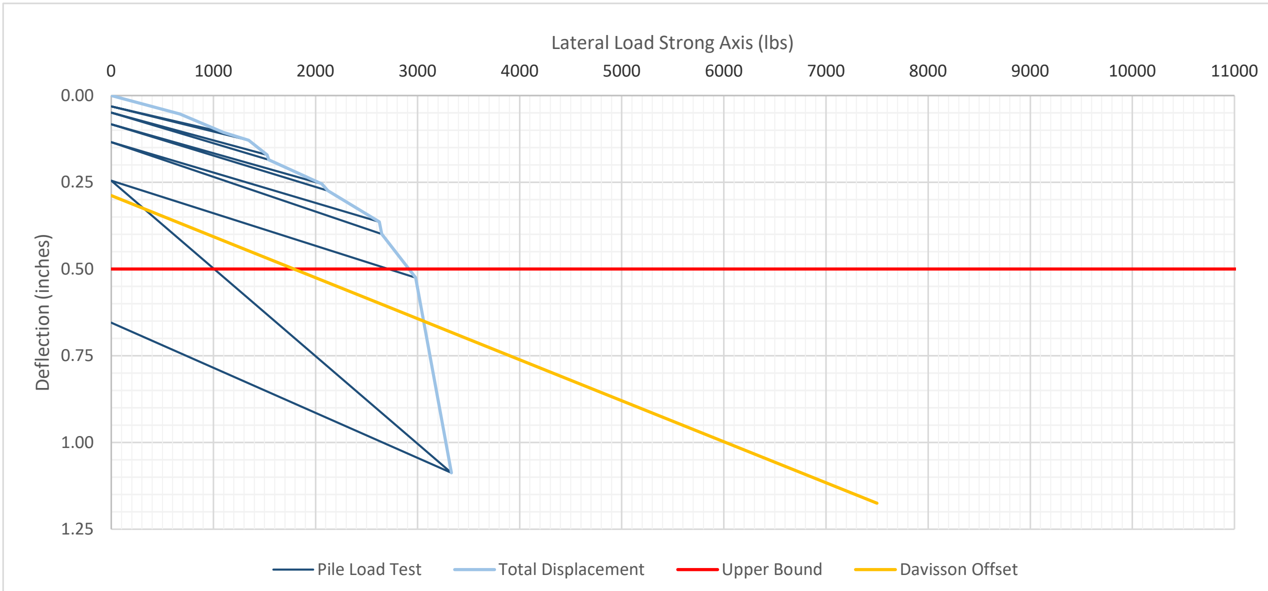


Figure No. 112C

CONSULTING GROUP

Post Load Test Results

Test Location:	10A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	3 feet	Project Number:	193508
GPS Test Coordinates:	37.80730°, -84.87122°	Test Date:	11/19/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	514	0.003	0.000	0.002	2	1	590	0.016	0.031	0.023
3	1	1071	0.007	0.001	0.004	3	1	1420	0.063	0.106	0.084
4	1	1625	0.027	0.011	0.019	4	1	0	0.024	0.021	0.022
5	1	2004	0.108	0.080	0.094	5	1	1452	0.079	0.111	0.095
6	5	2048	0.201	0.164	0.182	6	1	1767	0.106	0.139	0.122
7	1	0	0.188	0.163	0.175	7	1	0	0.042	0.023	0.032
8	1	2343	0.288	0.245	0.267	8	1	1548	0.110	0.123	0.116
9	1	0	0.272	0.241	0.256	9	1	2399	0.177	0.182	0.179
10	1	3207	1.051	0.979	1.015	10	1	0	0.072	0.031	0.051
11	1	0	1.014	0.961	0.988	11	1	2378	0.226	0.215	0.220
Reset Gauges to Zero						12	1	2780	0.273	0.256	0.264
12	1	0	0.000	0.000	0.000	13	1	0	0.131	0.072	0.101
13	1	3194	0.547	0.469	0.508	14	1	2670	0.329	0.308	0.319
14	1	0	0.501	0.444	0.472	15	1	3004	0.375	0.364	0.369
						16	1	0	0.221	0.148	0.185
						17	1	3166	0.473	0.414	0.444
						18	1	3325	0.546	0.491	0.518
						19	1	0	0.305	0.217	0.261
						20	1	4182	1.068	0.976	1.022
						21	1	0	0.715	0.585	0.650

Figure No. 113A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	10A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	3 feet	Project Number:	193508
GPS Test Coordinates:	37.80730°, -84.87122°	Test Date:	11/19/2019

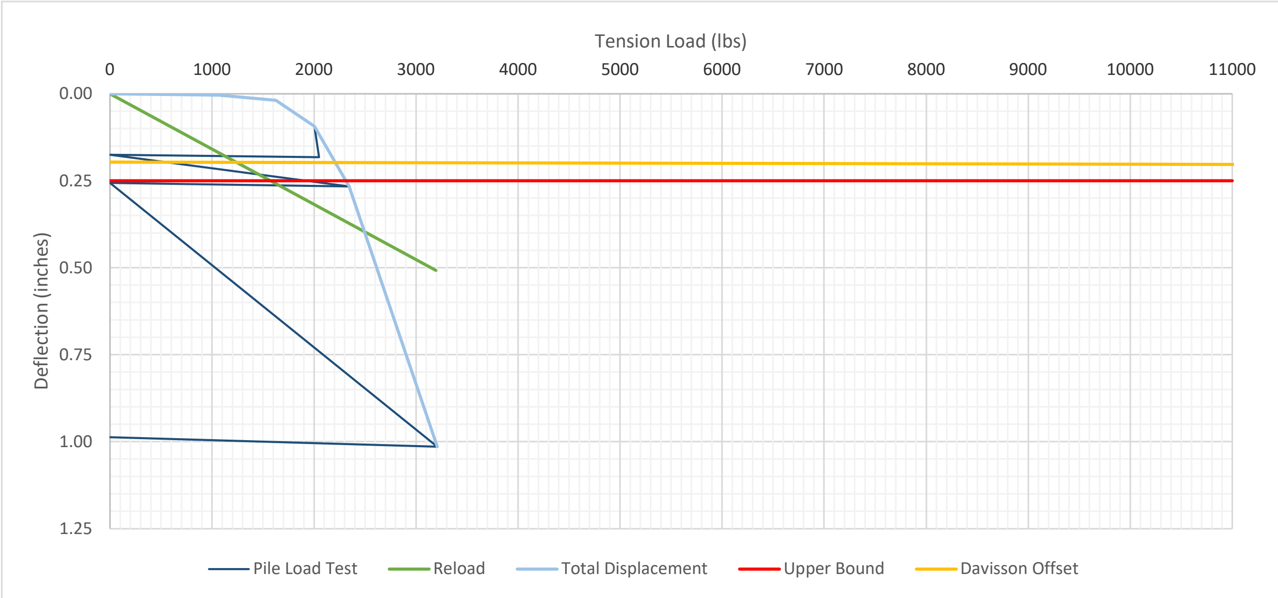


Figure No. 113B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	10A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	3 feet	Project Number:	193508
GPS Test Coordinates:	37.80730°, -84.87122°	Test Date:	11/19/2019

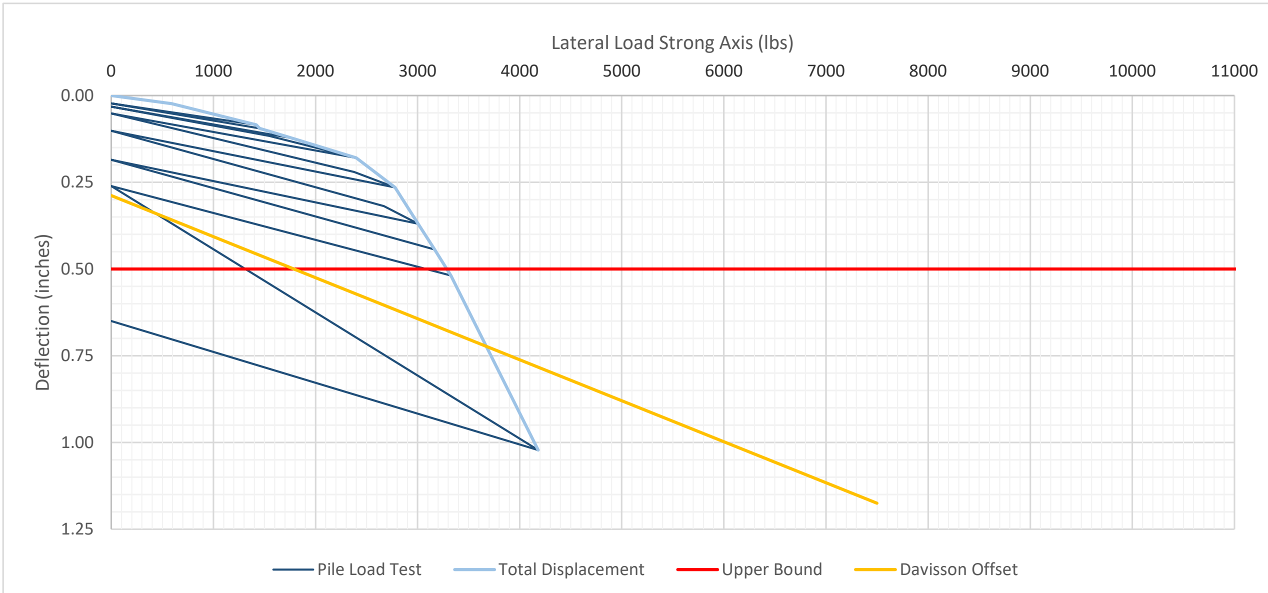


Figure No. 113C

CONSULTING GROUP

Post Load Test Results

Test Location: 10B
Post Size: W6x9
Depth Driven: 4-1/4 feet
GPS Test Coordinates: 37.80730°, -84.87122°

Project Name: Mercer County Solar Power Plant
Project Number: 193508
Test Date: 11/19/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	530	0.003	0.000	0.002	2	1	700	0.061	0.003	0.032
3	1	1114	0.006	0.000	0.003	3	1	1002	0.099	0.009	0.054
4	1	1507	0.010	0.000	0.005	4	1	0	0.014	0.012	0.013
5	1	2099	0.014	0.001	0.008	5	1	1238	0.113	0.021	0.067
6	5	2078	0.017	0.002	0.009	6	1	1847	0.188	0.055	0.121
7	1	0	0.013	0.002	0.007	7	1	0	0.022	0.048	0.035
8	1	2447	0.020	0.003	0.011	8	1	1726	0.190	0.044	0.117
9	1	5449	0.269	0.247	0.258	9	1	2305	0.230	0.067	0.148
10	1	0	0.234	0.230	0.232	10	1	0	0.019	0.017	0.018
11	1	8923	1.033	1.008	1.020	11	1	2264	0.183	0.179	0.181
12	1	0	0.941	0.956	0.948	12	1	2728	0.215	0.215	0.215
Reset Gauges to Zero						13	1	0	0.003	0.088	0.042
13	1	0	0.000	0.000	0.000	14	1	2926	0.243	0.221	0.232
14	1	8119	0.548	0.530	0.539	15	1	3513	0.257	0.262	0.259
15	1	0	0.445	0.471	0.458	16	1	0	0.010	0.124	0.067
						17	1	3192	0.264	0.279	0.271
						18	1	5384	0.438	0.577	0.507
						19	1	0	0.102	0.252	0.177
						20	1	7052	0.975	1.047	1.011
						21	1	0	0.460	0.515	0.488

Figure No. 114A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	10B			
Post Size:	W6x9		Project Name:	Mercer County Solar Power Plant
Depth Driven:	4-1/4 feet		Project Number:	193508
GPS Test Coordinates:	37.80730°, -84.87122°		Test Date:	11/19/2019

Figure No. 114B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	10B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	4-1/4 feet	Project Number:	193508
GPS Test Coordinates:	37.80730°, -84.87122°	Test Date:	11/19/2019

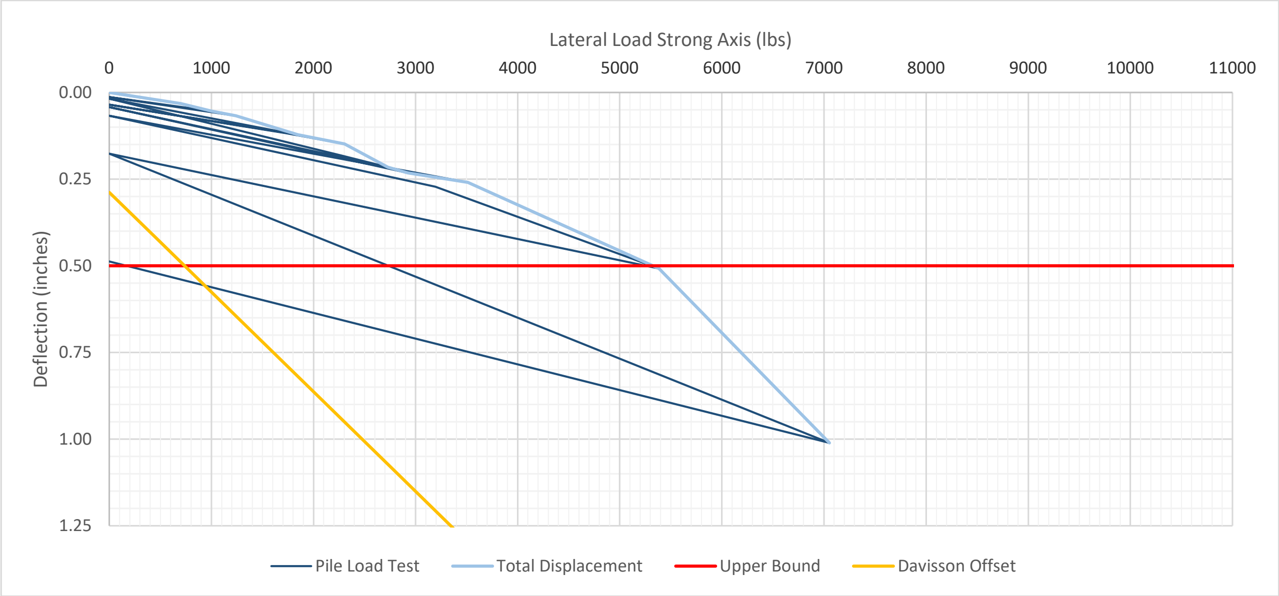


Figure No. 114C

CONSULTING GROUP

Post Load Test Results

Test Location: 11A
Post Size: W6x9
Depth Driven: 5-1/2 feet
GPS Test Coordinates: 37.80486°, -84.86358°

Project Name: Mercer County Solar Power Plant
Project Number: 193508
Test Date: 11/19/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	754	0.000	0.003	0.001	2	1	602	0.019	0.031	0.025
3	1	1014	0.000	0.004	0.002	3	1	1361	0.044	0.060	0.052
4	1	1539	0.000	0.008	0.004	4	1	0	0.002	0.010	0.006
5	1	2059	0.000	0.012	0.006	5	1	1230	0.045	0.063	0.054
6	5	2039	0.005	0.017	0.011	6	1	1591	0.056	0.076	0.066
7	1	0	0.005	0.015	0.010	7	1	0	0.005	0.015	0.010
8	1	2157	0.006	0.018	0.012	8	1	1870	0.076	0.096	0.086
9	1	4961	0.256	0.300	0.278	9	1	2307	0.097	0.117	0.107
10	1	0	0.260	0.280	0.270	10	1	0	0.014	0.018	0.016
11	1	4546	0.998	1.033	1.015	11	1	2421	0.096	0.119	0.107
12	1	0	1.004	1.012	1.008	12	1	2795	0.107	0.132	0.119
Reset Gauges to Zero						13	1	0	0.018	0.025	0.022
13	1	0	0.000	0.000	0.000	14	1	2741	0.089	0.102	0.095
14	1	4576	0.499	0.532	0.515	15	1	3200	0.111	0.124	0.117
15	1	0	0.506	0.513	0.509	16	1	0	0.004	0.001	0.002
						17	1	3438	0.132	0.144	0.138
						18	1	5685	0.496	0.516	0.506
						19	1	0	0.163	0.122	0.143
						20	1	7425	0.986	1.104	1.045
						21	1	0	0.332	0.281	0.306

Figure No. 115A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	11A			
Post Size:	W6x9		Project Name:	Mercer County Solar Power Plant
Depth Driven:	5-1/2 feet		Project Number:	193508
GPS Test Coordinates:	37.80486°, -84.86358°		Test Date:	11/19/2019

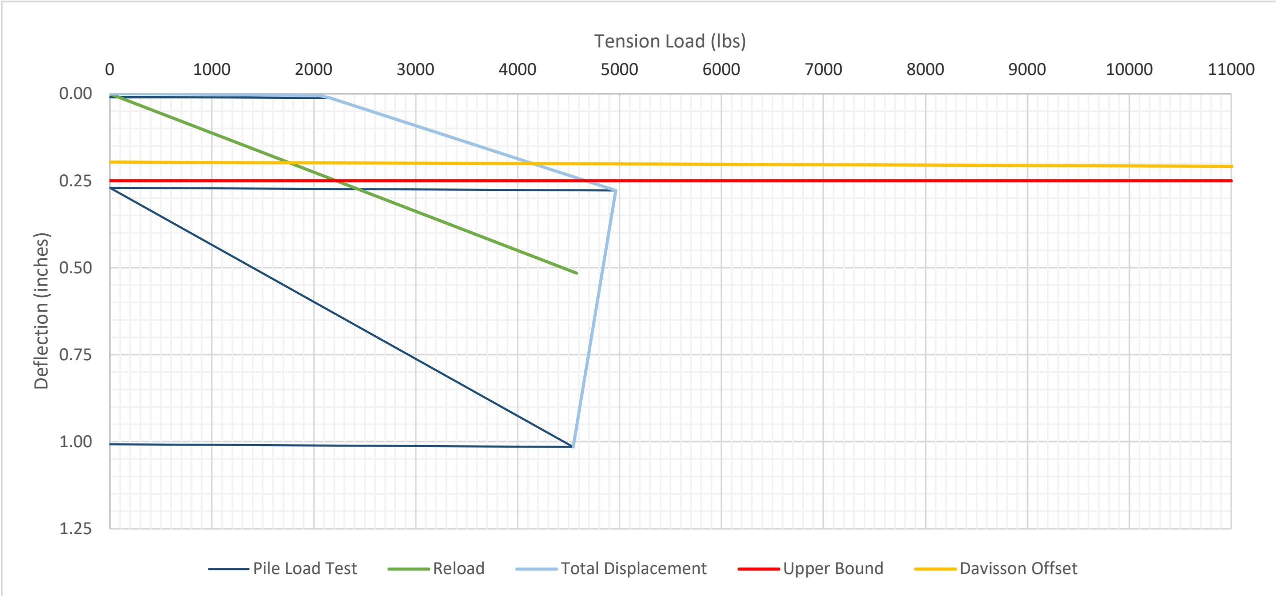


Figure No. 115B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	11A
Post Size:	W6x9
Depth Driven:	5-1/2 feet
GPS Test Coordinates:	37.80486°, -84.86358°
Project Name:	Mercer County Solar Power Plant
Project Number:	193508
Test Date:	11/19/2019

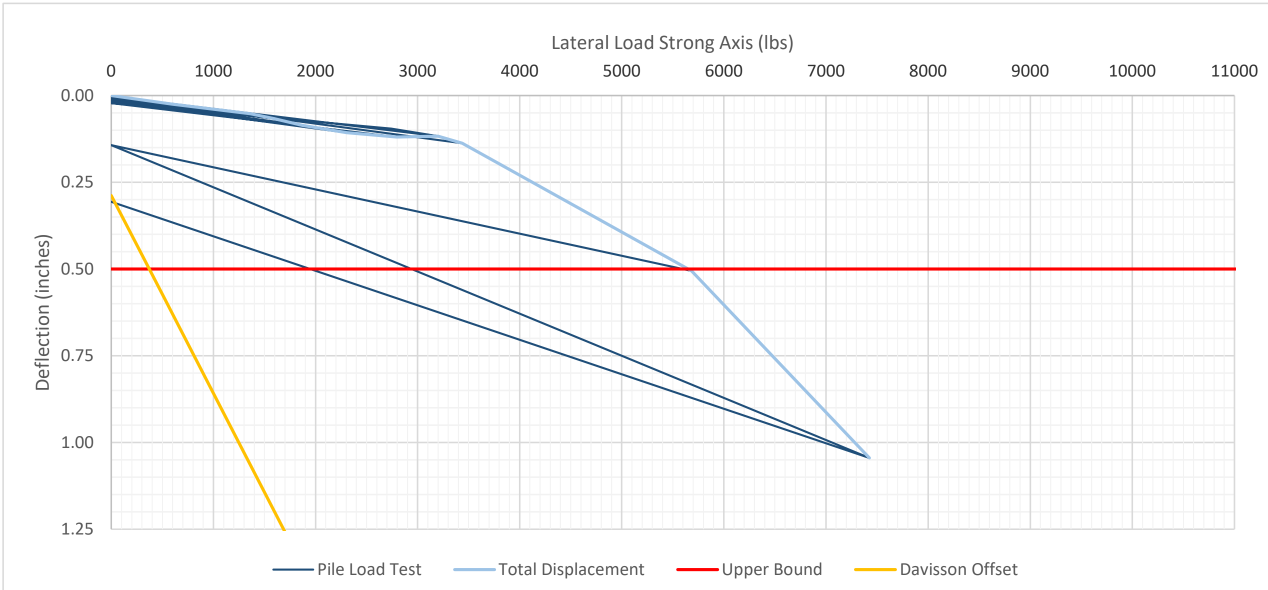


Figure No. 115C

CONSULTING GROUP

Post Load Test Results

Test Location:	11B
Post Size:	W6x9
Depth Driven:	8 feet
GPS Test Coordinates:	37.80486°, -84.86358°
Project Name:	Mercer County Solar Power Plant
Project Number:	193508
Test Date:	11/19/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	803	0.003	0.000	0.002	2	1	697	0.052	0.008	0.030
3	1	1213	0.008	0.000	0.004	3	1	1442	0.107	0.034	0.070
4	1	1543	0.010	0.000	0.005	4	1	0	0.007	0.004	0.006
5	1	2017	0.012	0.000	0.006	5	1	1467	0.110	0.044	0.077
6	5	2169	0.018	0.004	0.011	6	1	1672	0.127	0.054	0.090
7	1	0	0.012	0.000	0.006	7	1	0	0.010	0.006	0.008
8	1	2543	0.021	0.004	0.012	8	1	1563	0.116	0.051	0.083
9	1	10333	0.120	0.059	0.089	9	1	2124	0.154	0.073	0.113
10	1	0	0.077	0.062	0.069	10	1	0	0.013	0.009	0.011
						11	1	2488	0.175	0.090	0.132
						12	1	2956	0.216	0.115	0.165
						13	1	0	0.023	0.015	0.019
						14	1	2694	0.207	0.114	0.161
						15	1	3564	0.264	0.149	0.206
						16	1	0	0.033	0.020	0.026
						17	1	3280	0.260	0.152	0.206
						18	1	6042	0.515	0.493	0.504
						19	1	0	0.068	0.034	0.051
						20	1	9442	1.103	0.924	1.014
						21	1	0	0.148	0.079	0.113

Figure No. 116A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	11B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	8 feet	Project Number:	193508
GPS Test Coordinates:	37.80486°, -84.86358°	Test Date:	11/19/2019

Figure No. 116B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	11B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	8 feet	Project Number:	193508
GPS Test Coordinates:	37.80486°, -84.86358°	Test Date:	11/19/2019

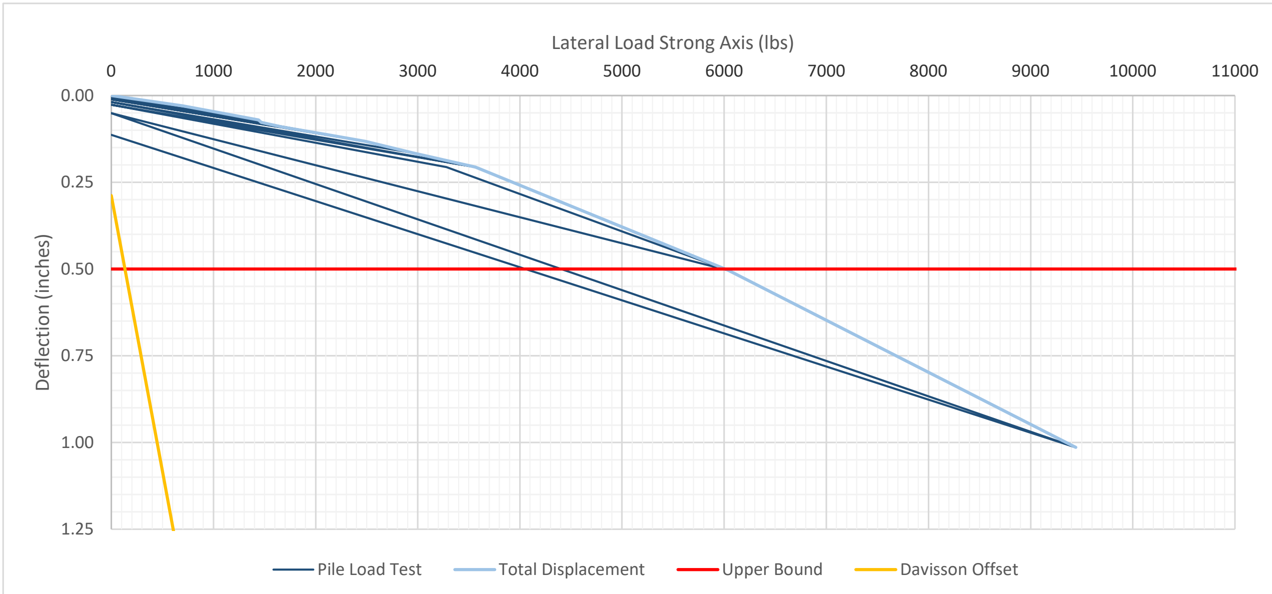


Figure No. 116C

CONSULTING GROUP

Post Load Test Results

Test Location: 12A
Post Size: W6x9
Depth Driven: 2-1/2 feet
GPS Test Coordinates: 37.80022°, -84.86640°

Project Name: Mercer County Solar Power Plant
Project Number: 193508
Test Date: 11/20/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	566	0.002	0.000	0.001	2	1	507	0.046	0.155	0.100
3	1	1078	0.002	0.000	0.001	3	1	1020	0.177	0.305	0.241
4	1	1780	0.006	0.000	0.003	4	1	0	0.102	0.097	0.100
5	1	2036	0.008	0.003	0.006	5	1	1235	0.330	0.321	0.325
6	5	2088	0.012	0.003	0.008	6	1	1647	0.565	0.484	0.524
7	1	0	0.012	0.003	0.008	7	1	0	0.375	0.274	0.325
8	1	2014	0.012	0.003	0.008	8	1	2315	1.120	0.944	1.032
9	1	3746	0.375	0.203	0.289	9	1	0	0.875	0.662	0.768
10	1	0	0.346	0.233	0.289						
11	1	2448	1.171	1.029	1.100						
12	1	0	1.134	0.972	1.053						
Reset Gauges to Zero											
13	1	0	0.000	0.000	0.000						
14	1	3716	0.591	0.442	0.516						
15	1	0	0.511	0.364	0.437						

Figure No. 117A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	12A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	2-1/2 feet	Project Number:	193508
GPS Test Coordinates:	37.80022°, -84.86640°	Test Date:	11/20/2019

Figure No. 117B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	12A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	2-1/2 feet	Project Number:	193508
GPS Test Coordinates:	37.80022°, -84.86640°	Test Date:	11/20/2019

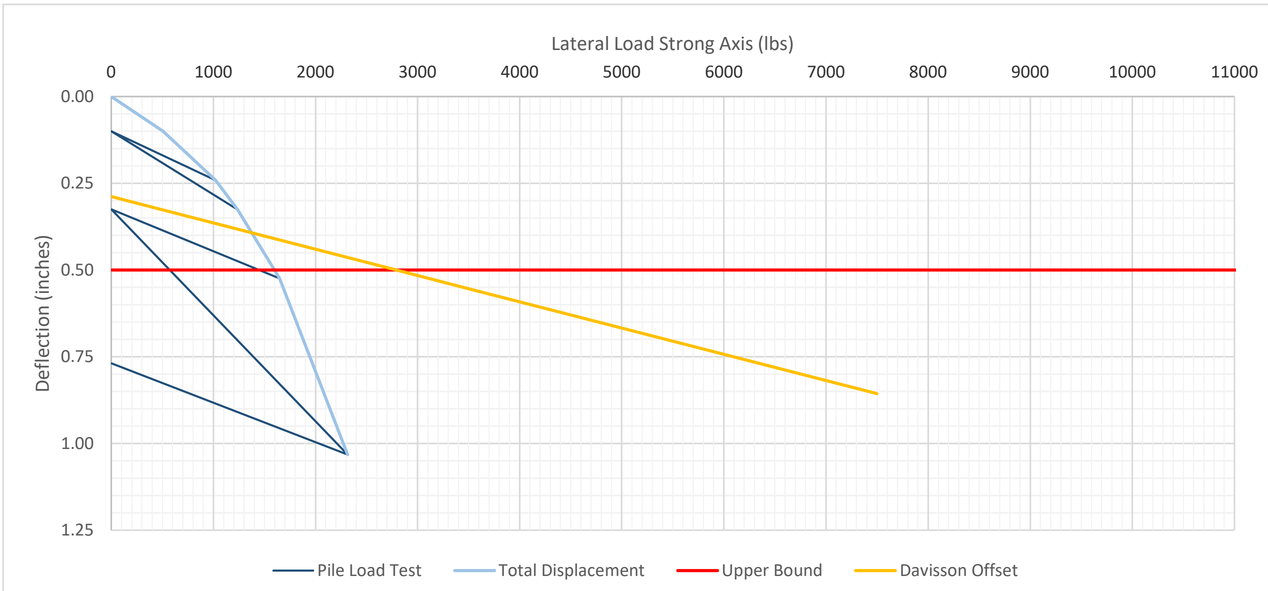


Figure No. 117C

CONSULTING GROUP

Post Load Test Results

Test Location:	12B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	4-1/2 feet	Project Number:	193508
GPS Test Coordinates:	37.80012°, -84.86641°	Test Date:	11/20/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	763	0.000	0.000	0.000	2	1	954	0.028	0.042	0.035
3	1	1075	0.000	0.000	0.000	3	1	1278	0.041	0.070	0.055
4	1	1646	0.000	0.000	0.000	4	1	0	0.003	0.014	0.008
5	1	2088	0.000	0.000	0.000	5	1	1155	0.044	0.062	0.053
6	5	2073	0.000	0.000	0.000	6	1	1693	0.076	0.093	0.084
7	1	0	0.000	0.001	0.000	7	1	0	0.007	0.022	0.014
8	1	2003	0.000	0.001	0.000	8	1	1545	0.078	0.093	0.086
9	1	2877	0.215	0.318	0.266	9	1	2121	0.116	0.125	0.120
10	1	0	0.204	0.327	0.265	10	1	0	0.015	0.035	0.025
11	1	3000	1.012	1.015	1.013	11	1	2142	0.137	0.150	0.144
12	1	0	1.012	1.022	1.017	12	1	2647	0.204	0.201	0.202
Reset Gauges to Zero						13	1	0	0.039	0.071	0.055
13	1	0	0.000	0.000	0.000	14	1	2713	0.236	0.230	0.233
14	1	3118	0.532	0.513	0.523	15	1	3125	0.285	0.288	0.286
15	1	0	0.516	0.525	0.520	16	1	0	0.080	0.128	0.104
						17	1	3253	0.323	0.361	0.342
						18	1	3842	0.489	0.541	0.515
						19	1	0	0.198	0.287	0.242
						20	1	4715	0.962	1.092	1.027
						21	1	0	0.590	0.720	0.655

Figure No. 118A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	12B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	4-1/2 feet	Project Number:	193508
GPS Test Coordinates:	37.80012°, -84.86641°	Test Date:	11/20/2019

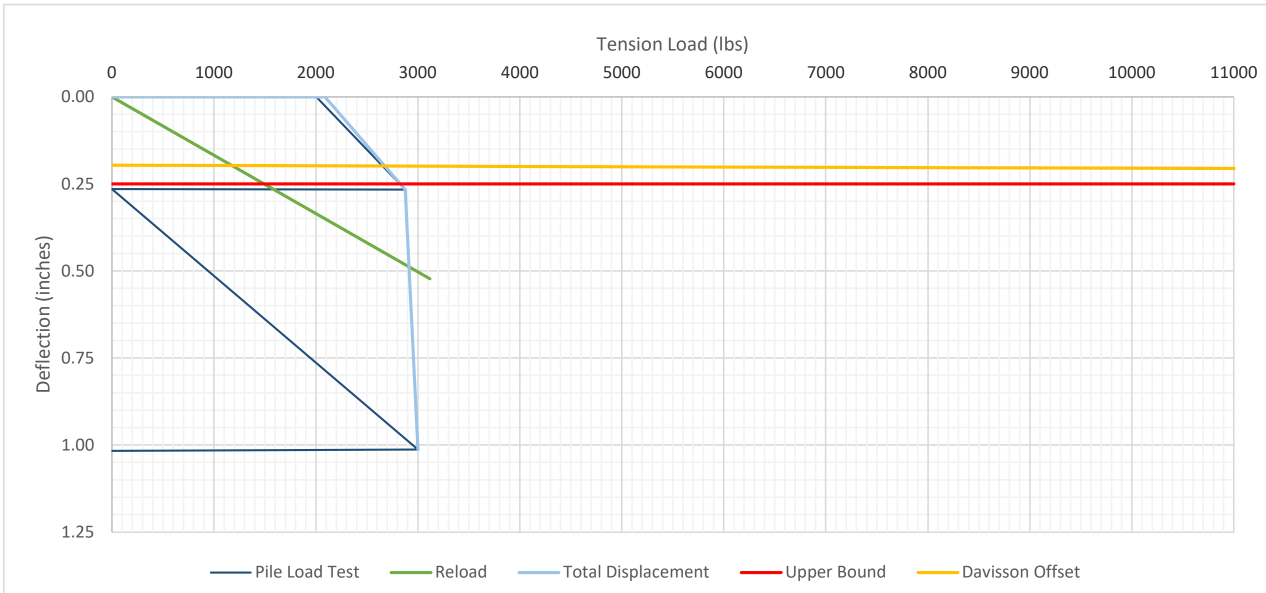


Figure No. 118B

Lateral Post Load Test Results

Test Location:	12B			
Post Size:	W6x9		Project Name:	Mercer County Solar Power Plant
Depth Driven:	4-1/2 feet		Project Number:	193508
GPS Test Coordinates:	37.80012°, -84.86641°		Test Date:	11/20/2019

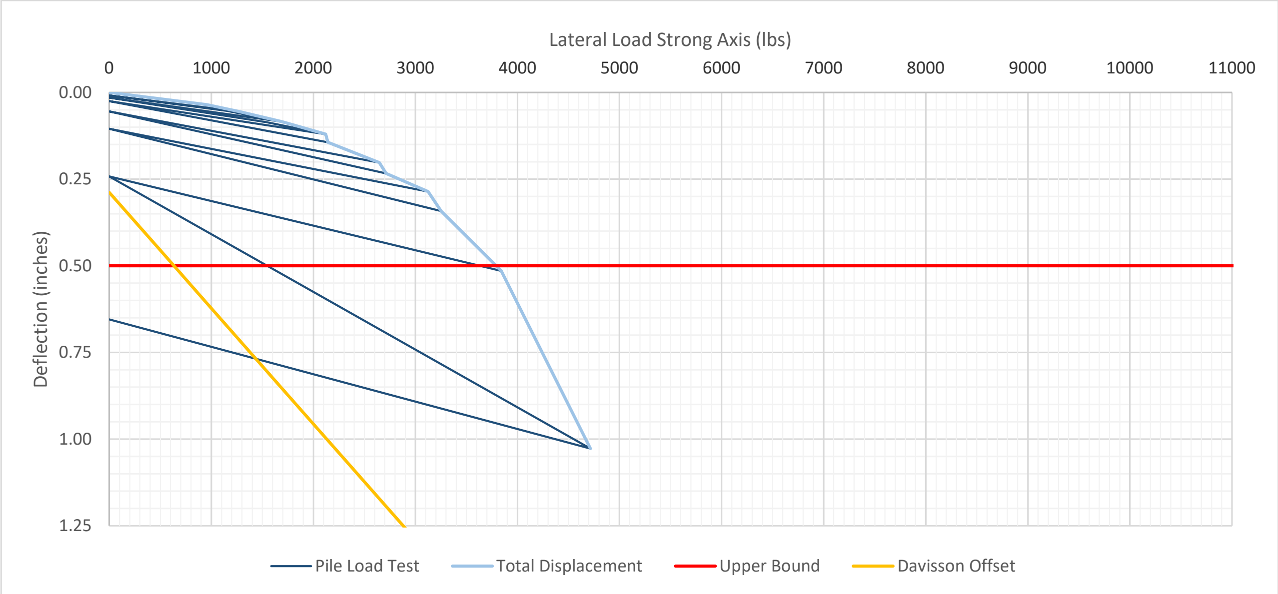


Figure No. 118C

CONSULTING GROUP

Post Load Test Results

Test Location:	13A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	3-1/2 feet	Project Number:	193508
GPS Test Coordinates:	37.79610°, -84.86605°	Test Date:	11/20/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	521	0.003	0.003	0.003	2	1	805	0.075	0.034	0.054
3	1	1052	0.006	0.007	0.007	3	1	1070	0.105	0.055	0.080
4	1	1539	0.031	0.030	0.030	4	1	0	0.028	0.014	0.021
5	1	2125	0.110	0.112	0.111	5	1	1115	0.108	0.082	0.095
6	5	2107	0.198	0.195	0.196	6	1	1574	0.152	0.119	0.135
7	1	0	0.190	0.184	0.187	7	1	0	0.047	0.036	0.041
8	1	2050	0.205	0.200	0.202	8	1	1528	0.169	0.137	0.153
9	1	2272	0.279	0.275	0.277	9	1	2085	0.258	0.217	0.237
10	1	0	0.262	0.257	0.259	10	1	0	0.077	0.071	0.074
11	1	3724	1.004	1.013	1.009	11	1	2211	0.276	0.294	0.285
12	1	0	0.974	0.980	0.977	12	1	2572	0.354	0.375	0.364
Reset Gauges to Zero						13	1	0	0.151	0.158	0.154
13	1	0	0.000	0.000	0.000	14	1	2509	0.410	0.430	0.420
14	1	3719	0.497	0.524	0.510	15	1	2575	0.493	0.511	0.502
15	1	0	0.438	0.461	0.449	16	1	0	0.241	0.253	0.247
						17	1	3421	1.044	0.964	1.004
						18	1	0	0.642	0.634	0.638

Figure No. 119A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	13A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	3-1/2 feet	Project Number:	193508
GPS Test Coordinates:	37.79610°, -84.86605°	Test Date:	11/20/2019

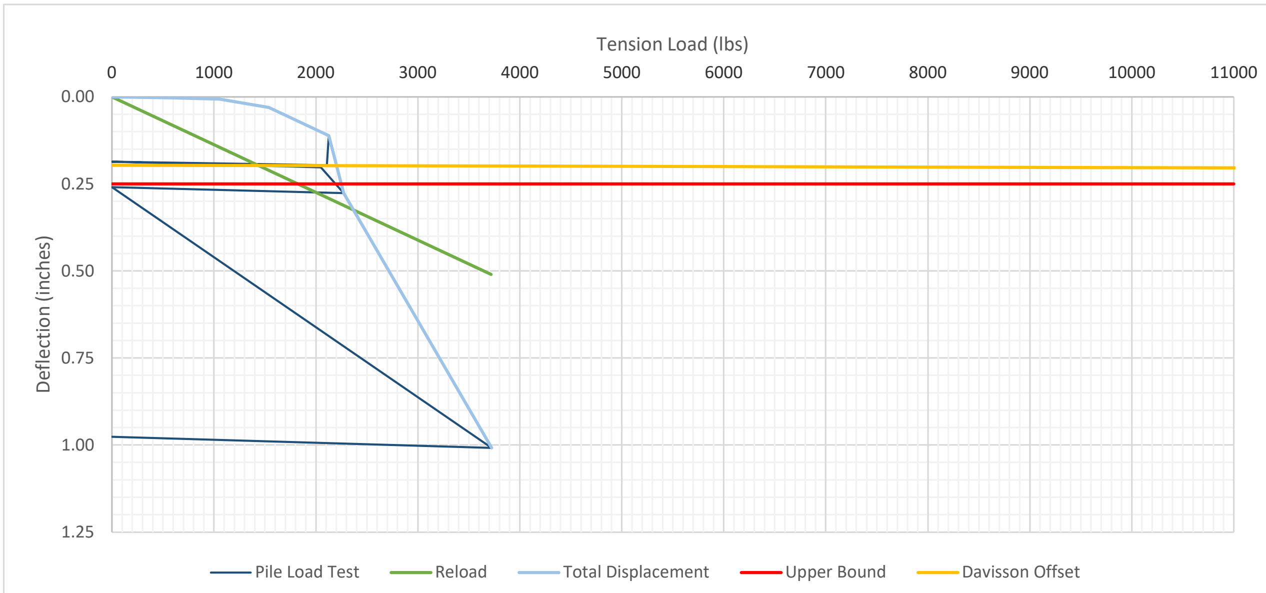


Figure No. 119B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	13A		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	3-1/2 feet	Project Number:	193508
GPS Test Coordinates:	37.79610°, -84.86605°	Test Date:	11/20/2019

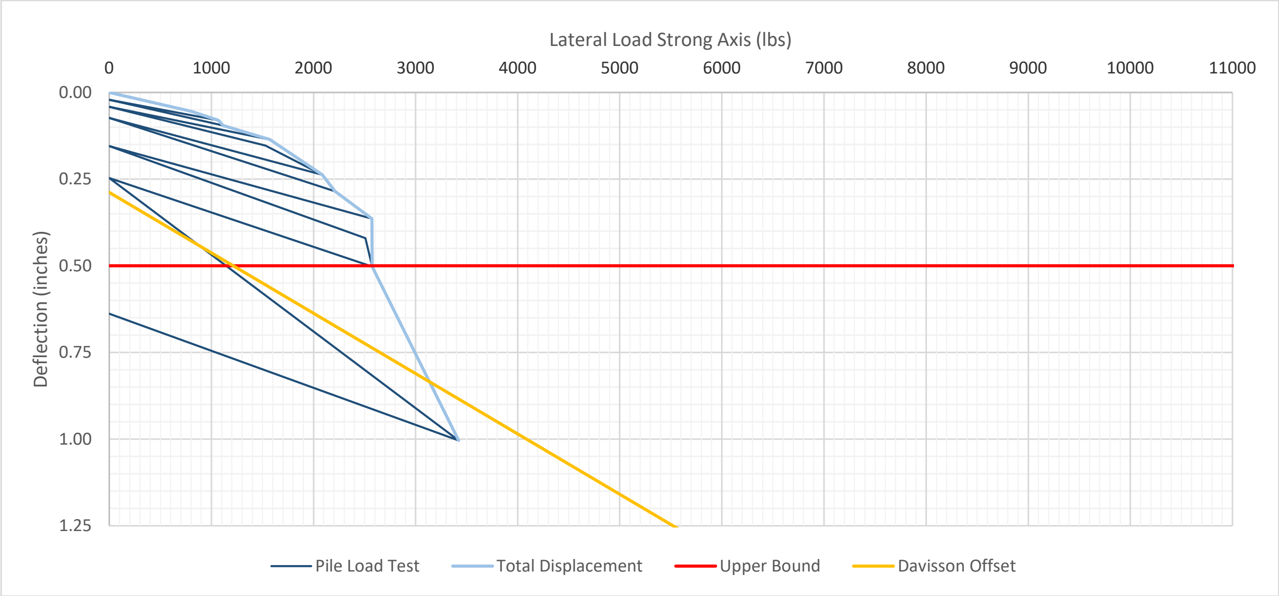


Figure No. 119C

CONSULTING GROUP

Post Load Test Results

Test Location:	13B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	4-1/4 feet	Project Number:	193508
GPS Test Coordinates:	37.79610°, -84.86605°	Test Date:	11/20/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	530	0.002	0.003	0.002	2	1	623	0.043	0.051	0.047
3	1	1228	0.002	0.003	0.003	3	1	1326	0.158	0.158	0.158
4	1	1592	0.004	0.006	0.005	4	1	0	0.009	0.001	0.005
5	1	2248	0.015	0.017	0.016	5	1	1156	0.174	0.143	0.158
6	5	2052	0.027	0.029	0.028	6	1	1627	0.200	0.198	0.199
7	1	0	0.028	0.030	0.029	7	1	0	0.002	0.015	0.007
8	1	2214	0.030	0.031	0.030	8	1	1614	0.205	0.199	0.202
9	1	2990	0.259	0.271	0.265	9	1	2049	0.218	0.204	0.211
10	1	0	0.260	0.273	0.266	10	1	0	0.005	0.016	0.010
11	1	3413	1.006	1.024	1.015	11	1	2052	0.226	0.221	0.223
12	1	0	0.988	1.012	1.000	12	1	2545	0.277	0.264	0.270
Reset Gauges to Zero						13	1	0	0.039	0.035	0.037
13	1	0	0.000	0.000	0.000	14	1	2545	0.293	0.282	0.287
14	1	4013	0.569	0.568	0.568	15	1	3035	0.342	0.331	0.337
15	1	0	0.409	0.426	0.417	16	1	0	0.107	0.096	0.101
						17	1	3114	0.373	0.373	0.373
						18	1	3823	0.535	0.531	0.533
						19	1	0	0.161	0.159	0.160
						20	1	4997	1.050	1.035	1.042
						21	1	0	0.509	0.503	0.506

Figure No. 120A

Tension Post Load Test Results

Test Location:	13B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	4-1/4 feet	Project Number:	193508
GPS Test Coordinates:	37.79610°, -84.86605°	Test Date:	11/20/2019

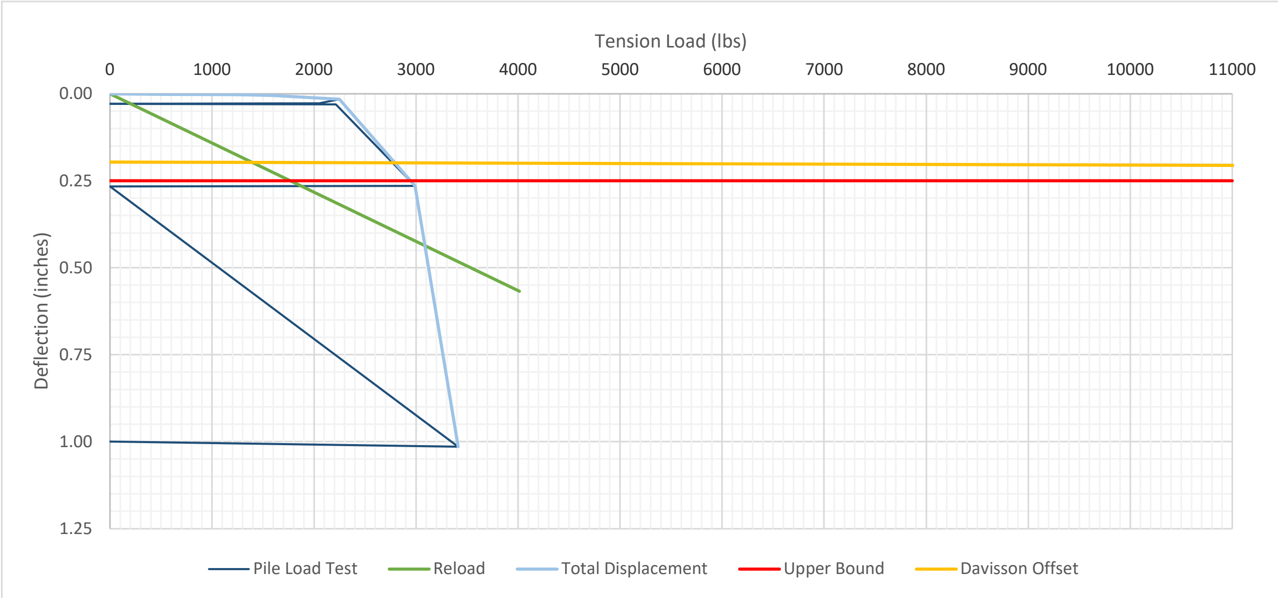


Figure No. 120B

Lateral Post Load Test Results

Test Location:	13B		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	4-1/4 feet	Project Number:	193508
GPS Test Coordinates:	37.79610°, -84.86605°	Test Date:	11/20/2019

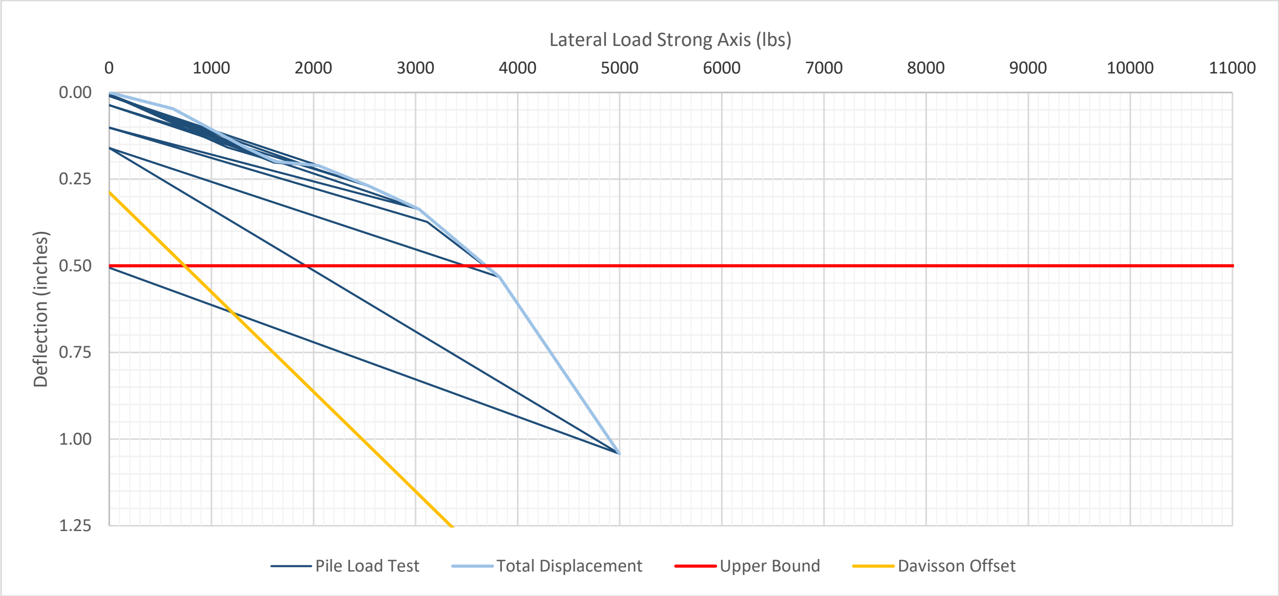


Figure No. 120C

CONSULTING GROUP

Post Load Test Results

Test Location: PD-1
Post Size: W6x9
Depth Driven: 4-1/2 feet
GPS Test Coordinates: 37.83506°, -84.85579°

Project Name: Mercer County Solar Power Plant
Project Number: 193508
Test Date: 11/17/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	622	0.000	0.000	0.000	2	1	925	0.005	0.014	0.009
3	1	1013	0.000	0.000	0.000	3	1	1103	0.009	0.018	0.013
4	1	1523	0.001	0.000	0.000	4	1	0	0.005	0.007	0.006
5	1	2034	0.001	0.001	0.001	5	1	1286	0.014	0.020	0.017
6	5	2083	0.005	0.003	0.004	6	1	1798	0.023	0.027	0.025
7	1	0	0.006	0.003	0.004	7	1	0	0.006	0.009	0.007
8	1	2294	0.007	0.004	0.006	8	1	1554	0.020	0.026	0.023
9	1	10208	0.020	0.011	0.015	9	1	2148	0.032	0.036	0.034
10	1	0	0.002	0.009	0.005	10	1	0	0.007	0.009	0.008
						11	1	2360	0.040	0.040	0.040
						12	1	2881	0.051	0.050	0.050
						13	1	0	0.009	0.010	0.010
						14	1	2657	0.049	0.051	0.050
						15	1	3188	0.061	0.062	0.061
						16	1	0	0.010	0.012	0.011
						17	1	3579	0.073	0.073	0.073
						18	1	10340	0.266	0.227	0.246
						19	1	0	0.042	0.040	0.041

Figure No. 121A

2G CONSULTING GROUP

Tension Post Load Test Results

Test Location:	PD-1			
Post Size:	W6x9		Project Name:	Mercer County Solar Power Plant
Depth Driven:	4-1/2 feet		Project Number:	193508
GPS Test Coordinates:	37.83506°, -84.85579°		Test Date:	11/17/2019

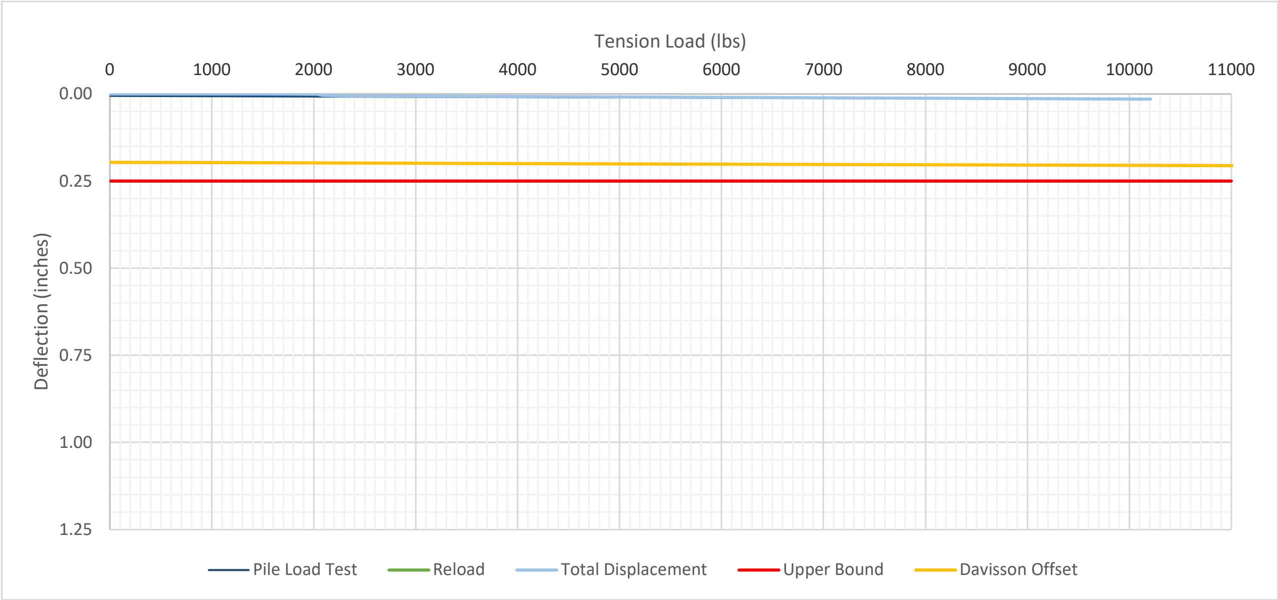


Figure No. 121B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	PD-1		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	4-1/2 feet	Project Number:	193508
GPS Test Coordinates:	37.83506°, -84.85579°	Test Date:	11/17/2019

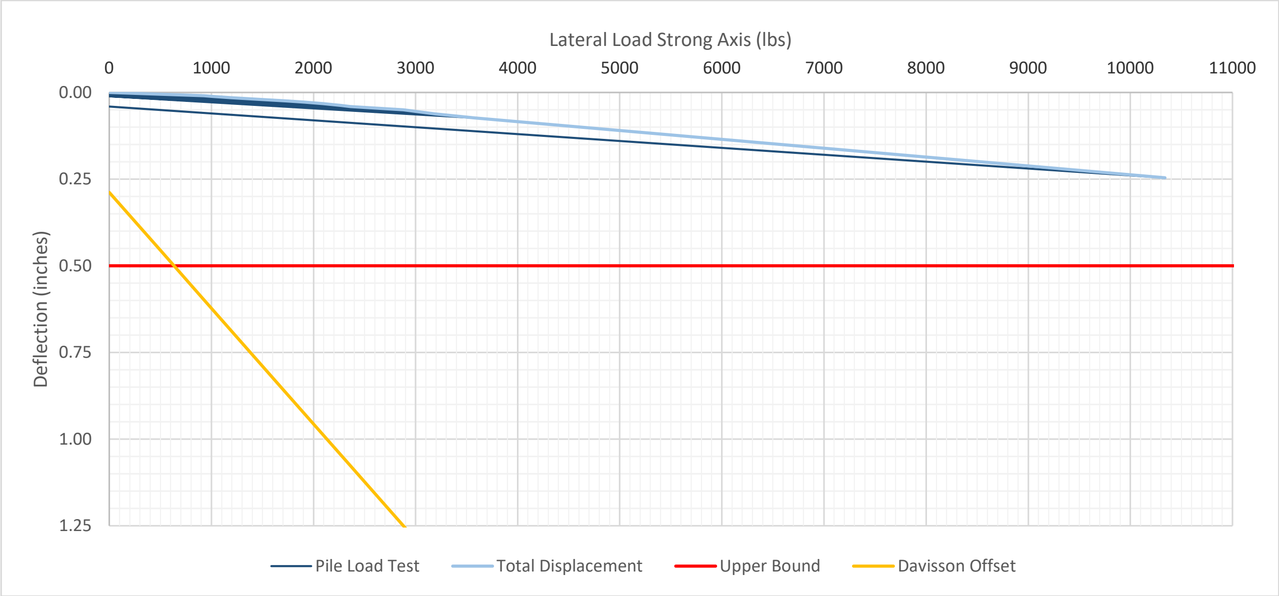


Figure No. 121C

CONSULTING GROUP

Post Load Test Results

Test Location:	PD-2		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	6 feet	Project Number:	193508
GPS Test Coordinates:	37.81468°, -84.85126°	Test Date:	11/15/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	519	0.004	0.007	0.005	2	1	1013	0.114	0.079	0.096
3	1	1099	0.023	0.034	0.029	3	1	0	0.031	0.003	0.017
4	1	1569	0.061	0.064	0.062	4	1	1218	0.133	0.090	0.112
5	1	2061	0.125	0.126	0.125	5	1	1596	0.164	0.120	0.142
6	1	2903	0.266	0.265	0.265	6	1	0	0.043	0.005	0.024
7	1	0	0.267	0.252	0.259	7	1	1687	0.196	0.144	0.170
8	1	5573	1.044	1.038	1.041	8	1	2134	0.247	0.191	0.219
9	1	0	0.886	1.007	0.946	9	1	0	0.079	0.002	0.041
Reset Gauges to Zero						10	1	2034	0.259	0.196	0.227
11	1	0	0.000	0.000	0.000	11	1	2534	0.318	0.248	0.283
12	1	6014	0.531	0.532	0.531	12	1	0	0.097	0.011	0.043
13	1	0	0.531	0.487	0.509	13	1	2879	0.454	0.370	0.412
						14	1	3012	0.455	0.370	0.413
						15	1	0	0.156	0.008	0.082
						16	1	3450	0.566	0.455	0.510
						17	1	0	0.203	0.016	0.109
						18	1	5468	1.079	0.935	1.007
						19	1	0	0.454	0.161	0.307

Figure No. 122A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	PD-2			
Post Size:	W6x9		Project Name:	Mercer County Solar Power Plant
Depth Driven:	6 feet		Project Number:	193508
GPS Test Coordinates:	37.81468°, -84.85126°		Test Date:	11/15/2019

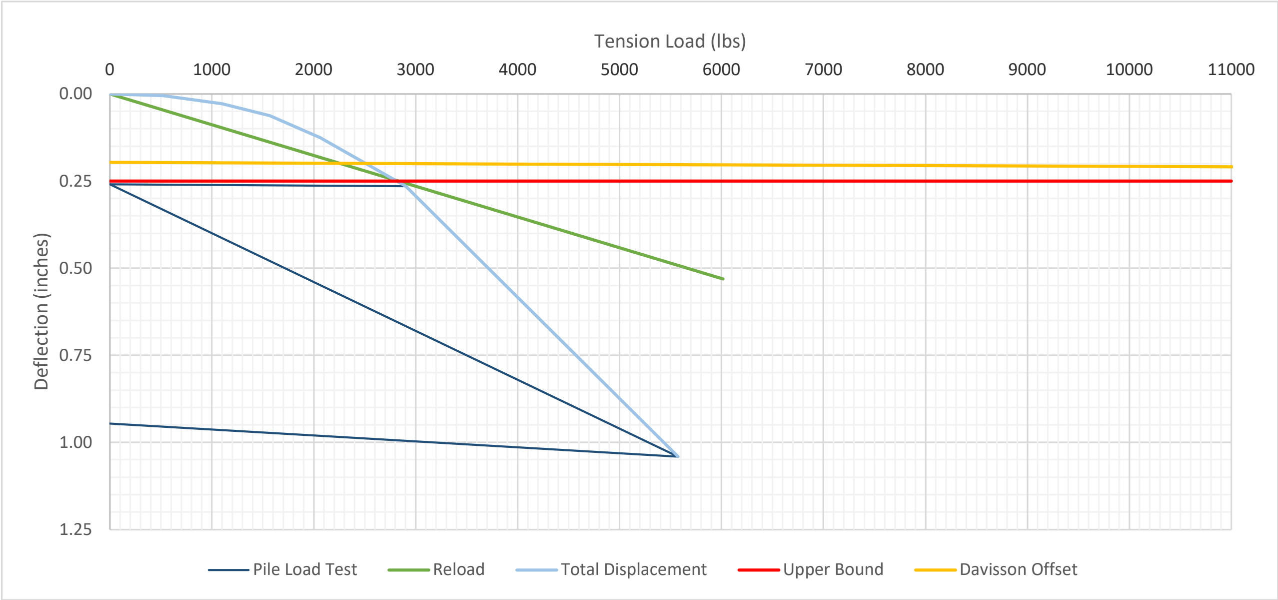


Figure No. 122B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	PD-2		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	6 feet	Project Number:	193508
GPS Test Coordinates:	37.81468°, -84.85126°	Test Date:	11/15/2019

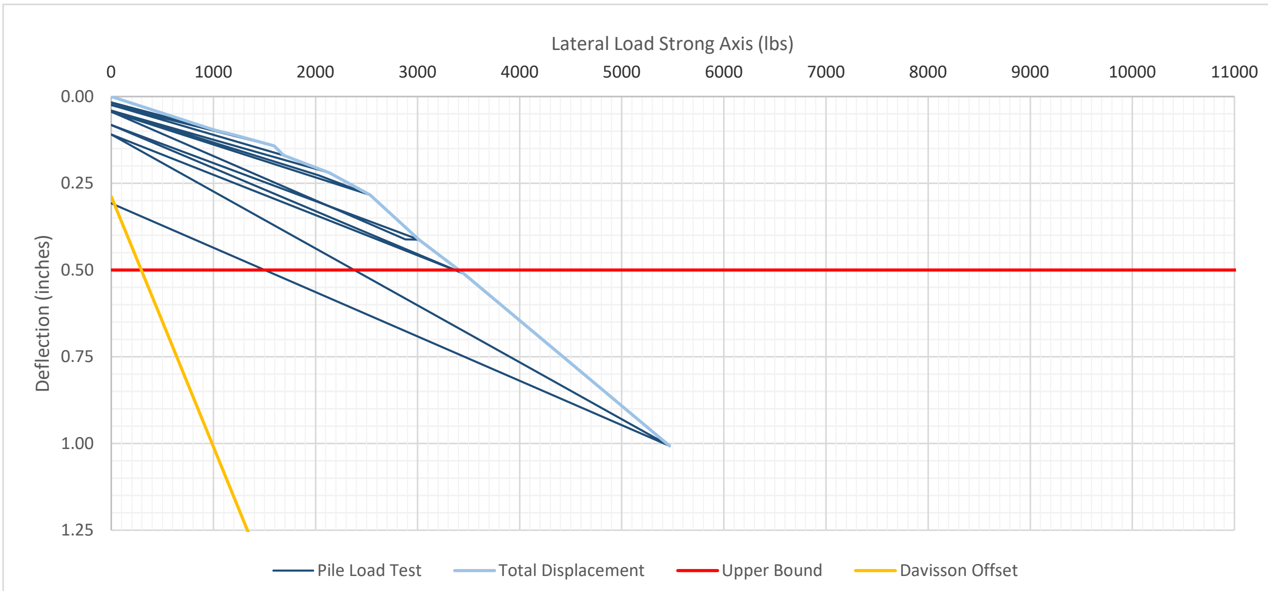


Figure No. 122C

CONSULTING GROUP

Post Load Test Results

Test Location: PD-3
Post Size: W6x9
Depth Driven: 3-1/2 feet
GPS Test Coordinates: 37.79432°, -84.87050°

Project Name: Mercer County Solar Power Plant
Project Number: 193508
Test Date: 11/20/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	871	0.000	0.000	0.000	2	1	519	0.008	0.011	0.009
3	1	1022	0.000	0.000	0.000	3	1	1244	0.012	0.016	0.014
4	1	1599	0.000	0.000	0.000	4	1	0	0.004	0.004	0.004
5	1	2365	0.000	0.001	0.000	5	1	1149	0.010	0.014	0.012
6	5	2205	0.001	0.002	0.001	6	1	1784	0.023	0.031	0.027
7	1	0	0.001	0.002	0.001	7	1	0	0.003	0.006	0.004
8	1	3354	0.003	0.002	0.003	8	1	1617	0.021	0.030	0.025
9	1	10003	0.013	0.006	0.009	9	1	2000	0.029	0.041	0.035
10	1	0	0.013	0.006	0.009	10	1	0	0.003	0.006	0.005
						11	1	2207	0.049	0.034	0.041
						12	1	2694	0.053	0.037	0.045
						13	1	0	0.002	0.005	0.004
						14	1	2617	0.050	0.034	0.042
						15	1	3129	0.072	0.050	0.061
						16	1	0	0.007	0.007	0.007
						17	1	3452	0.077	0.052	0.064
						18	1	10200	0.227	0.297	0.262
						19	1	0	0.032	0.030	0.031

Figure No. 123A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	PD-3		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	3-1/2 feet	Project Number:	193508
GPS Test Coordinates:	37.79432°, -84.87050°	Test Date:	11/20/2019

Figure No. 123B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	PD-3		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	3-1/2 feet	Project Number:	193508
GPS Test Coordinates:	37.79432°, -84.87050°	Test Date:	11/20/2019

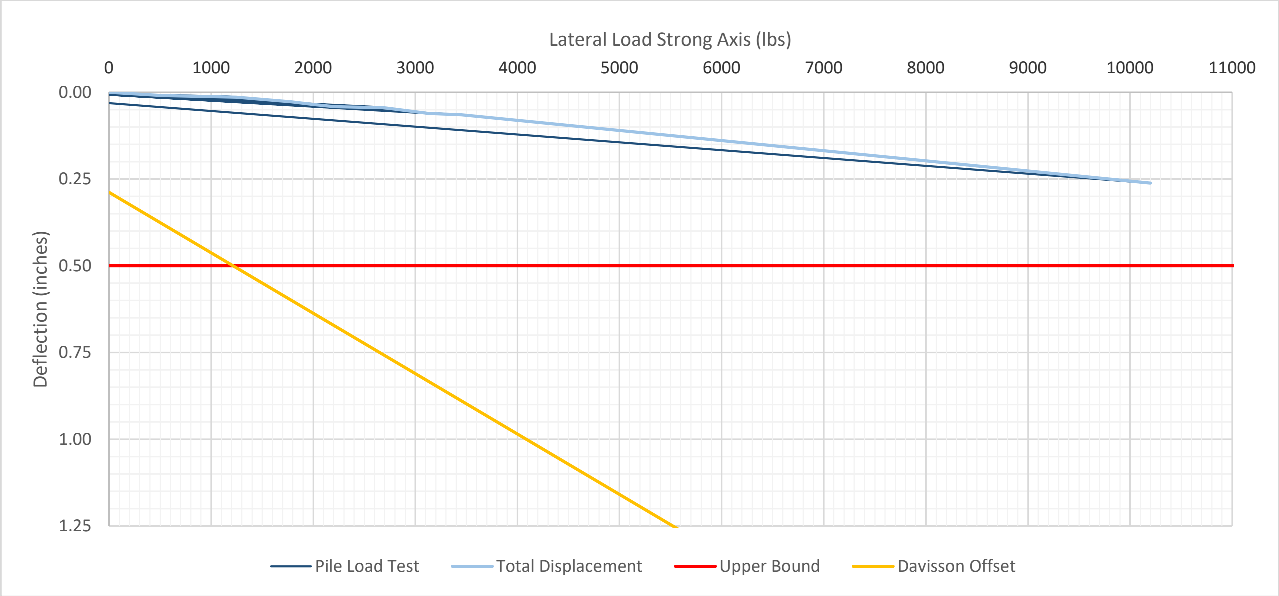


Figure No. 123C

CONSULTING GROUP

Post Load Test Results

Test Location: PD-4
Post Size: W6x9
Depth Driven: 8 feet
GPS Test Coordinates: 37.82924°, -84.85437°

Project Name: Mercer County Solar Power Plant
Project Number: 193508
Test Date: 11/17/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	833	0.000	0.000	0.000	2	1	666	0.047	0.098	0.072
3	1	1069	0.000	0.000	0.000	3	1	1158	0.047	0.098	0.072
4	1	1758	0.000	0.001	0.001	4	1	0	0.022	0.009	0.016
5	1	2123	0.000	0.002	0.001	5	1	1402	0.073	0.113	0.093
6	5	2124	0.000	0.006	0.003	6	1	1652	0.104	0.138	0.121
7	1	0	0.000	0.000	0.000	7	1	0	0.038	0.008	0.023
8	1	2613	0.000	0.000	0.000	8	1	1882	0.118	0.142	0.130
9	1	8892	0.274	0.286	0.280	9	1	2426	0.159	0.174	0.166
10	1	0	0.275	0.273	0.274	10	1	0	0.050	0.013	0.031
11	1	6871	1.020	1.022	1.021	11	1	2656	0.196	0.212	0.204
12	1	0	1.023	1.015	1.019	12	1	0	0.062	0.019	0.040
Reset Gauges to Zero						13	1	2654	0.236	0.256	0.246
13	1	0	0.000	0.000	0.000	14	1	3452	0.281	0.300	0.291
14	1	6587	0.528	0.524	0.526	15	1	0	0.078	0.029	0.054
15	1	0	0.531	0.519	0.525	16	1	3261	0.279	0.310	0.294
						17	1	5128	0.531	0.471	0.501
						18	1	0	0.129	0.064	0.096
						19	1	8514	1.116	0.884	1.000
						20	1	0	0.327	0.155	0.241

Figure No. 124A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	PD-4		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	8 feet	Project Number:	193508
GPS Test Coordinates:	37.82924°, -84.85437°	Test Date:	11/17/2019

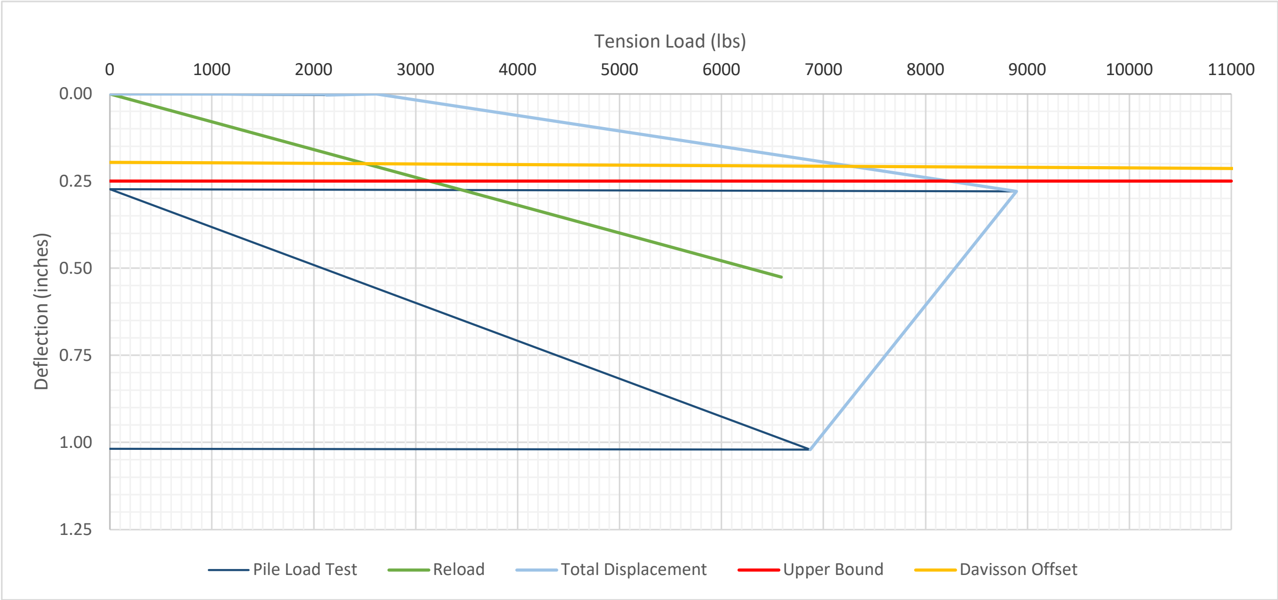


Figure No. 124B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	PD-4		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	8 feet	Project Number:	193508
GPS Test Coordinates:	37.82924°, -84.85437°	Test Date:	11/17/2019

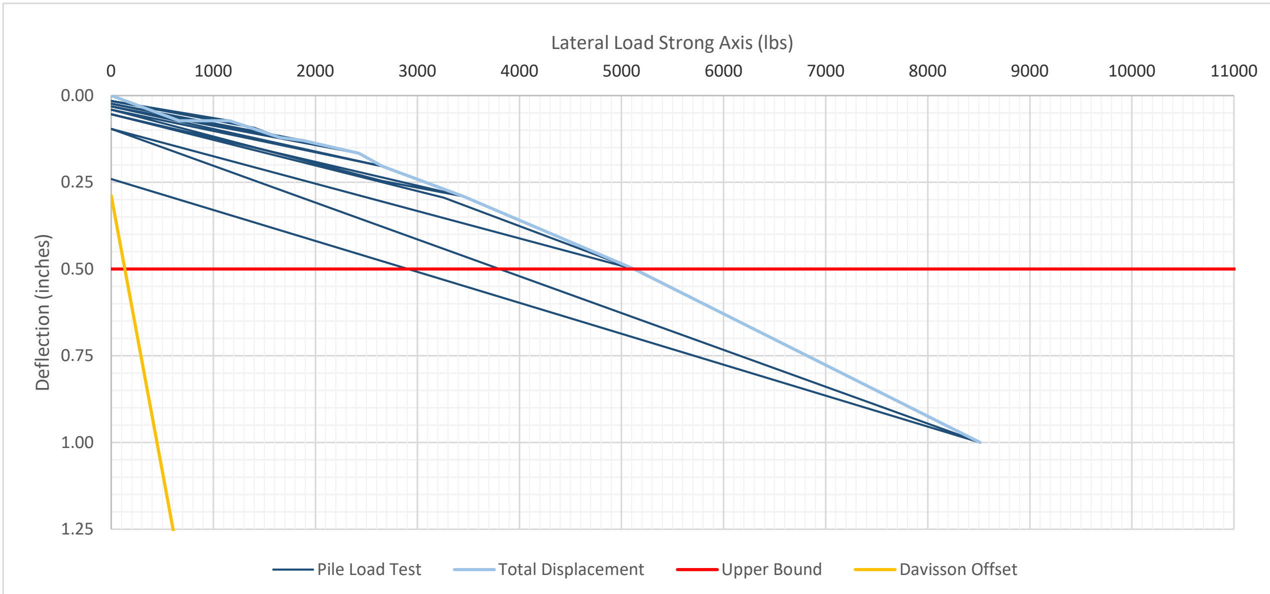


Figure No. 124C

CONSULTING GROUP

Post Load Test Results

Test Location:	PD-5		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	5 feet	Project Number:	193508
GPS Test Coordinates:	37.82207°, -84.86181°	Test Date:	11/16/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	675	0.001	0.003	0.002	2	1	700	0.005	0.047	0.021
3	1	1193	0.001	0.003	0.002	3	1	1175	0.012	0.076	0.044
4	1	1821	0.003	0.004	0.003	4	1	0	0.002	0.012	0.005
5	1	2605	0.004	0.004	0.004	5	1	1305	0.023	0.095	0.059
6	5	2030	0.010	0.009	0.009	6	1	1832	0.070	0.141	0.106
7	1	0	0.009	0.009	0.009	7	1	0	0.005	0.018	0.011
8	1	2207	0.009	0.009	0.009	8	1	1845	0.067	0.149	0.108
9	1	10555	0.034	0.009	0.022	9	1	2334	0.108	0.198	0.153
10	1	0	0.013	0.011	0.012	10	1	0	0.009	0.024	0.016
						11	1	2420	0.117	0.216	0.166
						12	1	2523	0.125	0.231	0.178
						13	1	0	0.013	0.027	0.020
						14	1	2672	0.133	0.246	0.189
						15	1	3516	0.171	0.302	0.236
						16	1	0	0.016	0.035	0.025
						17	1	3213	0.290	0.271	0.280
						18	1	5713	0.529	0.477	0.503
						19	1	0	0.063	0.052	0.058
						20	1	10173	0.954	0.956	0.955
						21	1	0	0.260	0.159	0.209

Figure No. 125A

Tension Post Load Test Results

Test Location:	PD-5			
Post Size:	W6x9		Project Name:	Mercer County Solar Power Plant
Depth Driven:	5 feet		Project Number:	193508
GPS Test Coordinates:	37.82207°, -84.86181°		Test Date:	11/16/2019

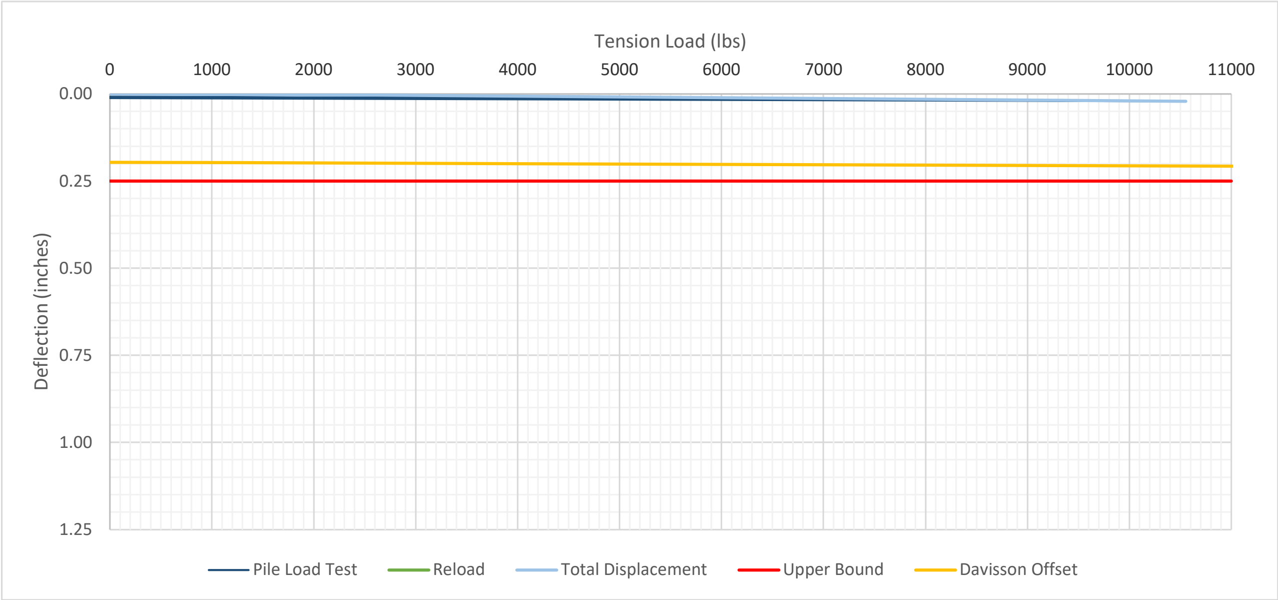


Figure No. 125B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	PD-5
Post Size:	W6x9
Depth Driven:	5 feet
GPS Test Coordinates:	37.82207°, -84.86181°

Project Name:	Mercer County Solar Power Plant
Project Number:	193508
Test Date:	11/16/2019

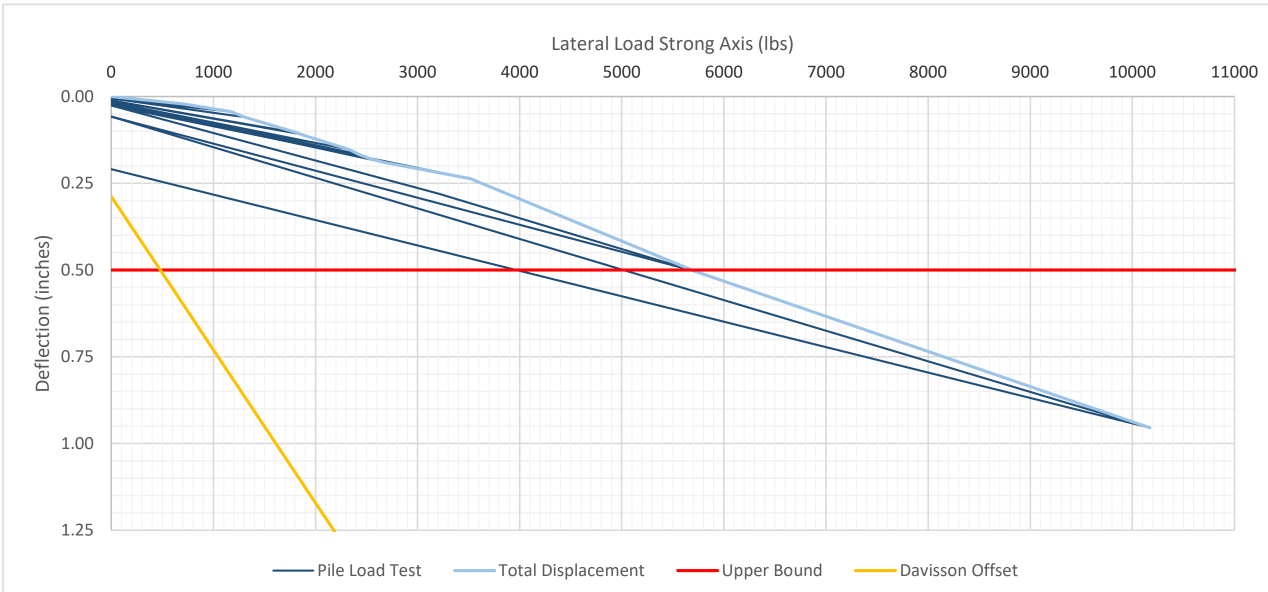


Figure No. 125C

CONSULTING GROUP

Post Load Test Results

Test Location:	PD-6		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	5 feet	Project Number:	193508
GPS Test Coordinates:	37.81122°, -84.87051°	Test Date:	11/18/2019

Tension Load Test						Lateral Load Test					
	Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)		Hold Time (min)	Load (lbs)	Deflection Gauge #1 (inches)	Deflection Gauge #2 (inches)	Average Deflection (inches)
1	1	0	0.000	0.000	0.000	1	1	0	0.000	0.000	0.000
2	1	775	0.002	0.002	0.002	2	1	768	0.155	0.034	0.061
3	1	1438	0.002	0.002	0.002	3	1	1173	0.220	0.037	0.092
4	1	1582	0.002	0.003	0.003	4	1	0	0.088	0.050	0.019
5	1	2125	0.005	0.003	0.004	5	1	1210	0.120	0.035	0.077
6	5	2047	0.006	0.006	0.006	6	1	1501	0.151	0.055	0.103
7	1	0	0.006	0.005	0.005	7	1	0	0.072	0.041	0.016
8	1	2021	0.006	0.005	0.005	8	1	1750	0.150	0.075	0.113
9	1	10019	0.009	0.024	0.016	9	1	2032	0.149	0.107	0.128
10	1	0	0.009	0.007	0.008	10	1	0	0.055	0.026	0.015
						11	1	2005	0.119	0.130	0.124
						12	1	2736	0.170	0.166	0.168
						13	1	0	0.053	0.020	0.017
						14	1	2972	0.222	0.132	0.177
						15	1	3378	0.249	0.151	0.200
						16	1	0	0.072	0.029	0.022
						17	1	3679	0.263	0.160	0.211
						18	1	7760	0.555	0.455	0.505
						19	1	0	0.133	0.008	0.070
						20	1	10063	0.663	0.610	0.637
						21	1	0	0.142	0.053	0.097

Figure No. 126A

CONSULTING GROUP

Tension Post Load Test Results

Test Location:	PD-6		
Post Size:	W6x9	Project Name:	Mercer County Solar Power Plant
Depth Driven:	5 feet	Project Number:	193508
GPS Test Coordinates:	37.81122°, -84.87051°	Test Date:	11/18/2019

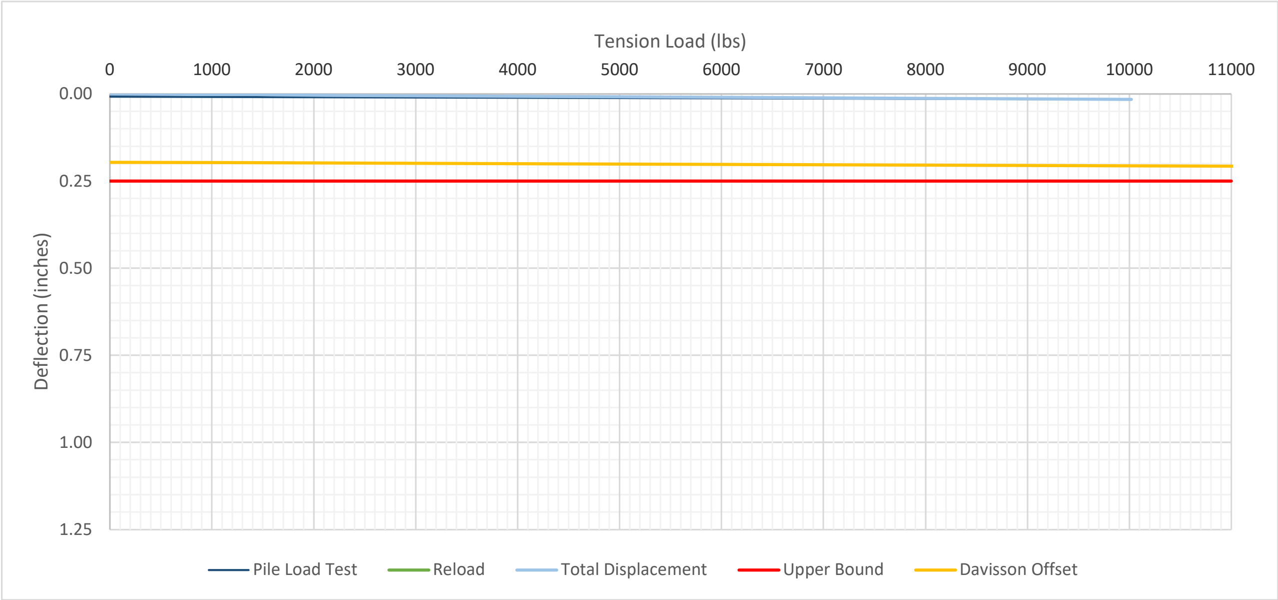


Figure No. 126B

CONSULTING GROUP

Lateral Post Load Test Results

Test Location:	PD-6			
Post Size:	W6x9		Project Name:	Mercer County Solar Power Plant
Depth Driven:	5 feet		Project Number:	193508
GPS Test Coordinates:	37.81122°, -84.87051°		Test Date:	11/18/2019

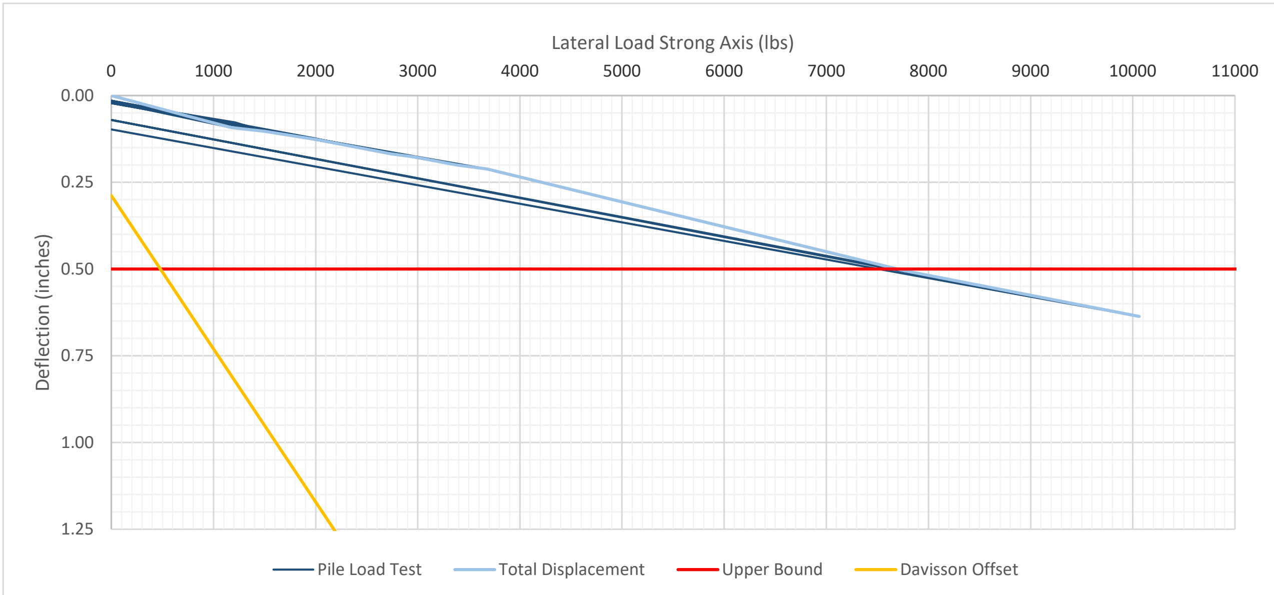


Figure No. 126C

CONSULTING GROUP

Mercer County Solar Power Plant
Harrodsburg, Mercer County, KY
G2 Project No. 193508

In-Situ Thermal Resistivity

Test Pit No.	Depth (ft)	Thermal Resistivity (^{o}C-cm/W)	Temperature (^{o}C)	Soil Classification
B-1	1	68.9	9.7	Lean Clay
TP-1	2	63.2	11.4	Fat Clay
	3	40.9	10.9	Fat Clay
	4	57.9	12.0	Fat Clay
TP-2	2	63.2	10.4	Fat Clay
	3	71.4	11.1	Fat Clay
	4	80.7	12.3	Fat Clay
TP-9	1.5	84.6	10.4	Fat Clay
	2.5	94.6	11.2	Fat Clay
TP-11	2	53.2	9.4	Fat Clay
	3	59.2	9.9	Fat Clay
	4	51.4	10.8	Fat Clay
TP-13	2	55.3	8.5	Fat Clay
	3	63.9	11.0	Fat Clay
	4	90.8	12.3	Fat Clay

Figure No. 127

CONSULTING GROUP

In-situ Electrical Resistivity (ohm-cm)
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

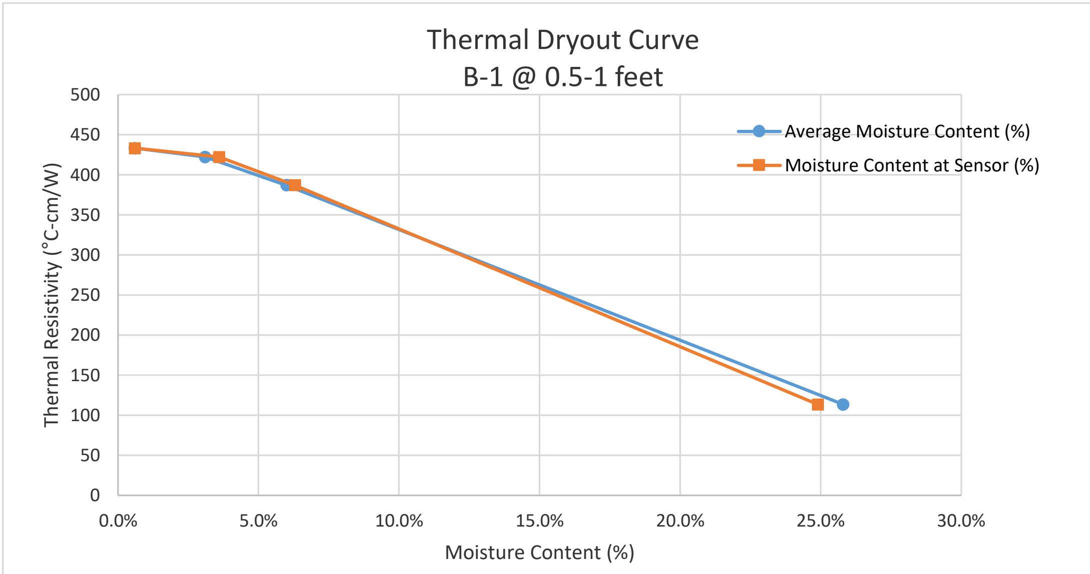
Location Number	Direction	0 to 2 ft.	0 to 5 ft.	0-10 ft.	0-25 ft.	0-50 ft.
B-1	North	3,715	5,649	12,448	31,119	67,983
	East	3,639	6,607	11,299	29,683	49,790
TP-1	North	8,043	15,320	22,980	31,119	37,343
	East	9,192	18,193	34,470	39,258	49,790
TP-2	North	4,213	4,022	5,937	13,405	27,768
	East	3,064	4,117	6,511	15,799	31,598
TP-5	North	5,362	7,852	14,937	32,076	49,790
	East	7,660	12,448	13,022	31,598	47,875
TP-7	North	11,490	7,564	9,384	21,065	39,258
	East	11,490	8,139	9,575	20,586	26,810
TP-9	North	7,277	8,522	16,469	24,895	27,768
	East	8,043	12,448	18,576	24,416	31,598
TP-11	North	4,979	11,490	13,597	23,459	29,683
	East	4,979	8,330	12,448	24,895	28,725
TP-12	North	4,979	6,511	12,448	30,640	62,238
	East	6,128	7,660	13,405	30,640	56,493
TP-13	North	9,958	17,235	13,022	28,246	40,215
	East	8,809	12,448	17,044	34,470	37,343

MINIMUM	3,064	4,022	5,937	13,405	26,810
MAXIMUM	11,490	18,193	34,470	39,258	67,983
AVERAGE	6,830	9,700	14,310	27,080	41,230

Figure No. 128

CONSULTING GROUP

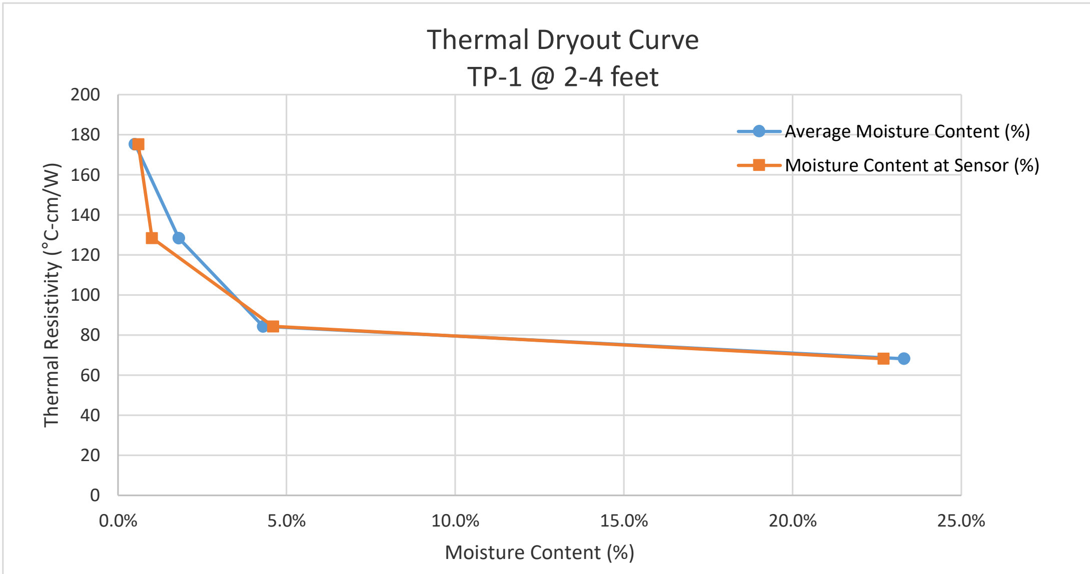
Thermal Resistivity Dryout Curve
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508



Remolded Target 85% Compaction									
Location	Sample Description	Depth	Dry Density (pcf)	Actual Compaction (%)	Shrinkage (%)	Average Moisture Content (%)	Moisture Content at Sensor (%)	Thermal Resistivity (°C-cm/W)	Temp (°C)
B-1	Brown Lean Clay	0.5-1 ft	76.6	87.9%	0.0%	25.8%	24.9%	114	19.4
			75.0	86.1%	2.1%	6.0%	6.3%	387	21.7
			75.8	87.0%	3.1%	3.1%	3.6%	422	20.4
			76.2	87.5%	3.6%	0.6%	0.6%	433	23.2

Figure No. 129

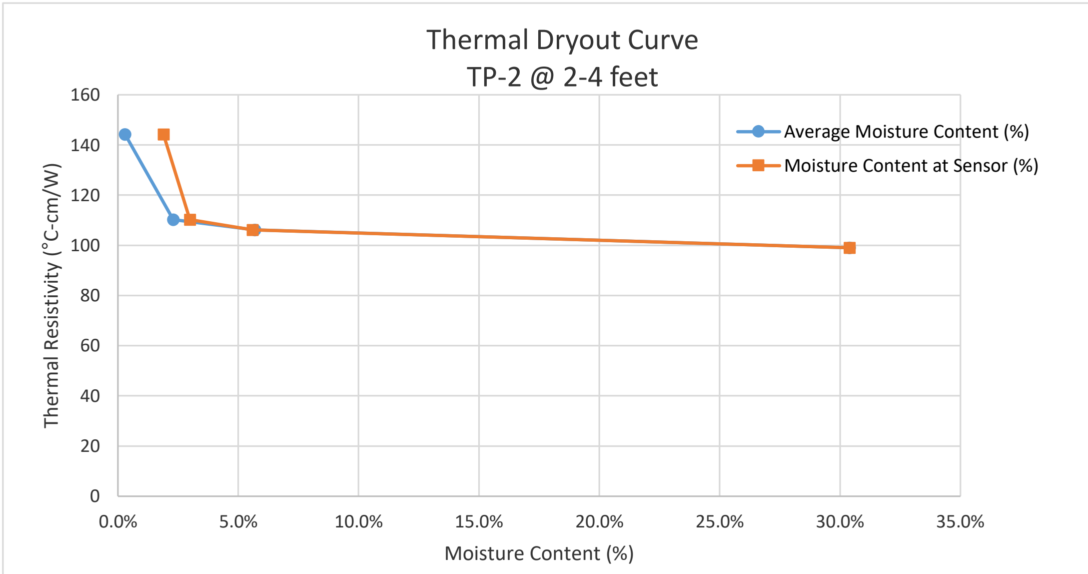
Thermal Resistivity Dryout Curve
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508



Remolded Target 85% Compaction									
Location	Sample Description	Depth	Dry Density (pcf)	Actual Compaction (%)	Shrinkage (%)	Average Moisture Content (%)	Moisture Content at Sensor (%)	Thermal Resistivity (°C-cm/W)	Temp (°C)
TP-1	Brown Fat Clay	2-4 feet	86.3	85.1%	0.0%	23.3%	22.7%	68	17.0
			89.2	88.0%	3.3%	4.3%	4.6%	84	19.8
			89.9	88.7%	4.0%	1.8%	1.0%	128	20.5
			89.6	88.4%	3.7%	0.5%	0.6%	175	20.5

Figure No. 130

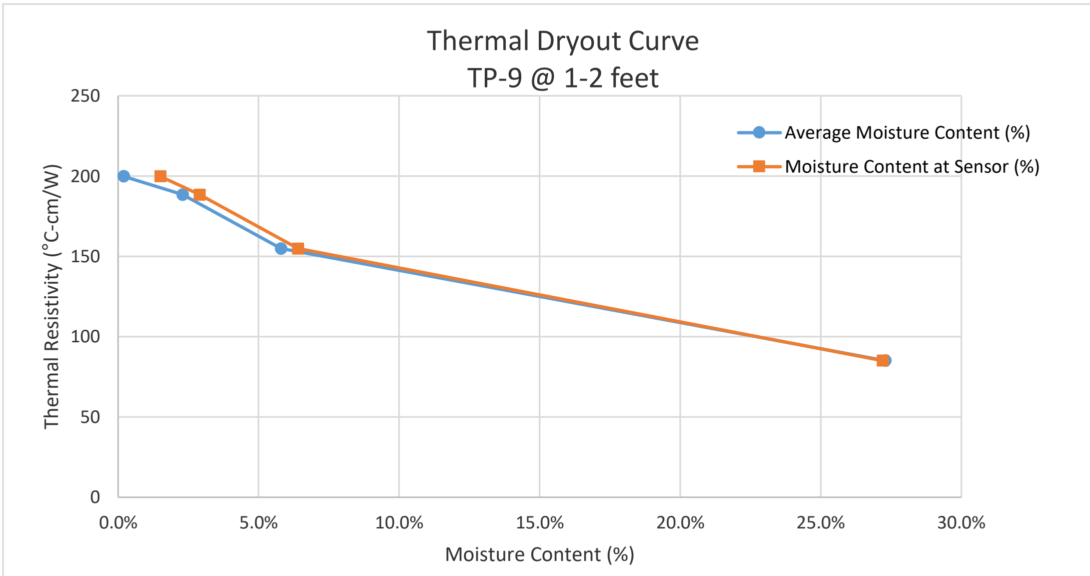
Thermal Resistivity Dryout Curve
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508



Remolded Target 85% Compaction									
Location	Sample Description	Depth	Dry Density (pcf)	Actual Compaction (%)	Shrinkage (%)	Average Moisture Content (%)	Moisture Content at Sensor (%)	Thermal Resistivity (°C-cm/W)	Temp (°C)
TP-2	Brown Fat Clay	2-4 feet	80.8	88.4%	0.0%	30.4%	30.4%	99	18.0
			81.8	89.5%	5.1%	5.7%	5.6%	106	21.4
			81.4	89.1%	4.7%	2.3%	3.0%	110	20.4
			82.0	89.7%	5.3%	0.3%	1.9%	144	21.4

Figure No. 131

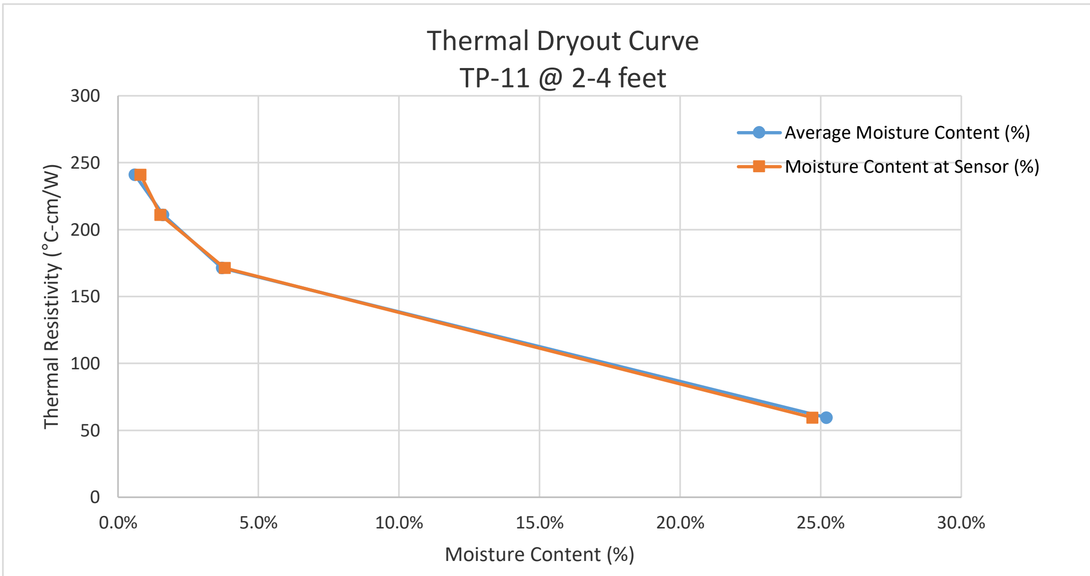
Thermal Resistivity Dryout Curve
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508



Remolded Target 85% Compaction									
Location	Sample Description	Depth	Dry Density (pcf)	Actual Compaction (%)	Shrinkage (%)	Average Moisture Content (%)	Moisture Content at Sensor (%)	Thermal Resistivity (°C-cm/W)	Temp (°C)
TP-9	Brown Fat Clay	1-2 feet	85.4	85.4%	0.0%	27.3%	27.2%	85	17.8
			88.4	88.4%	3.4%	5.8%	6.4%	155	20.9
			88.7	88.7%	3.8%	2.3%	2.9%	189	21.0
			89.1	89.1%	4.1%	0.2%	1.5%	200	20.6

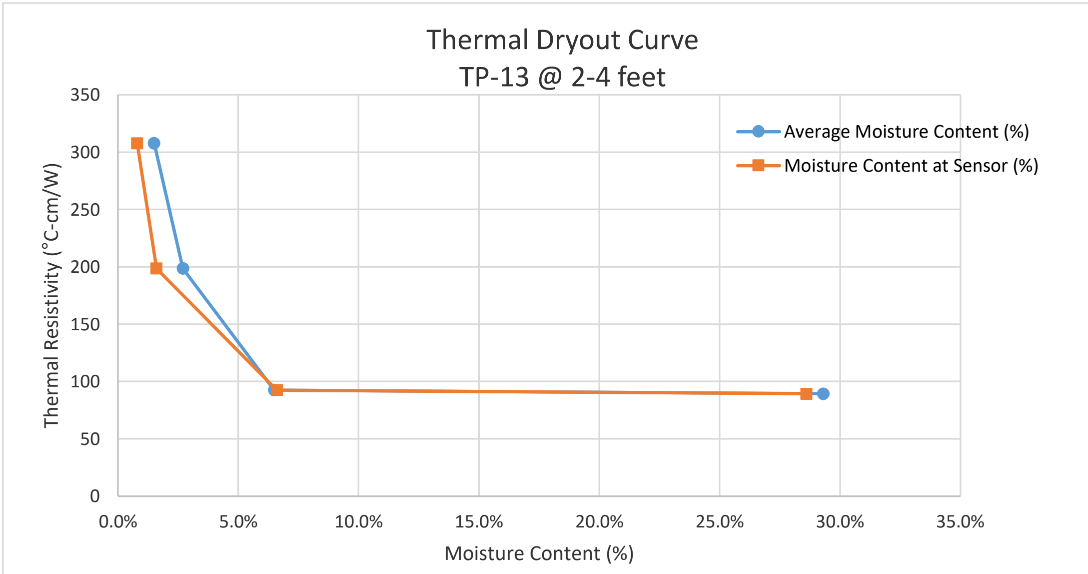
Figure No. 132

Thermal Resistivity Dryout Curve
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508



Remolded Target 85% Compaction									
Location	Sample Description	Depth	Dry Density (pcf)	Actual Compaction (%)	Shrinkage (%)	Average Moisture Content (%)	Moisture Content at Sensor (%)	Thermal Resistivity (°C-cm/W)	Temp (°C)
TP-11	Brown Fat Clay	2-4 feet	82.9	85.4%	0.0%	25.2%	24.7%	60	19.1
			84.8	87.3%	2.2%	3.7%	3.8%	171	21.9
			85.0	87.5%	2.5%	1.6%	1.5%	211	20.8
			84.7	87.2%	2.1%	0.6%	0.8%	241	23.2

Thermal Resistivity Dryout Curve
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508



Remolded Target 85% Compaction									
Location	Sample Description	Depth	Dry Density (pcf)	Actual Compaction (%)	Shrinkage (%)	Average Moisture Content (%)	Moisture Content at Sensor (%)	Thermal Resistivity (°C-cm/W)	Temp (°C)
TP-13	Brown Fat Clay	2-4 feet	78.9	84.5%	0.0%	29.3%	28.6%	89	18.9
			82.6	88.4%	4.6%	6.5%	6.6%	93	20.8
			83.0	88.9%	5.0%	2.7%	1.6%	199	20.6
			83.1	89.0%	5.1%	1.5%	0.8%	308	19.8

Figure No. 134

G2 Consulting Group, LLC **Moisture Density Curve**

Project Name:	**Mercer Co Solar**	Date:	**12/3/2019**
Job Number:	**193508**	Method used:	**A**
Project Location:	**KY**	As-received water content:	**Not determined**
Boring No.:	**TP-3**	Rammer type:	**Manual**
Sample No.:		Percent retained on No. 4 sieve	**0**
Depth of Sample:	**0 to 0.67 feet (tilled earth)**	Percent passing No. 4 sieve	**100**
Soil Description:	**Dark Brown Fat Clay with trace sand**	Oversize correction used?	**No**
Technician:	**A. Green**	Specific gravity (estimated)	**2.68**

Proctor Type: **Standard Proctor, ASTM D698**
Standard maximum dry unit weight (pcf) **96.1**
Standard optimum water content (%) **24.5**

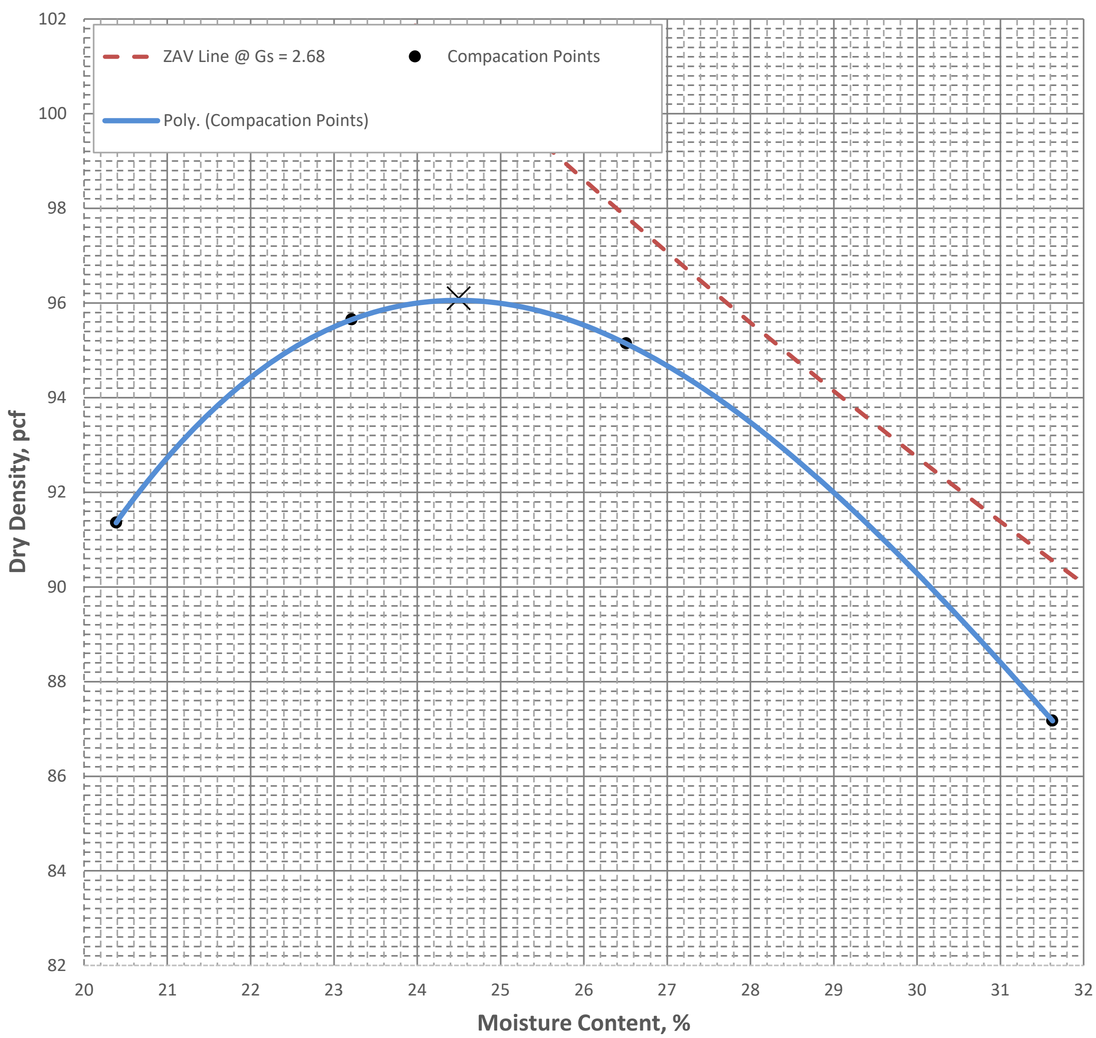


Figure No. 135

G2 Consulting Group, LLC

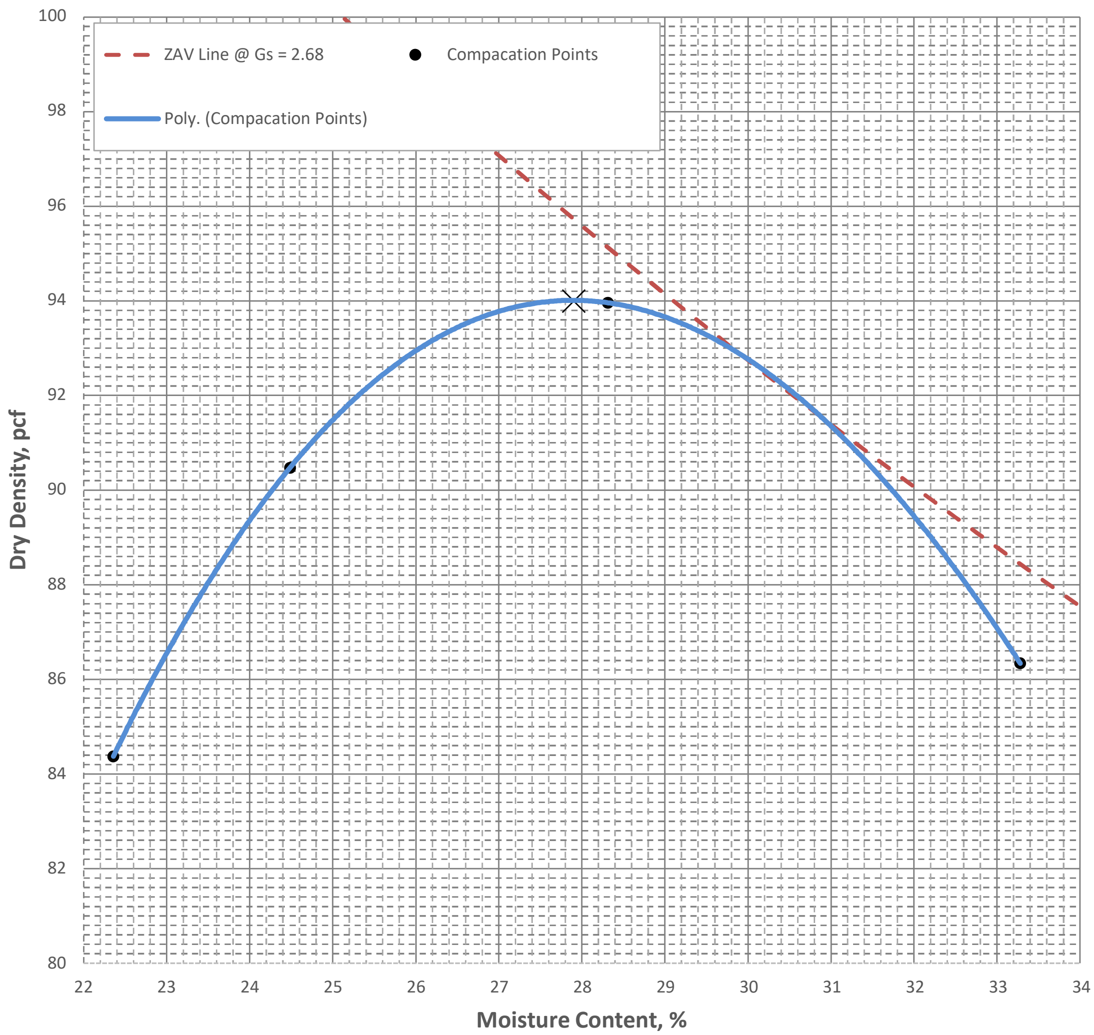
Moisture Density Curve

Project Name:	**Mercer Co Solar**	Date:	**12/3/2019**
Job Number:	**193508**	Method used:	**A**
Project Location:	**KY**	As-received water content:	**Not determined**
Boring No.:	**TP-13**	Rammer type:	**Manual**
Sample No.:		Percent retained on No. 4 sieve	**0**
Depth of Sample:	**2 to 4 feet**	Percent passing No. 4 sieve	**100**
Soil Description:	**Brown Fat Clay with trace sand**	Oversize correction used?	**No**
Technician:	**A. Green**	Specific gravity (estimated)	**2.68**

Proctor Type: **Standard Proctor, ASTM D698**

Standard maximum dry unit weight (pcf) **94.0**

Standard optimum water content (%) **27.9**



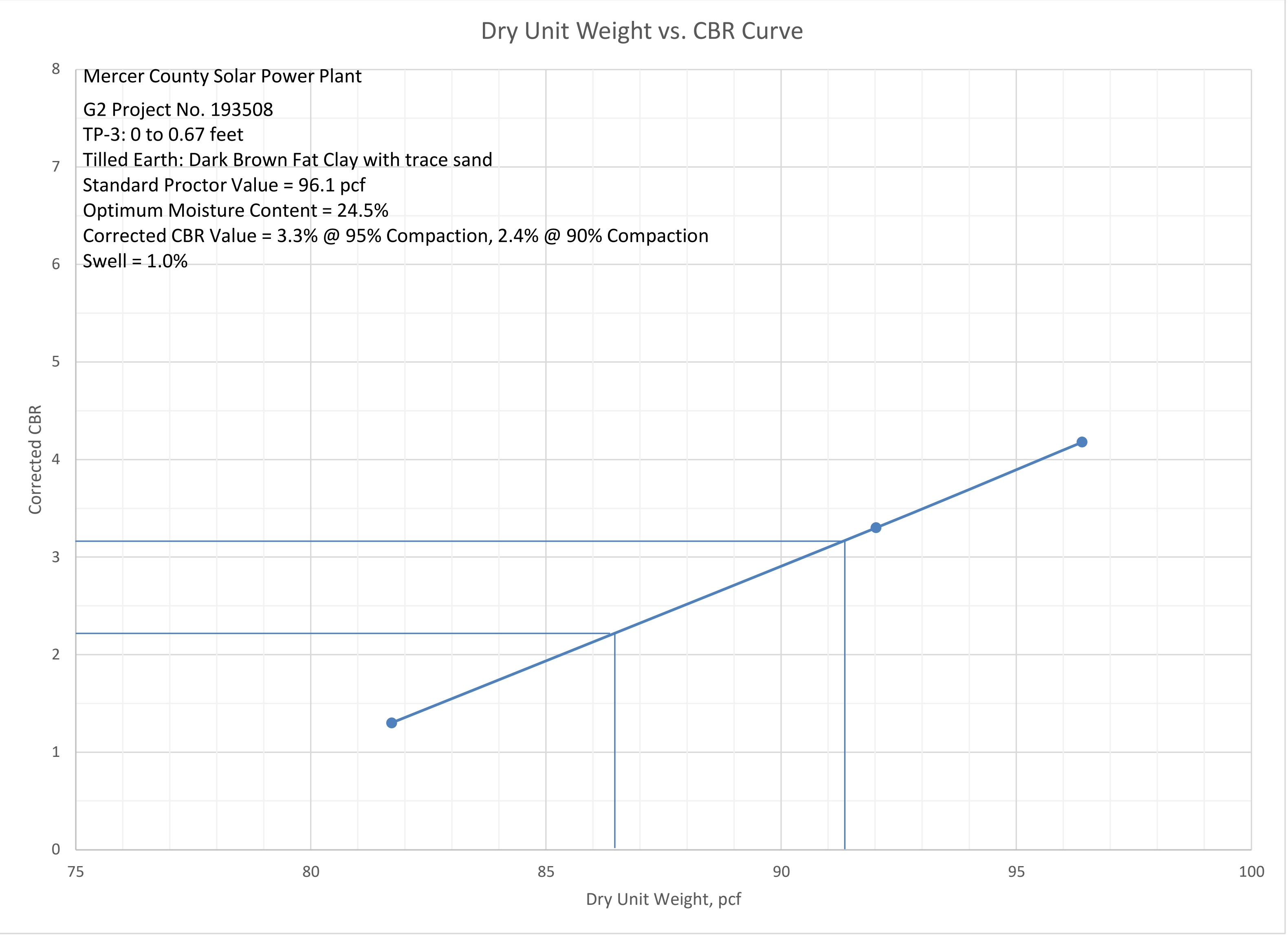


Figure No. 137

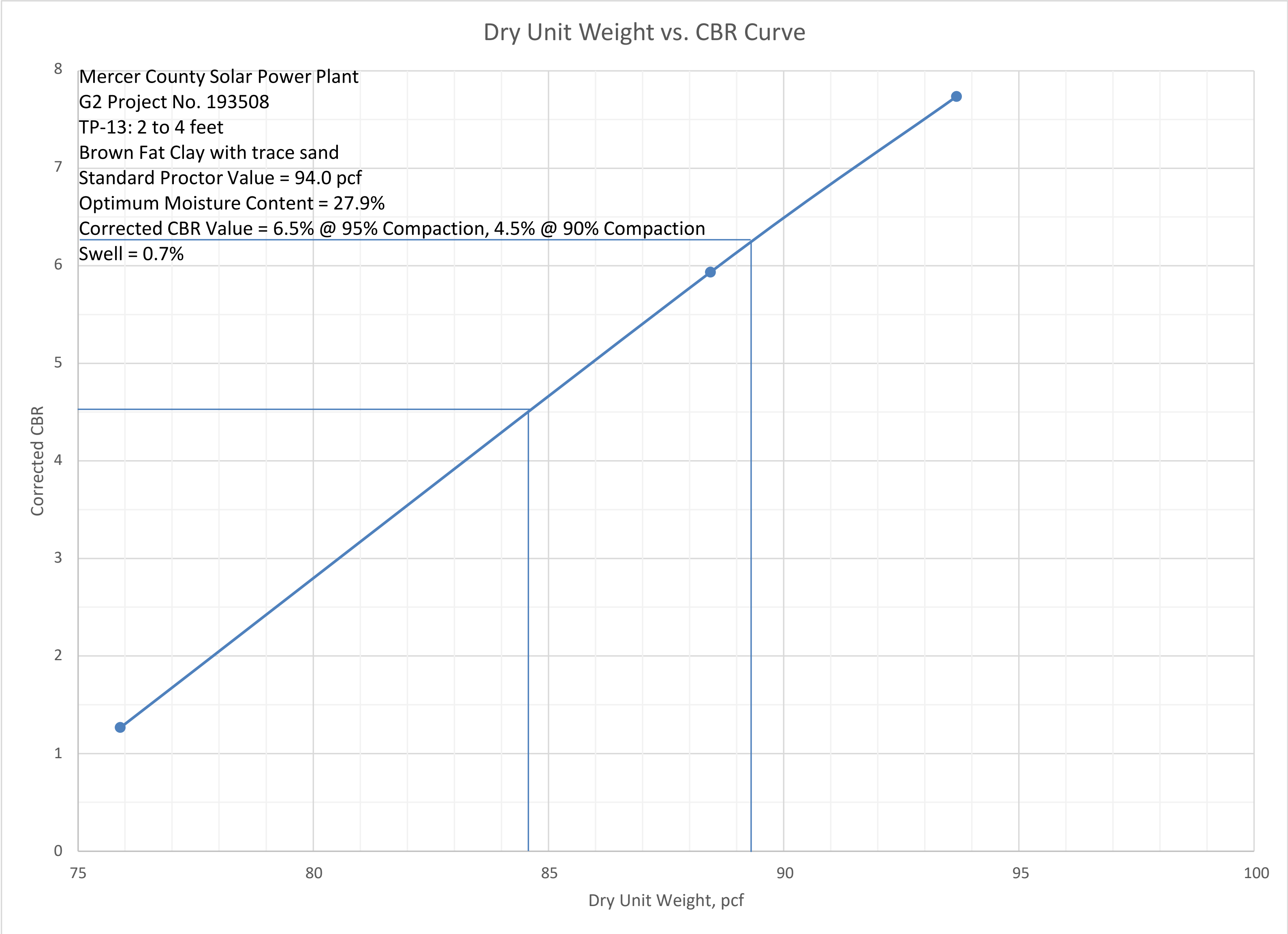
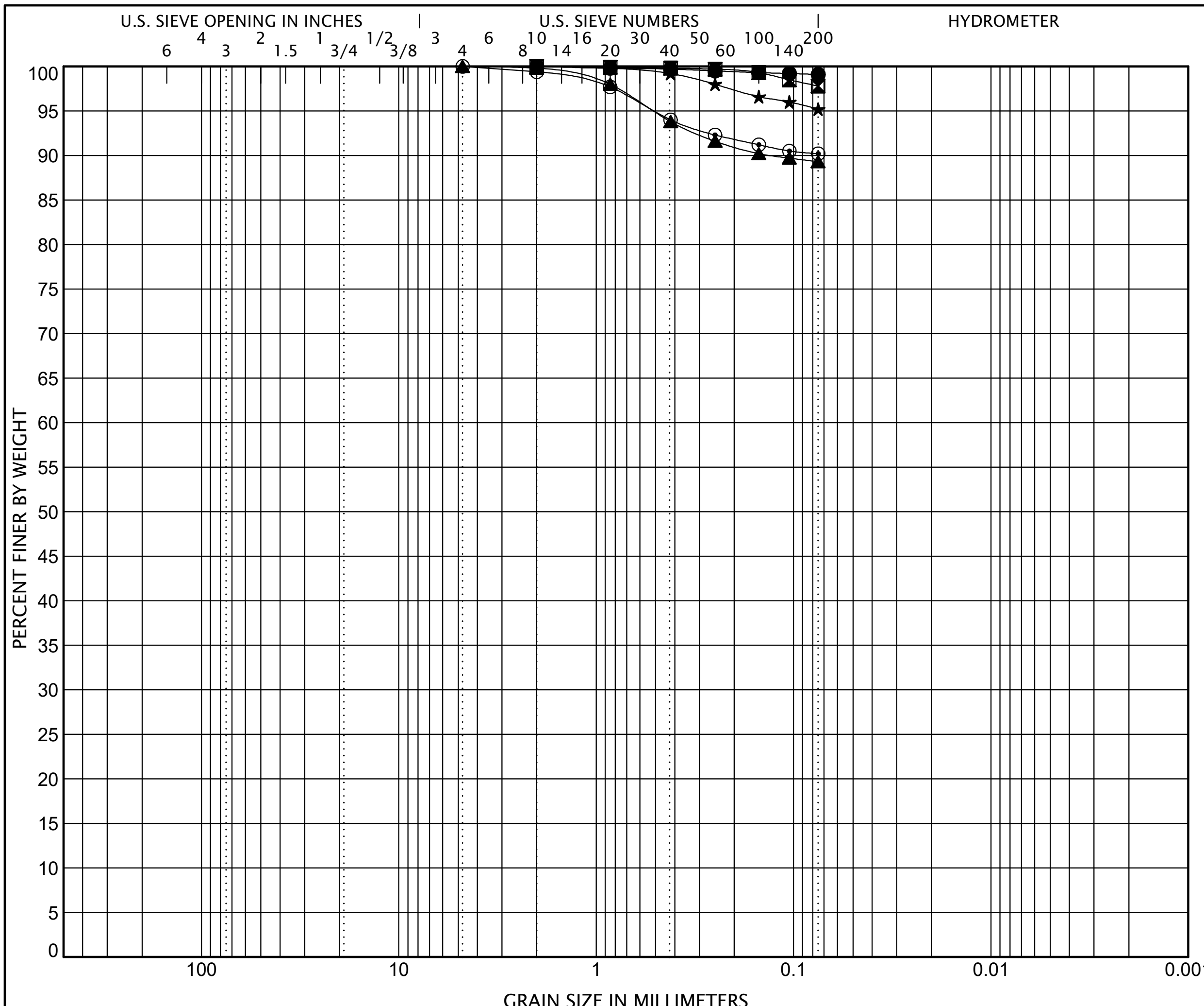


Figure No. 138



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen ID		Description	LL	PL	PI	Cc	Cu
●	B-03	S-1	Brown Fat Clay					
⧗	B-06	S-2	Mottled Brown and Gray Fat Clay with trace sand	62	26	36		
▲	B-09	S-2	Brown Lean Clay with trace sand	33	18	15		
★	B-18	S-5	Brown Lean Clay with trace sand					
⊙	TP-01	BS-1	Dark Brown Lean Clay with trace sand					

	Specimen ID		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-03	S-1	2				0.0	0.9	99.1	
⧗	B-06	S-2	2				0.0	2.2	97.8	
▲	B-09	S-2	4.75				0.0	10.7	89.3	
★	B-18	S-5	2				0.0	4.8	95.2	
⊙	TP-01	BS-1	4.75				0.0	9.8	90.2	

GRAIN SIZE DISTRIBUTION

G2 CONSULTING GROUP

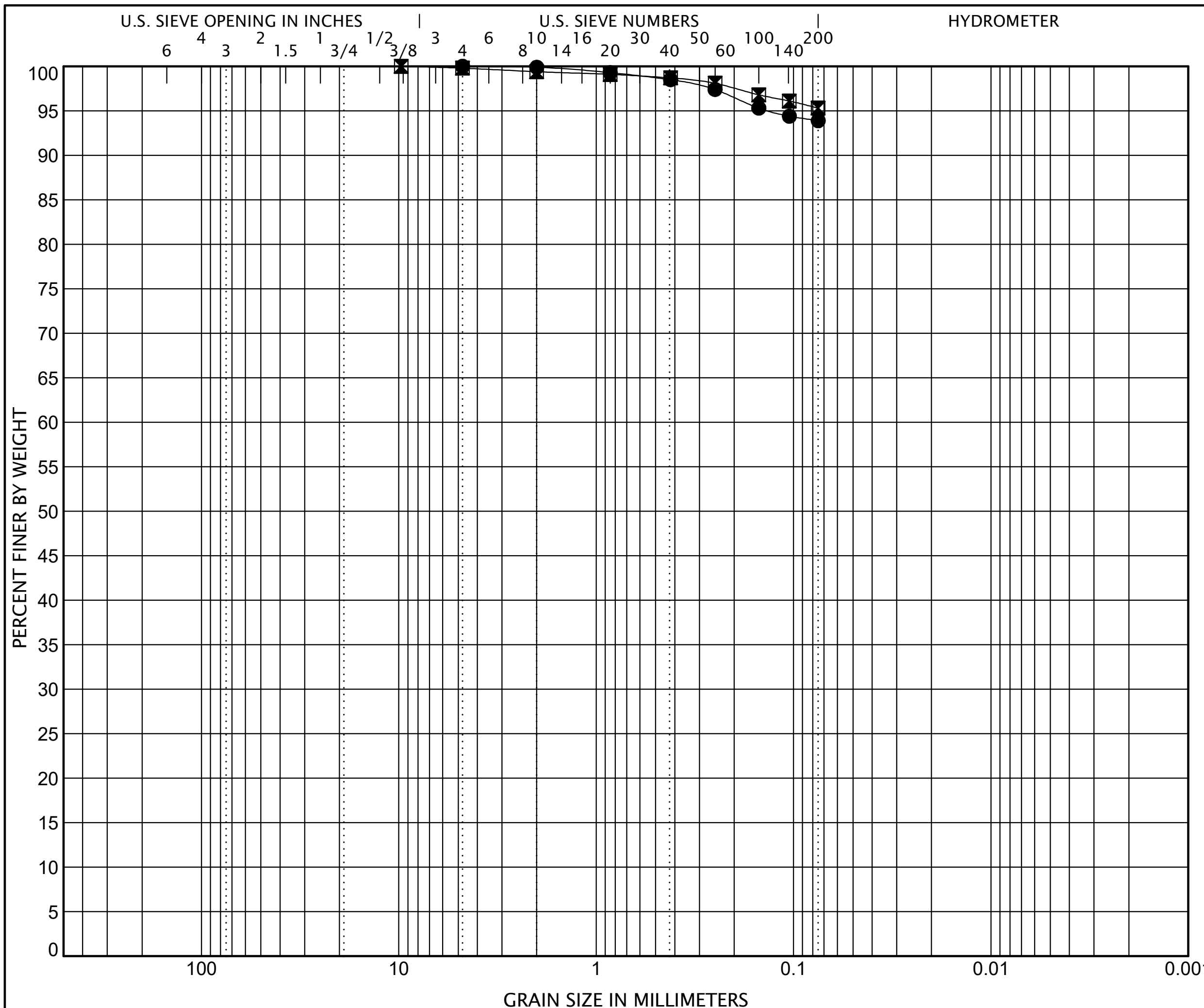
Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No.: 193508

Figure No. 139

US_GRAIN_SIZE 193508.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 12/12/19



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen ID	Description	LL	PL	PI	Cc	Cu
●	TP-07 BS-2	Brown Fat Clay with trace sand					
⧗	TP-11 BS-3	Brown Fat Clay with trace sand					

	Specimen ID	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	TP-07 BS-2	4.75				0.0	6.1	93.9	
⧗	TP-11 BS-3	9.73				0.2	4.5	95.3	

CONSULTING GROUP

GRAIN SIZE DISTRIBUTION

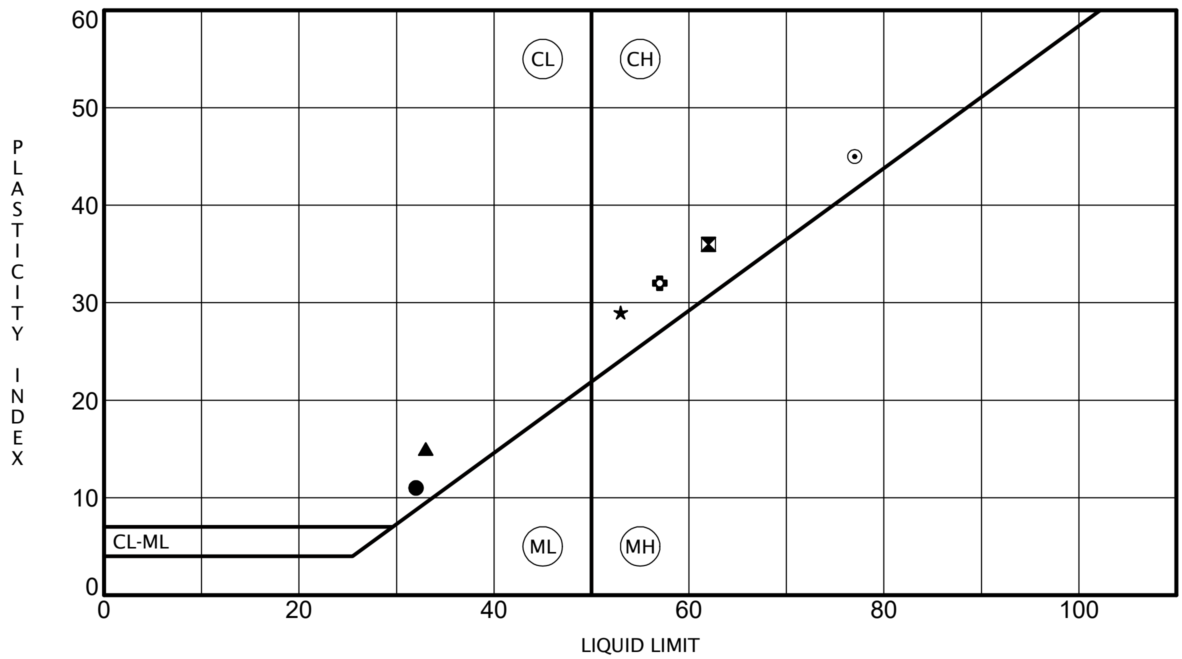
Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No.: 193508

Figure No. 140

US_GRAIN_SIZE 193508.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 12/12/19



	Specimen Identification		LL	PL	PI	Fines	M %	Classification
●	B-02	S-1	32	21	11		21	Mottled Brown and Gray Lean Clay
⧗	B-06	S-2	62	26	36	98	24	Mottled Brown and Gray Fat Clay
▲	B-09	S-2	33	18	15	89	21	Brown Lean Clay
★	TP-02	BS-3	53	24	29		22	Brown Fat Clay
⊙	TP-06	BS-3	77	32	45		13	Brown Fat Clay
✿	TP-11	BS-2	57	25	32		26	Brown Fat Clay

G2 CONSULTING GROUP

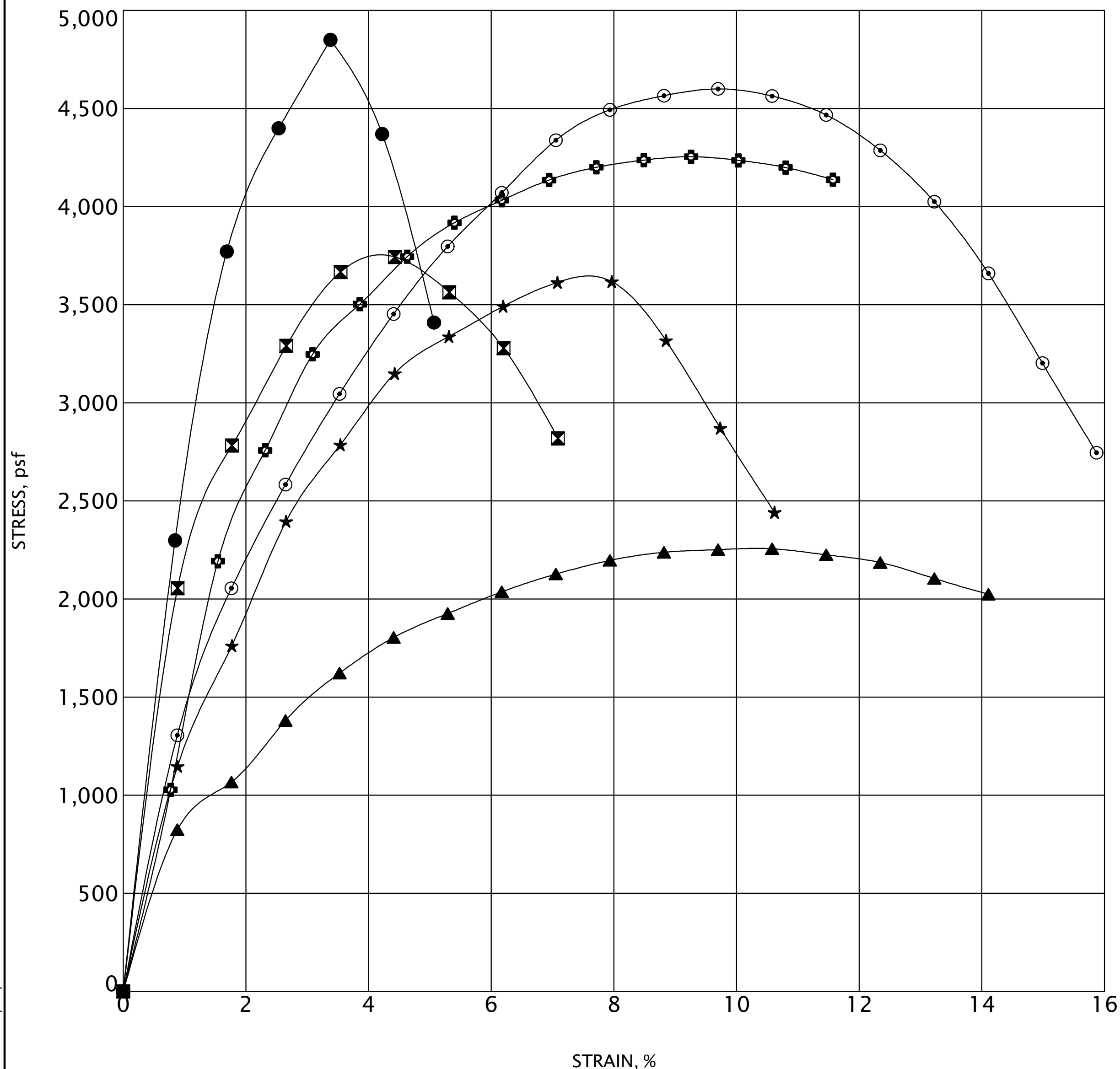
ATTERBERG LIMITS RESULTS

Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No.: 193508

Figure No. 141



Specimen		Classification	MC%	γ_d	UC
● B-02	S-2	Mottled Brown and Gray Lean Clay	18	113	4850
⊠ B-04	S-2	Brown Lean Clay	21	109	3740
▲ B-05	S-1	Brown Fat Clay	30	95	2260
★ B-06	S-3	Mottled Brown and Gray Fat Clay	25	106	3620
⊙ B-07	S-1	Brown Fat Clay	28	95	4600
✿ B-08	S-1	Brown Fat Clay	31	92	4250

G2 CONSULTING GROUP

UNCONFINED COMPRESSIVE STRENGTH TEST

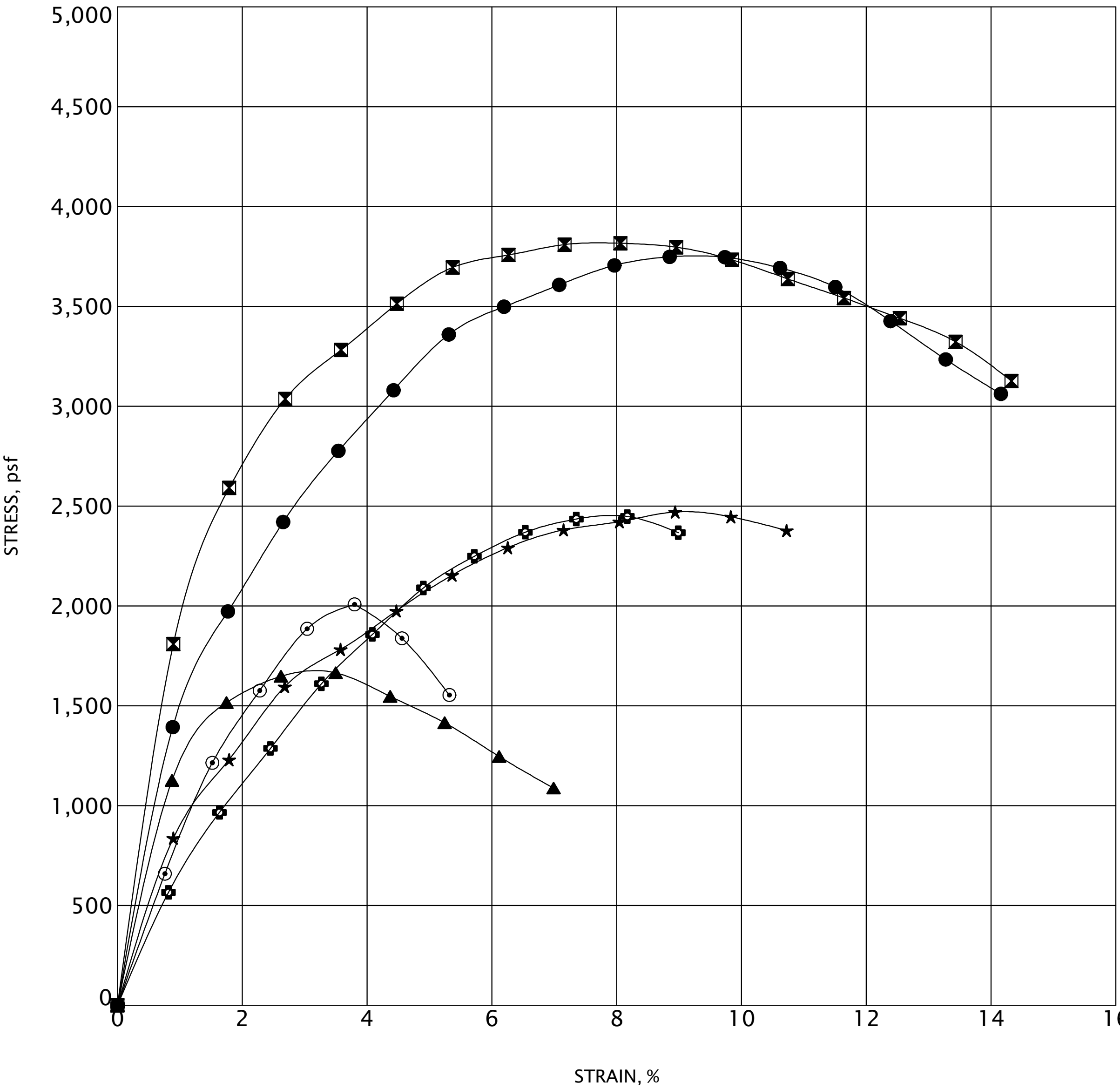
Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No.: 193508

Figure No. 142

US_UNCONFINED 193508.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 12/12/19



Specimen		Classification	MC%	γ_d	UC
● B-09	S-4	Brown Fat Clay	34	91	3750
⊠ B-10	S-3	Brown Fat Clay	35	87	3820
▲ B-12	S-1	Brown Fat Clay	27	96	1670
★ B-14	S-1	Mottled Brown and Gray Fat Clay	25	100	2470
⊙ B-15	S-2	Brown Lean Clay	21	102	2010
✿ B-17	S-1	Brown Fat Clay	40	81	2450

G2 CONSULTING GROUP

UNCONFINED COMPRESSIVE STRENGTH TEST

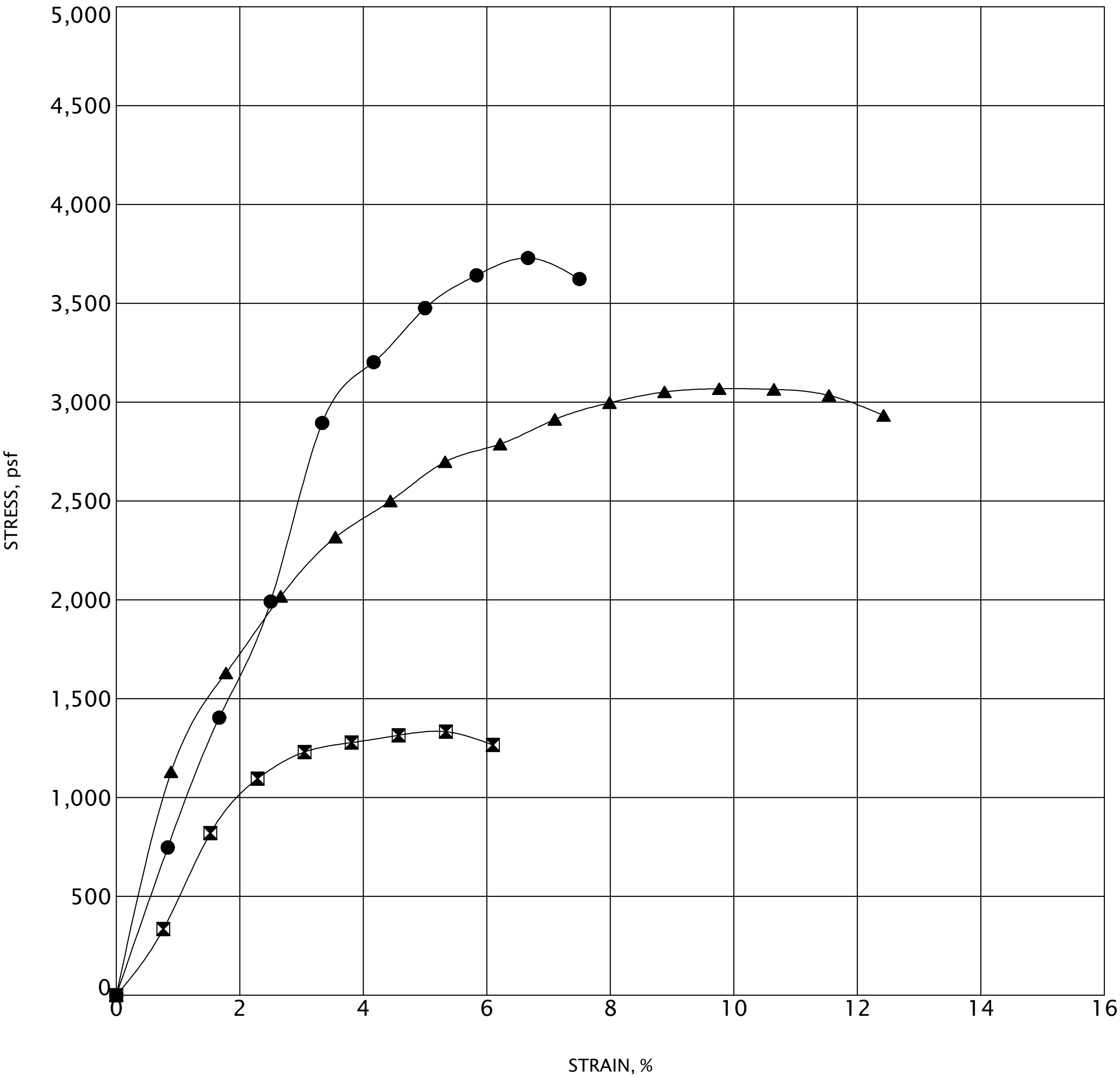
Project Name: Mercer County Solar Power Plant

Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

G2 Project No.: 193508

Figure No. 143

US_UNCONFINED 193508.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 12/12/19



Specimen		Classification	MC%	γ_d	UC
● B-18	S-2	Brown Fat Clay	23	99	3730
⧗ B-19	S-1	Brown Fat Clay	31	90	1330
▲ B-20	S-1	Brown Fat Clay	26	103	3070

US_UNCONFINED 193508.GPJ 20140820 G2 CONSULTING DATA TEMPLATE.GDT 12/12/19

2 CONSULTING GROUP

UNCONFINED COMPRESSIVE STRENGTH TEST

Project Name: Mercer County Solar Power Plant

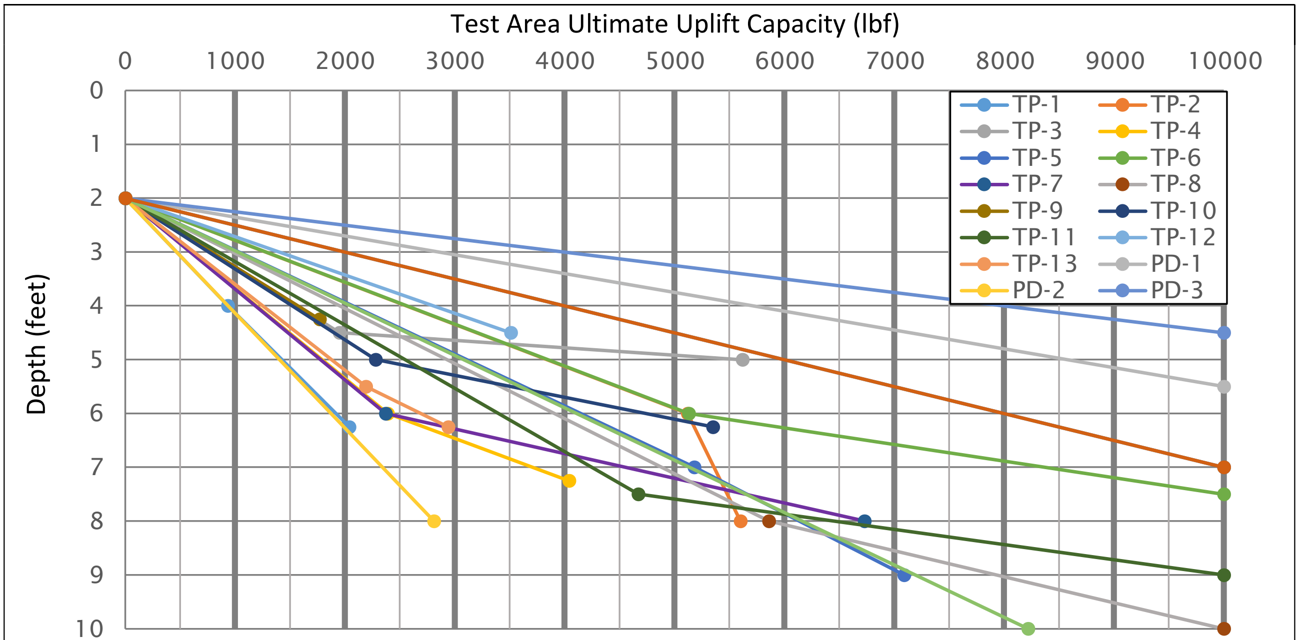
Project Location: West of U.S. Highway 127 (US-127)
Disjoined by Jackson Pike
Harrodsburg, Mercer County, Kentucky

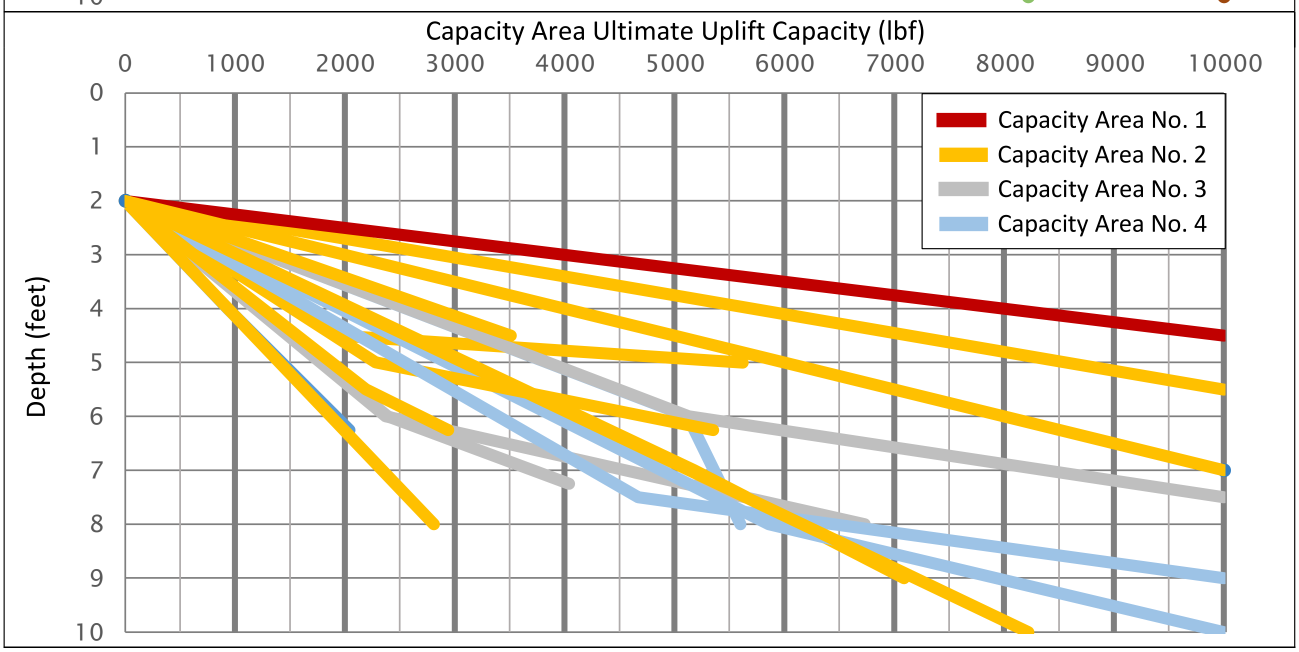
G2 Project No.: 193508

Figure No. 144

CONSULTING GROUP

Ultimate Uplift Capacity
TP-1 through TP-13 and PD-1 through PD-6
Mercer County Solar Power Plant
Harrodsburg, Mercer County, Kentucky
G2 Project No. 193508

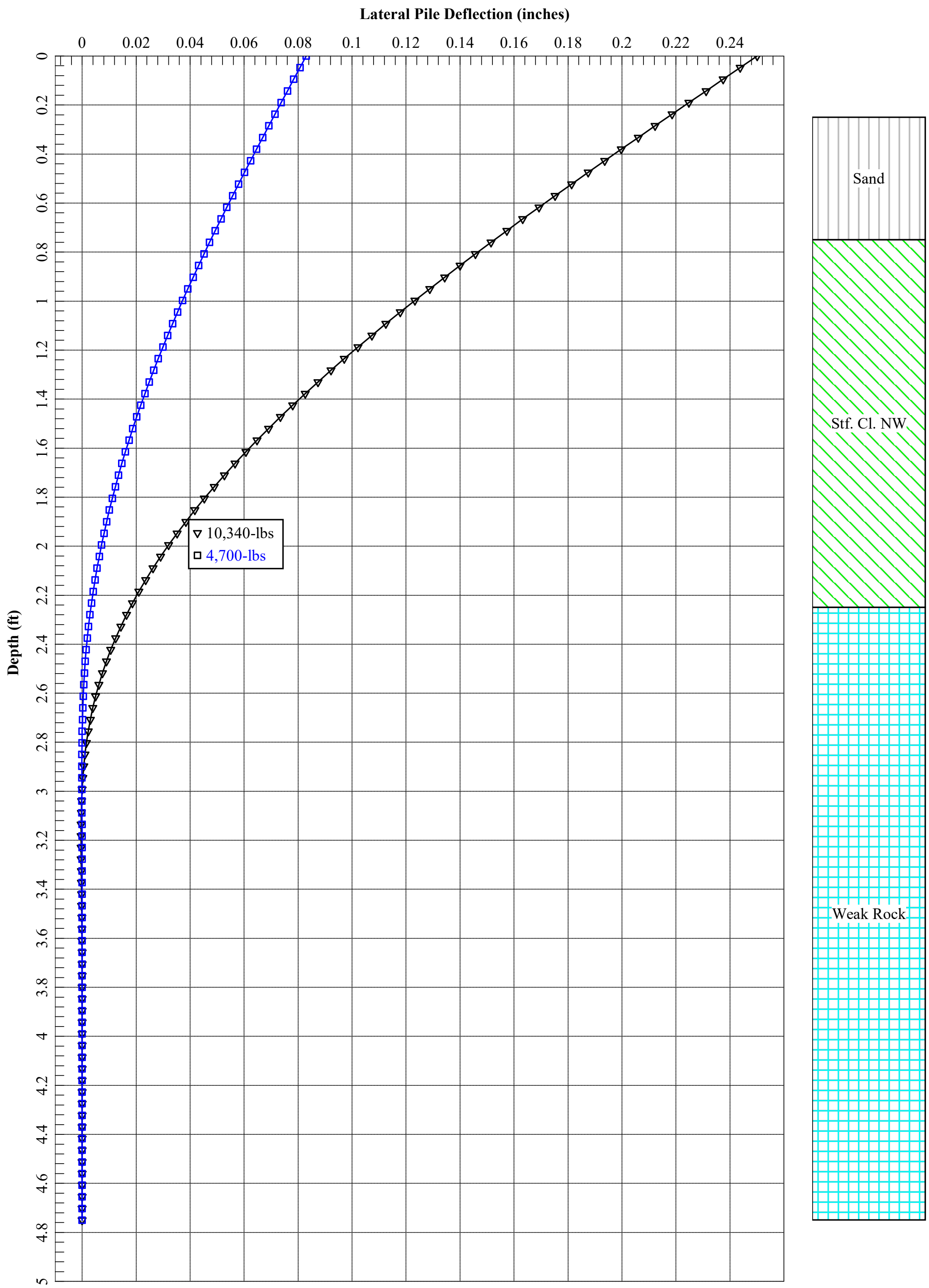




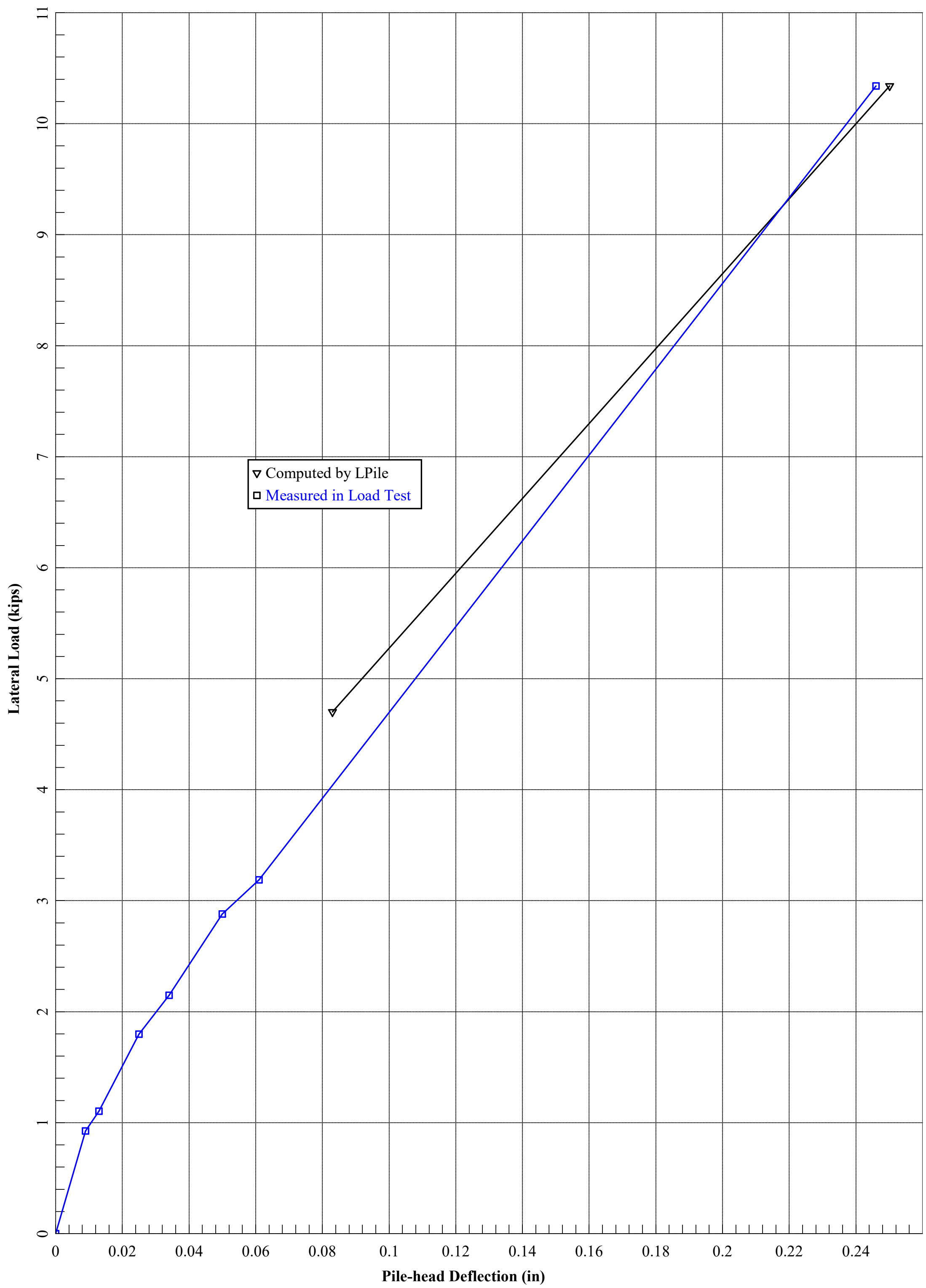
Note: Tension post load tests were performed in general conformance with the procedures described in the ASTM D3689 method of testing for Deep Foundations under Static Axial Tensile Load. The depicted capacities are based on the field test results that were performed in a relatively short timeframe. The load tests were generally performed within 1 to 3 hours the posts were installed. We assume no uplift capacity will be generated within the upper 2 feet.

Figure No. 145

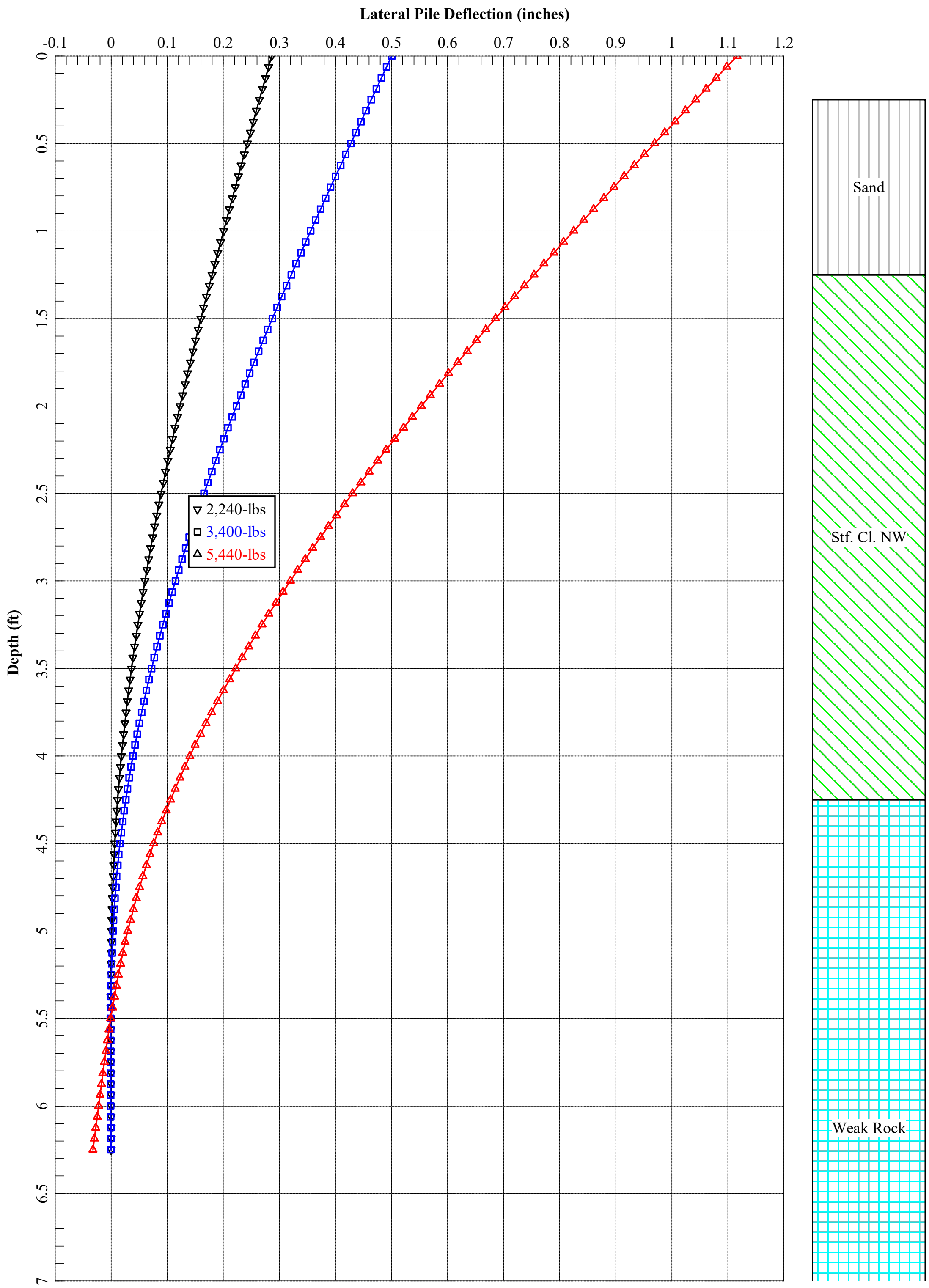
G2 Consulting Group, LLC
Mercer County Solar Power Plant
PD-1 - 4.5ft



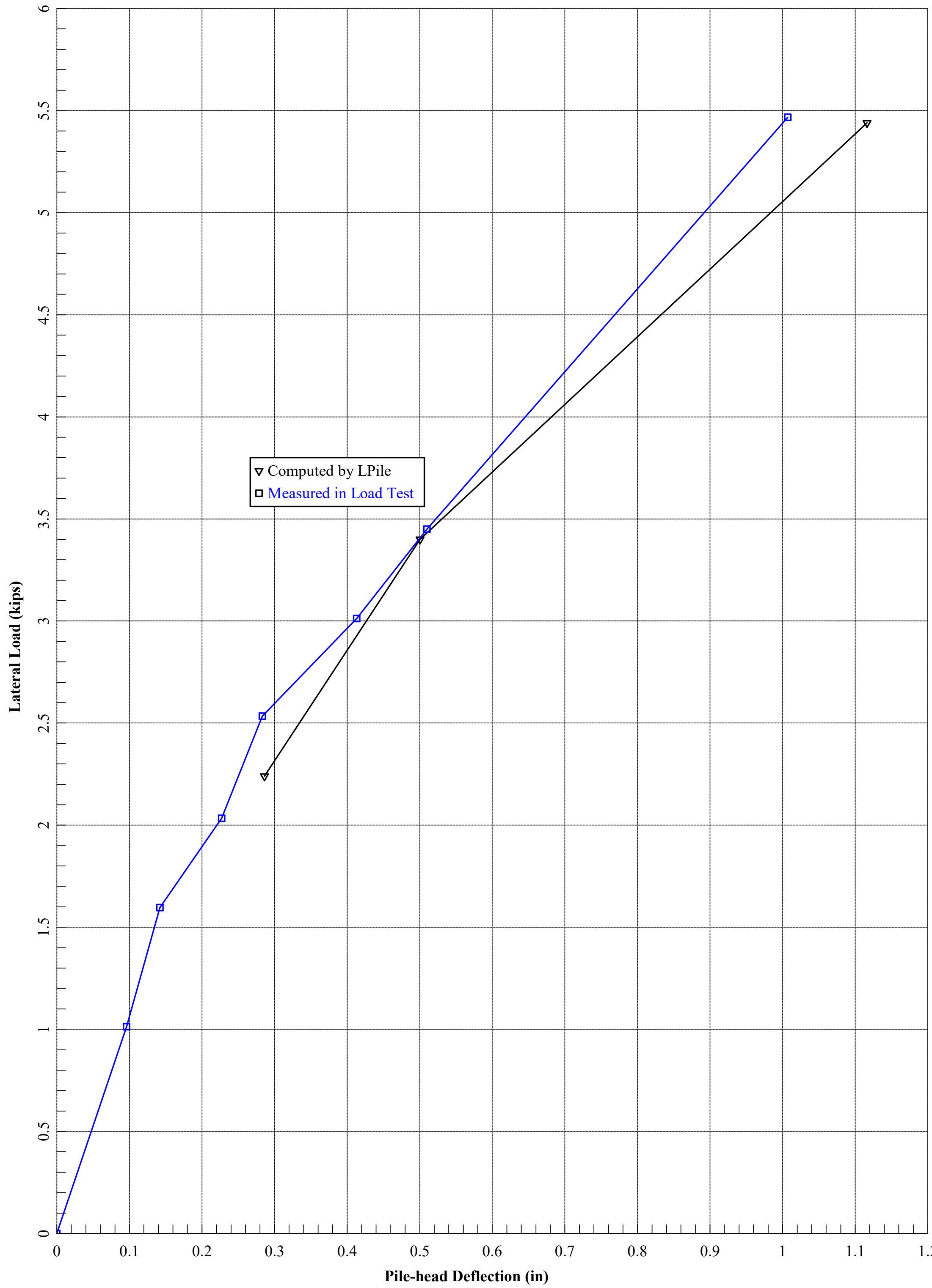
G2 Consulting Group, LLC
Mercer County Solar Power Plant
PD-1 - 4.5ft



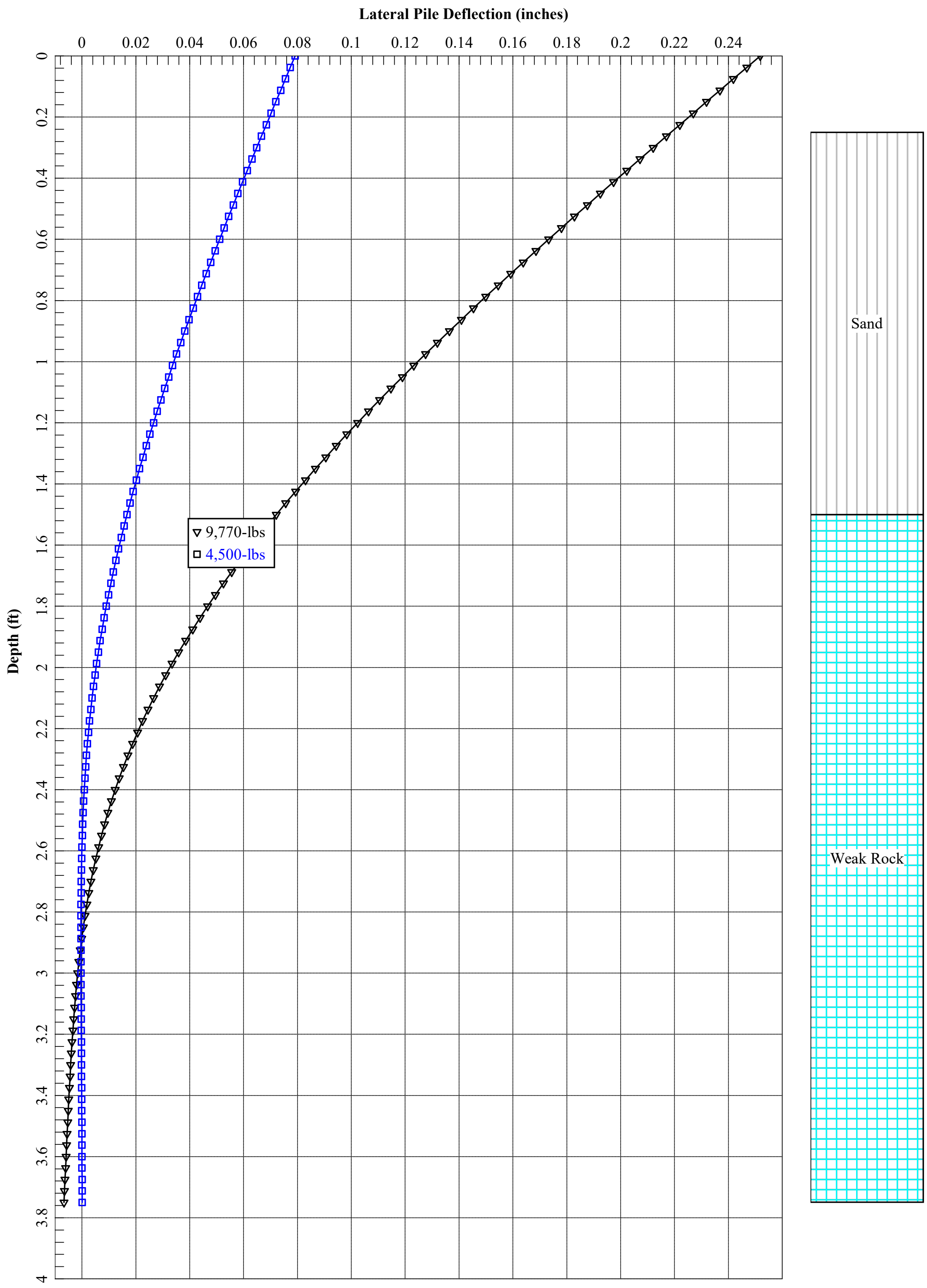
G2 Consulting Group, LLC
Mercer County Solar Power Plant
PD-2 - 6ft



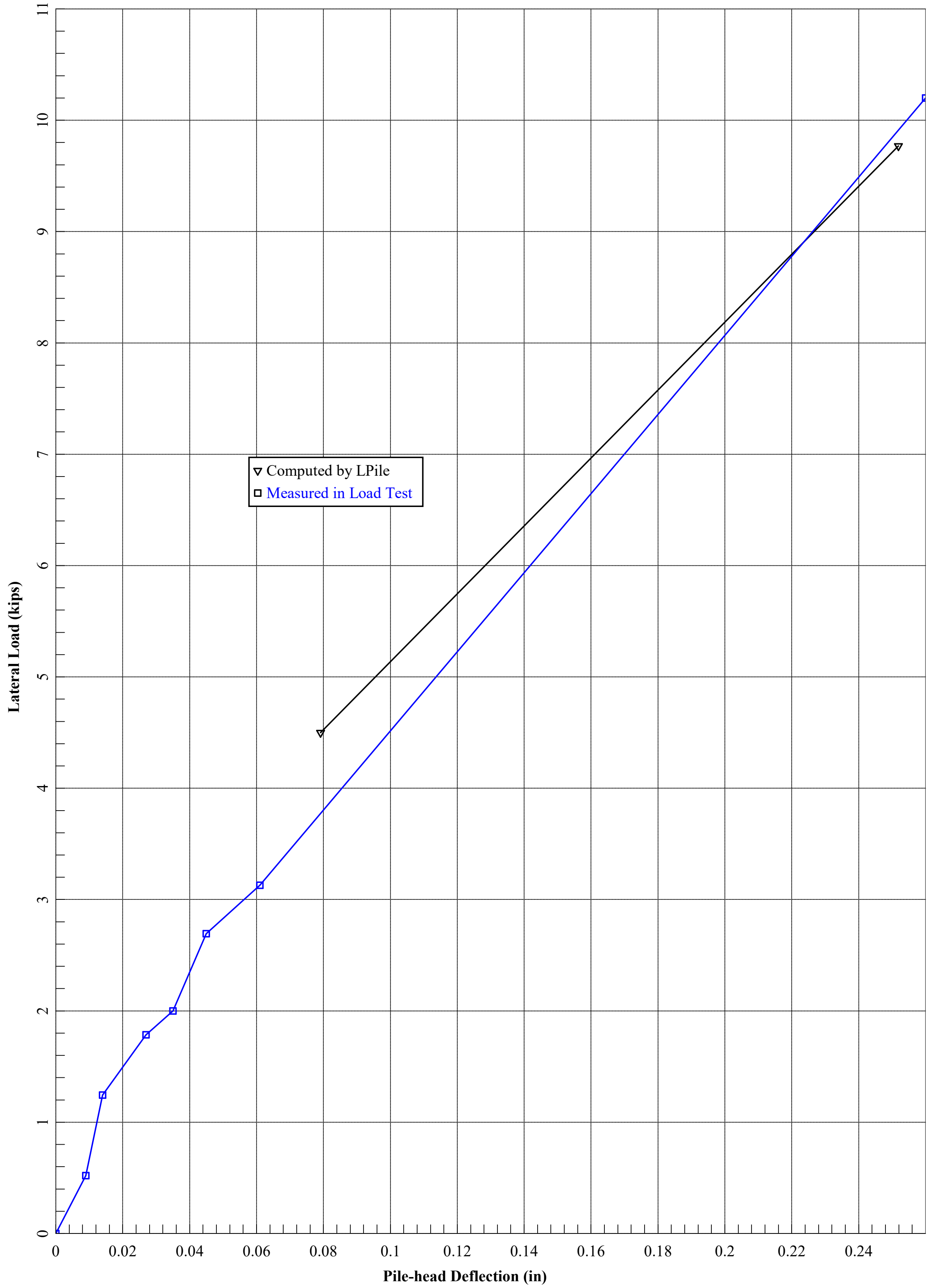
G2 Consulting Group, LLC
Mercer County Solar Power Plant
PD-2 - 6ft



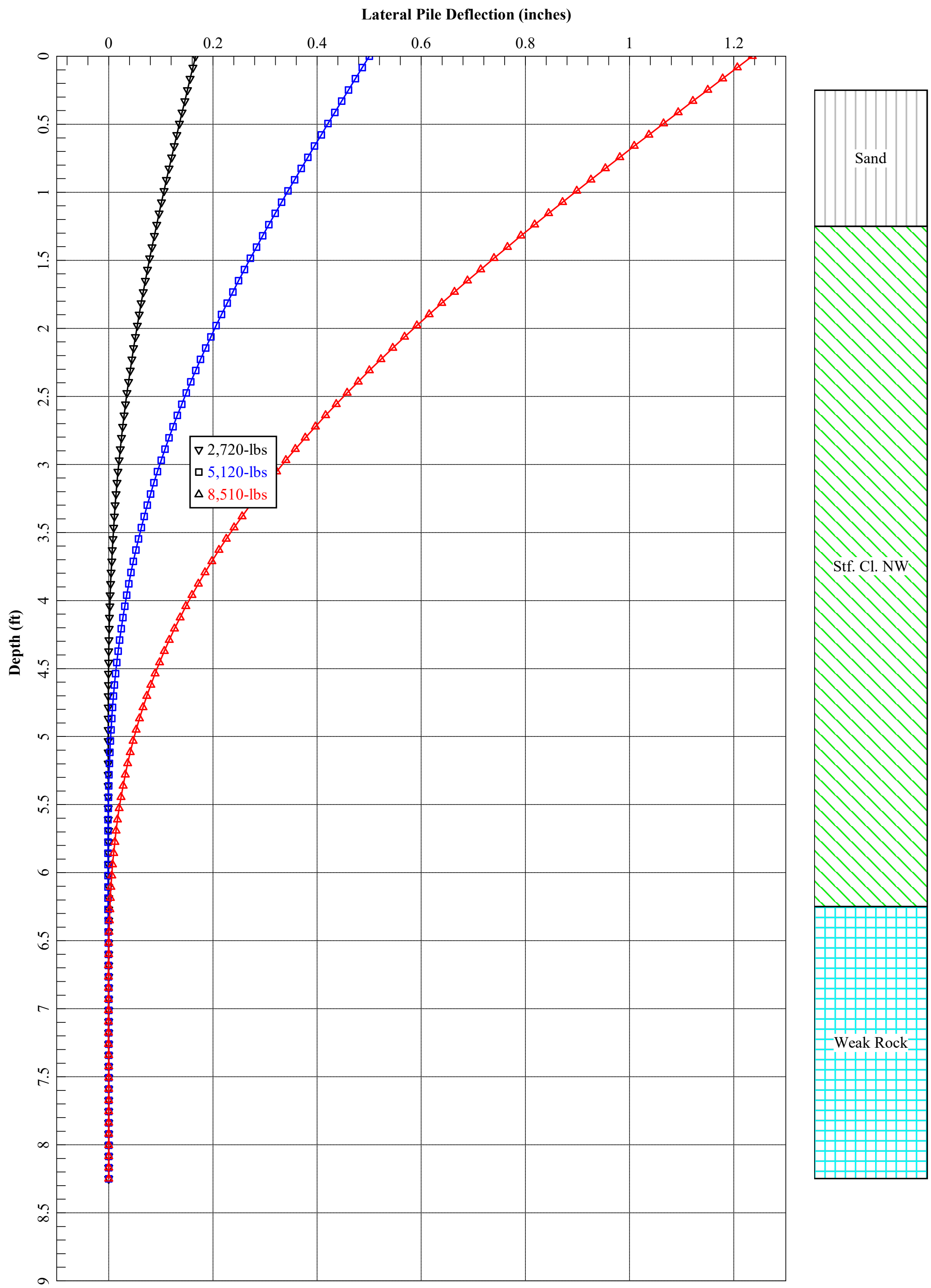
G2 Consulting Group, LLC
Mercer County Solar Power Plant
PD-3 - 3.5ft



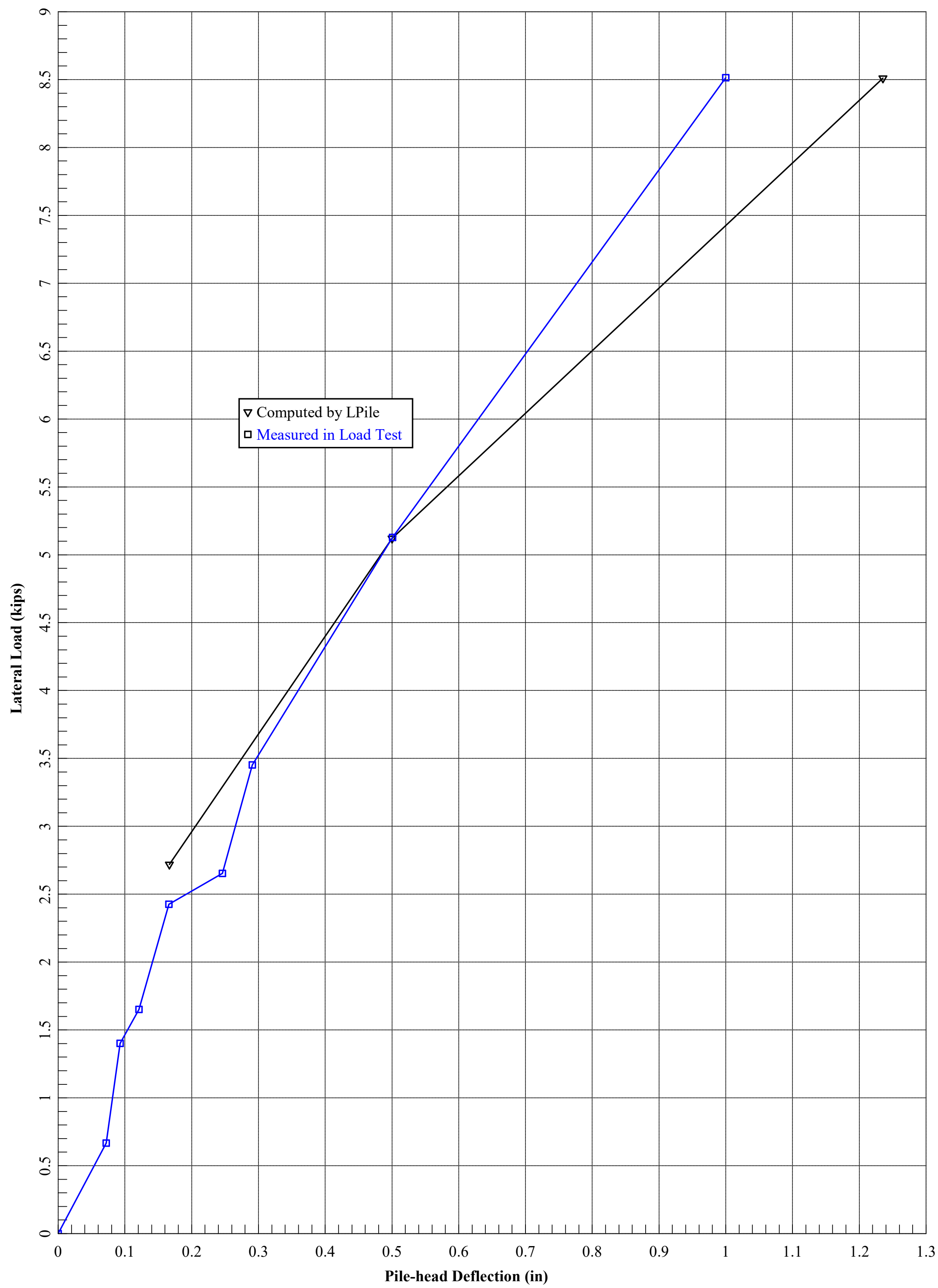
G2 Consulting Group, LLC
Mercer County Solar Power Plant
PD-3 - 3.5ft

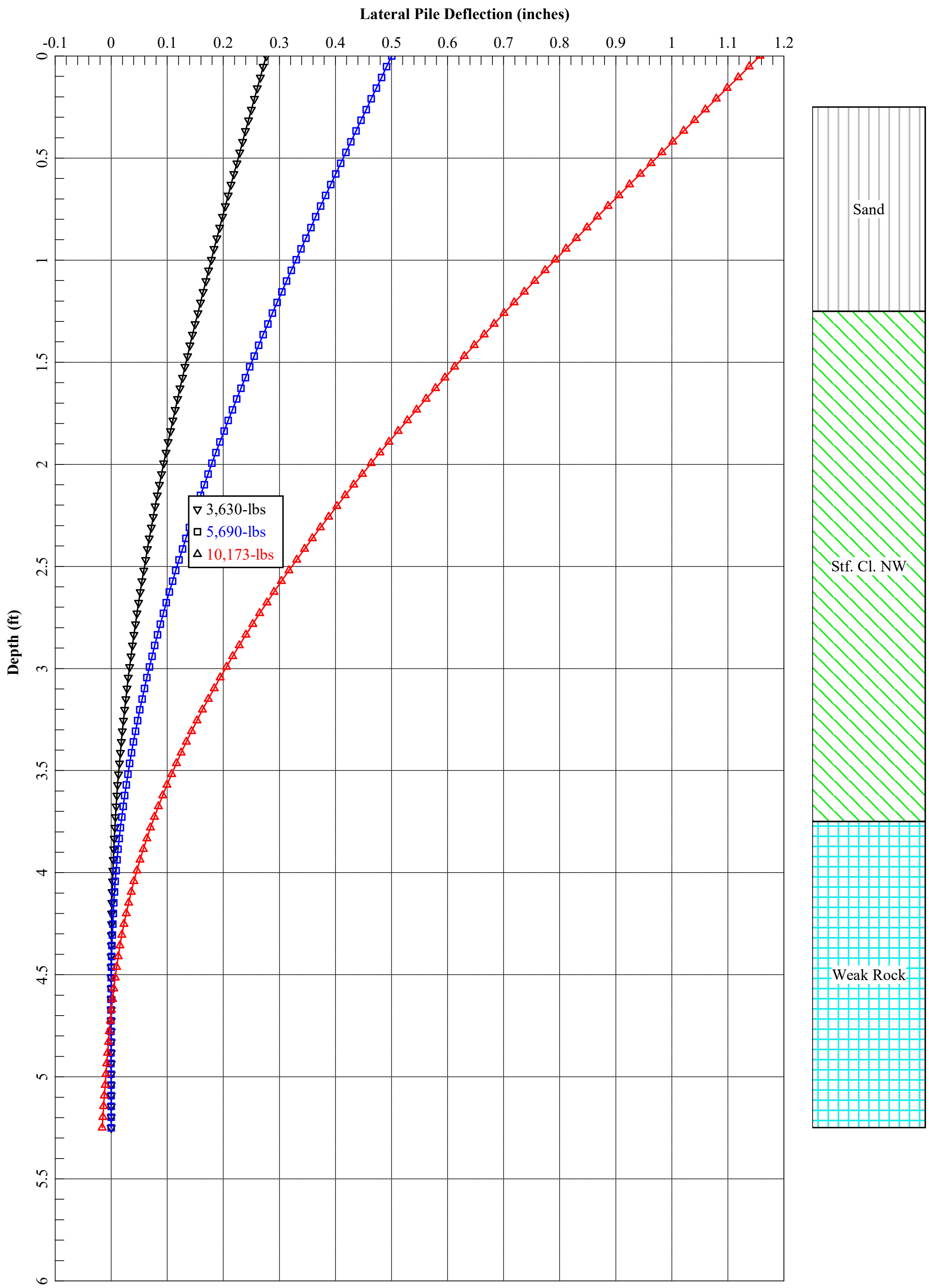


G2 Consulting Group, LLC
Mercer County Solar Power Plant
PD-4 - 8ft

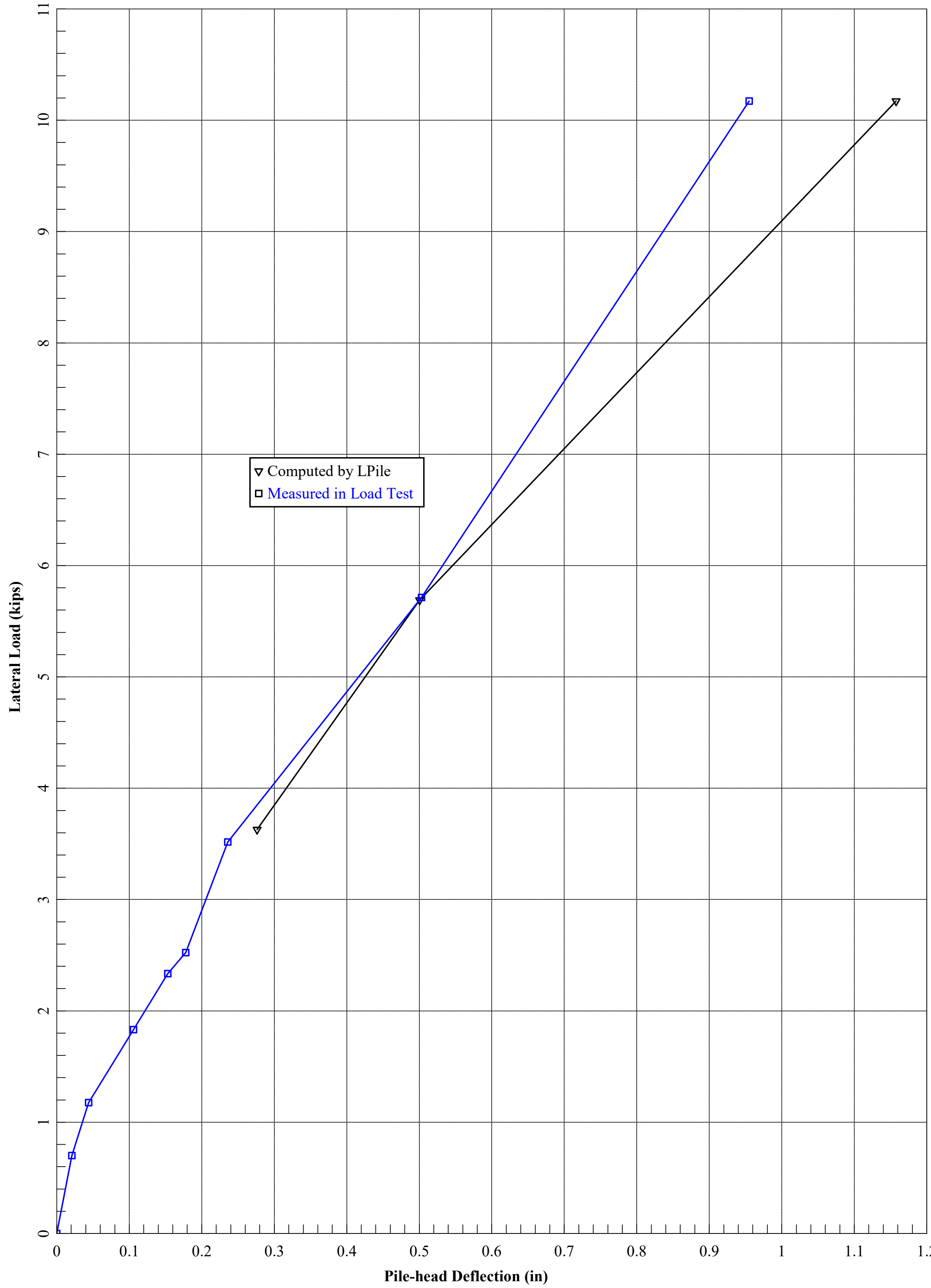


G2 Consulting Group, LLC
Mercer County Solar Power Plant
PD-4 - 8ft

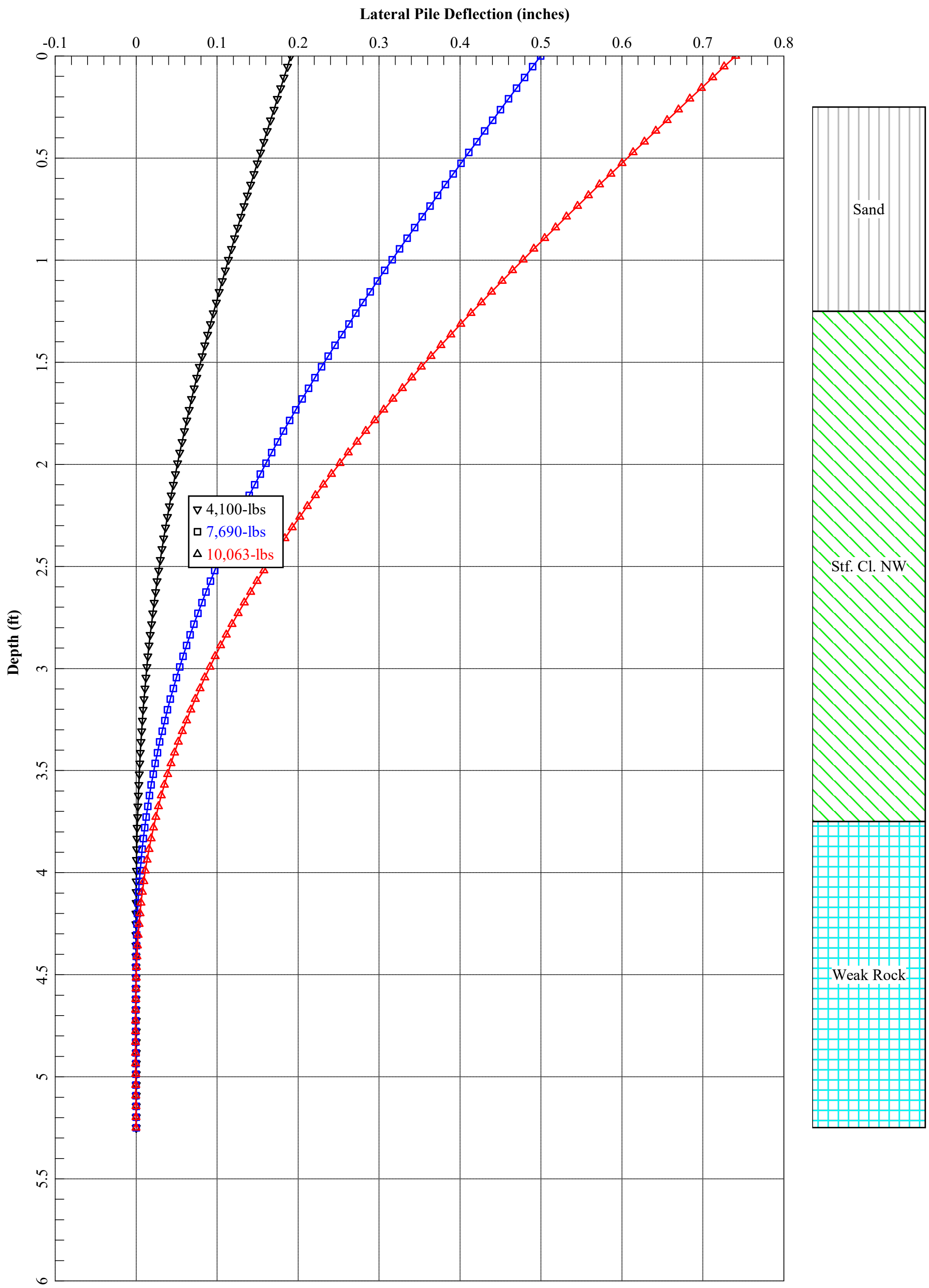


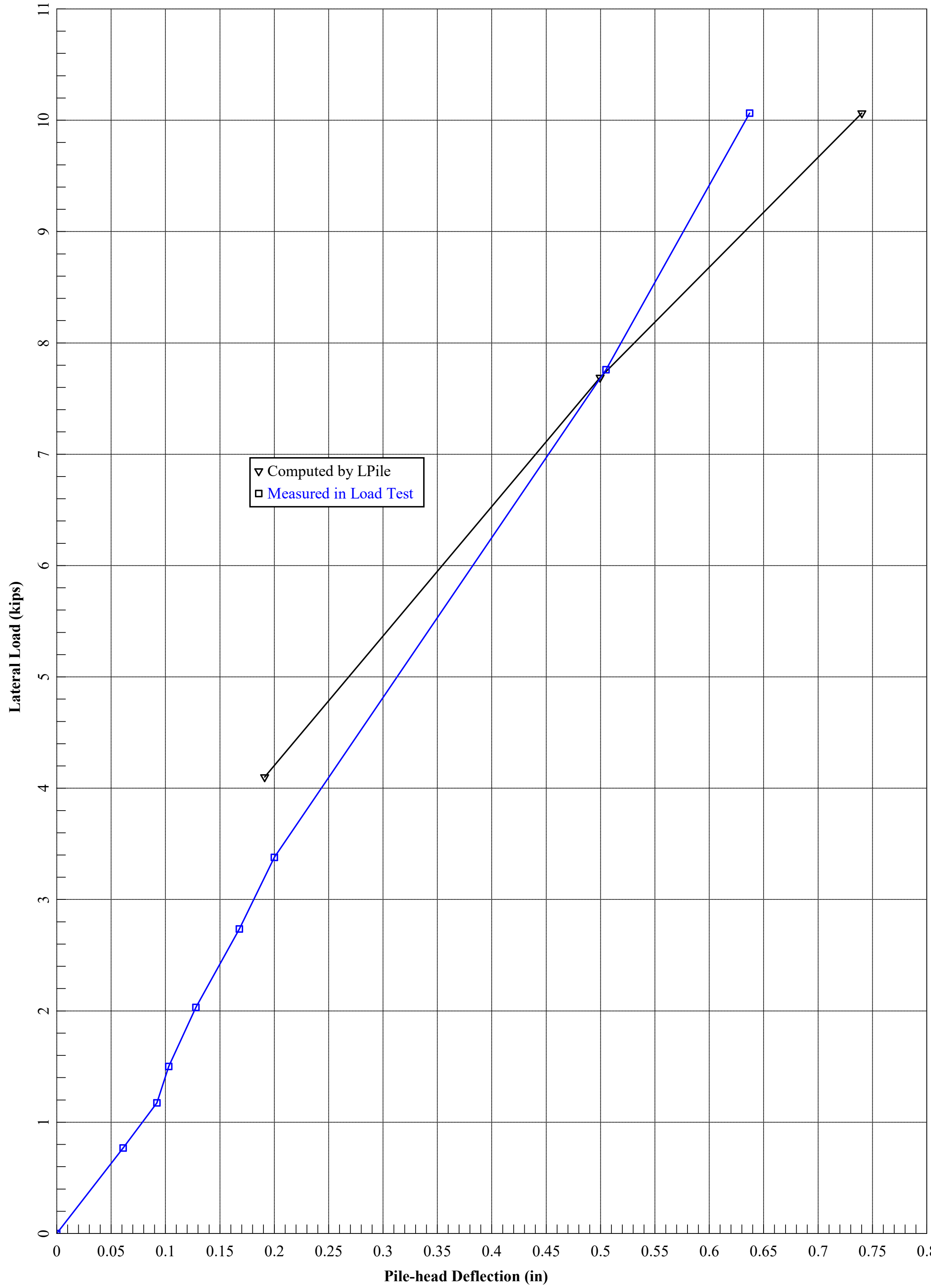

Lateral Pile Deflection (inches)
-0.1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2
Depth (ft)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
3,630-lbs
5,690-lbs
10,173-lbs
Sand
Stf. Cl. NW
Weak Rock

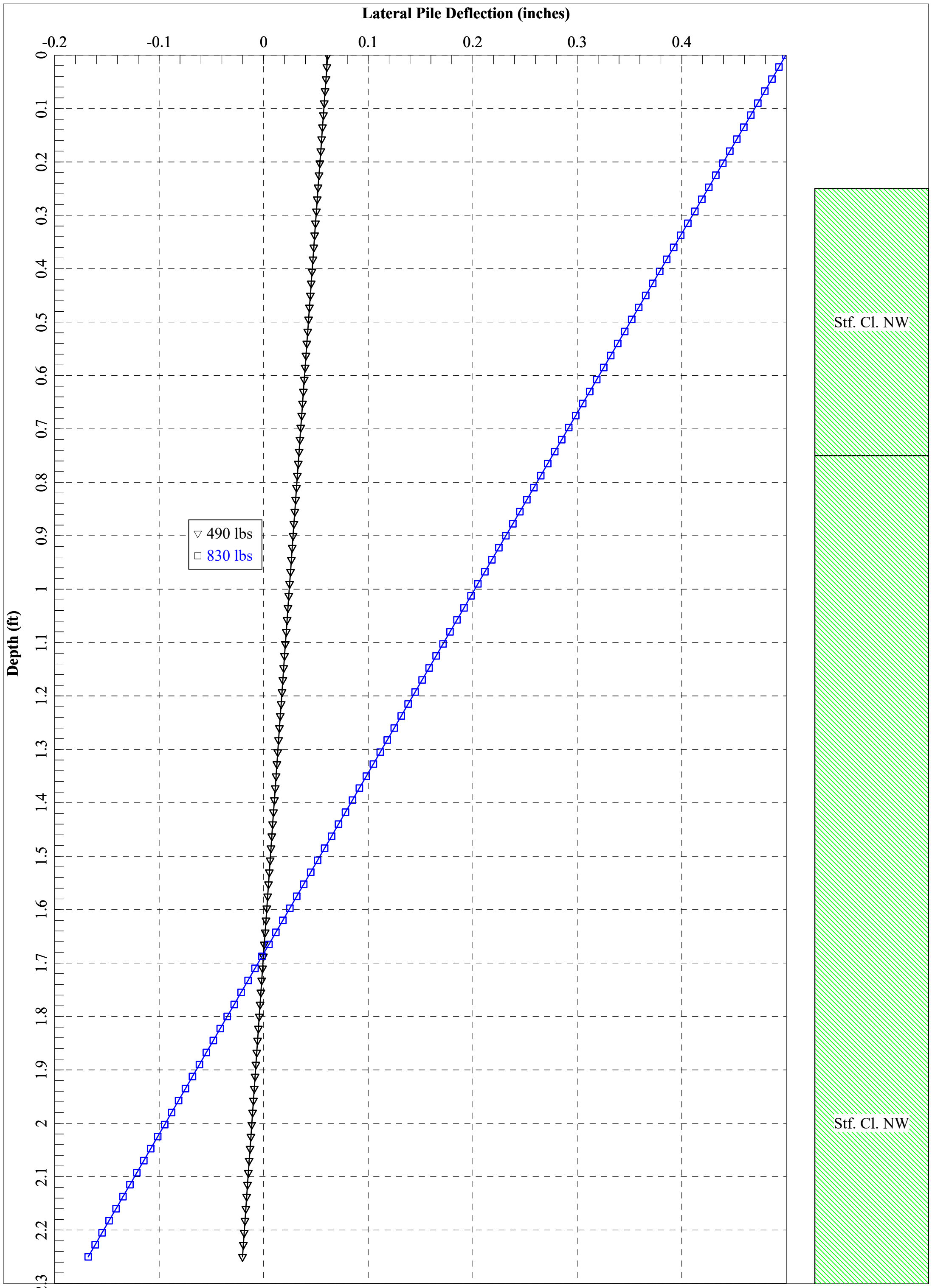
G2 Consulting Group, LLC
Mercer County Solar Power Plant
PD-5 - 5ft



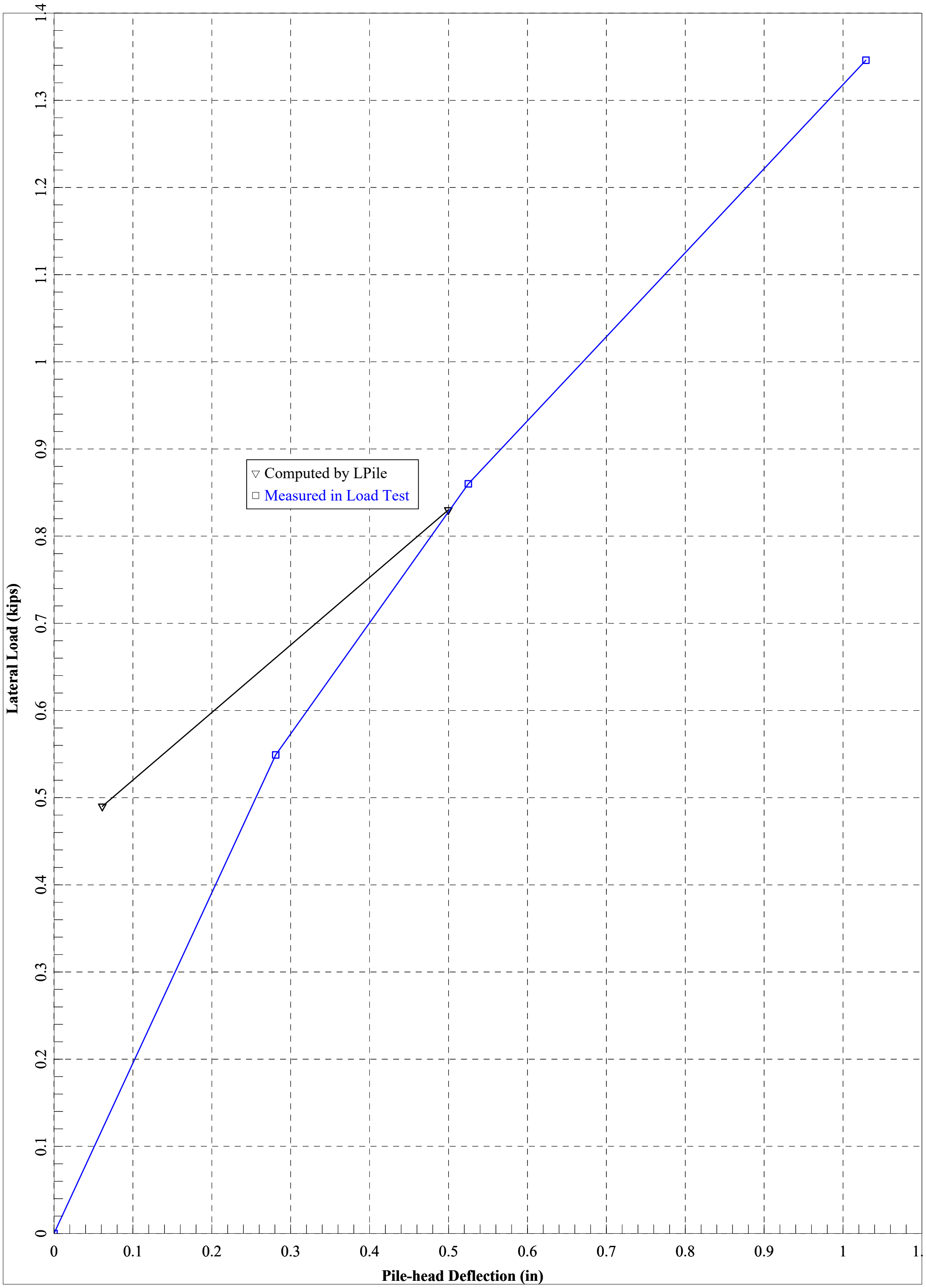
G2 Consulting Group, LLC
Mercer County Solar Power Plant
PD-6 - 5ft

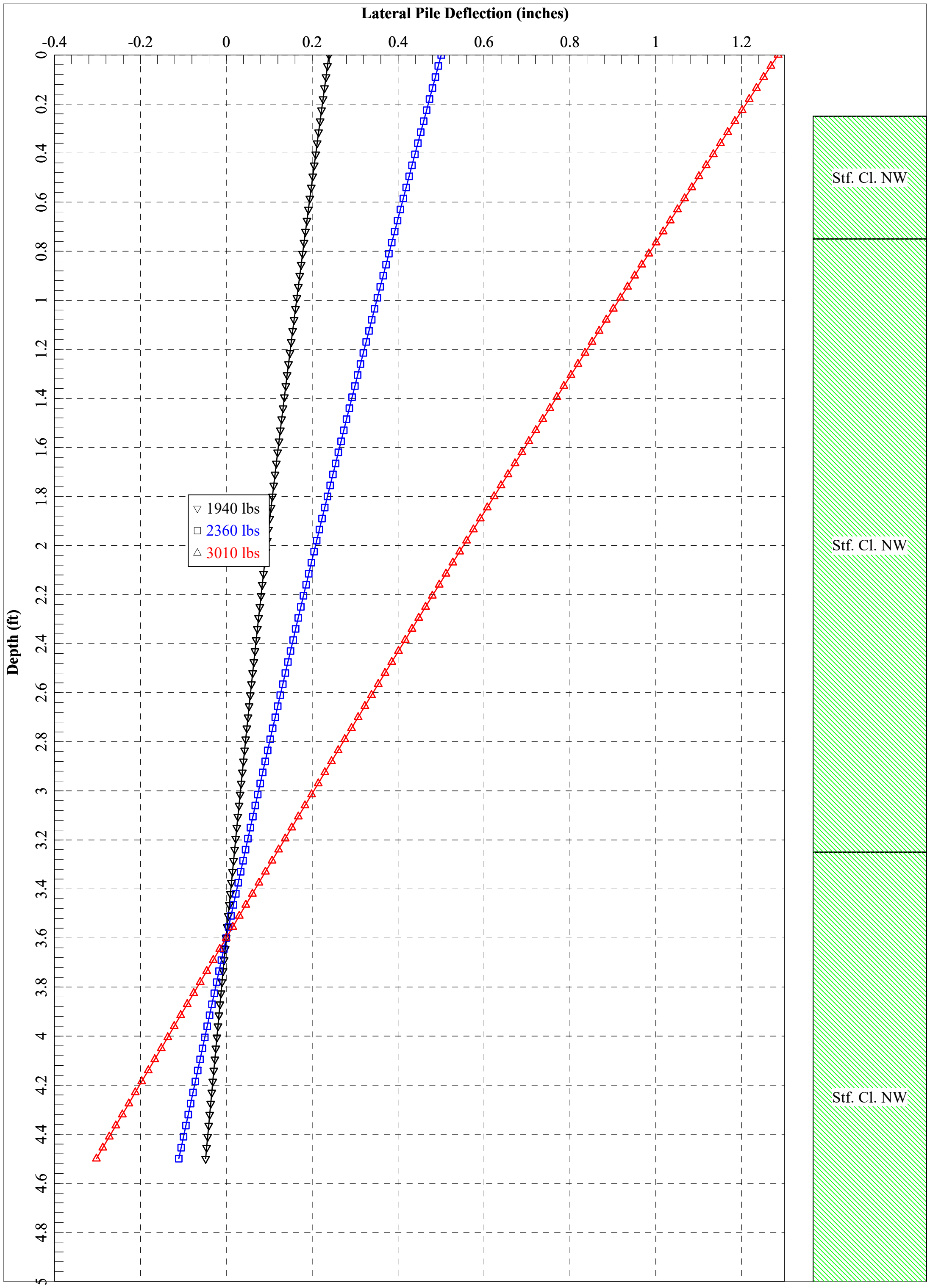


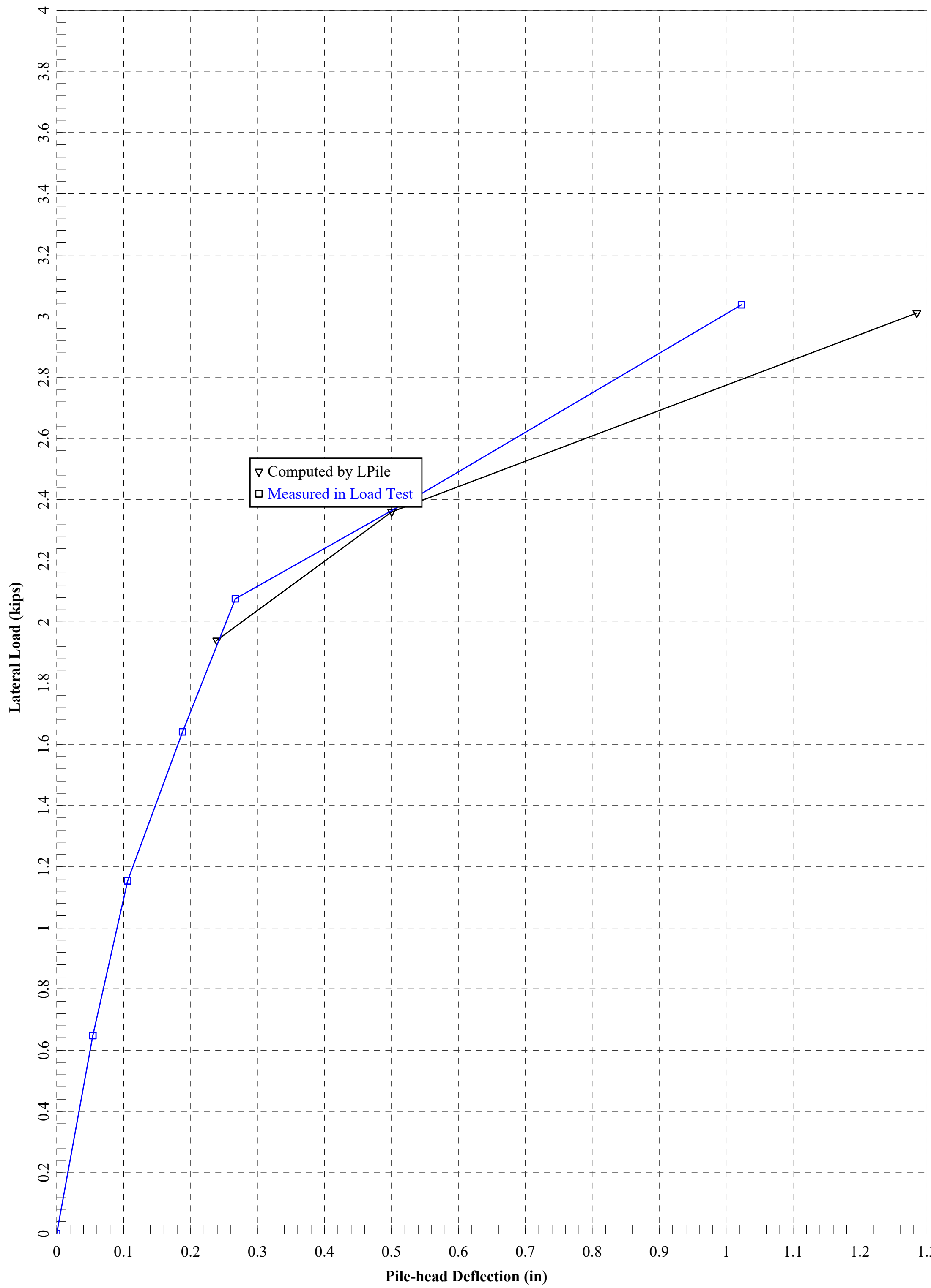

Computed by LPile
Measured in Load Test
Lateral Load (kips)
Pile-head Deflection (in)
0
1
2
3
4
5
6
7
8
9
10
11
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
0.6
0.65
0.7
0.75
0.8

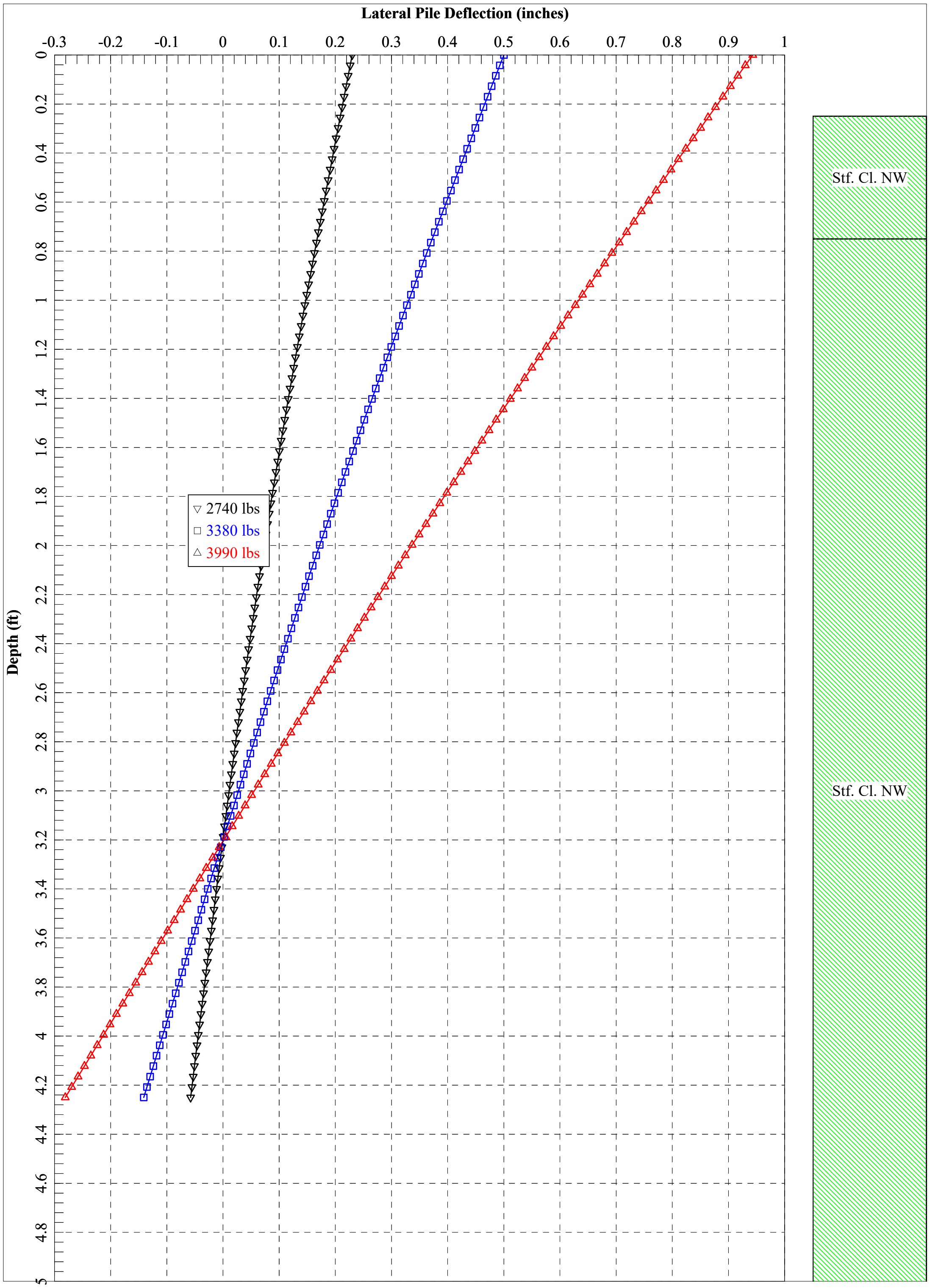

Lateral Pile Deflection (inches)
-0.2
-0.1
0
0.1
0.2
0.3
0.4
Depth (ft)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2
2.1
2.2
2.3
▽ 490 lbs
□ 830 lbs
Stf. Cl. NW
Stf. Cl. NW

G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-1A - 2ft

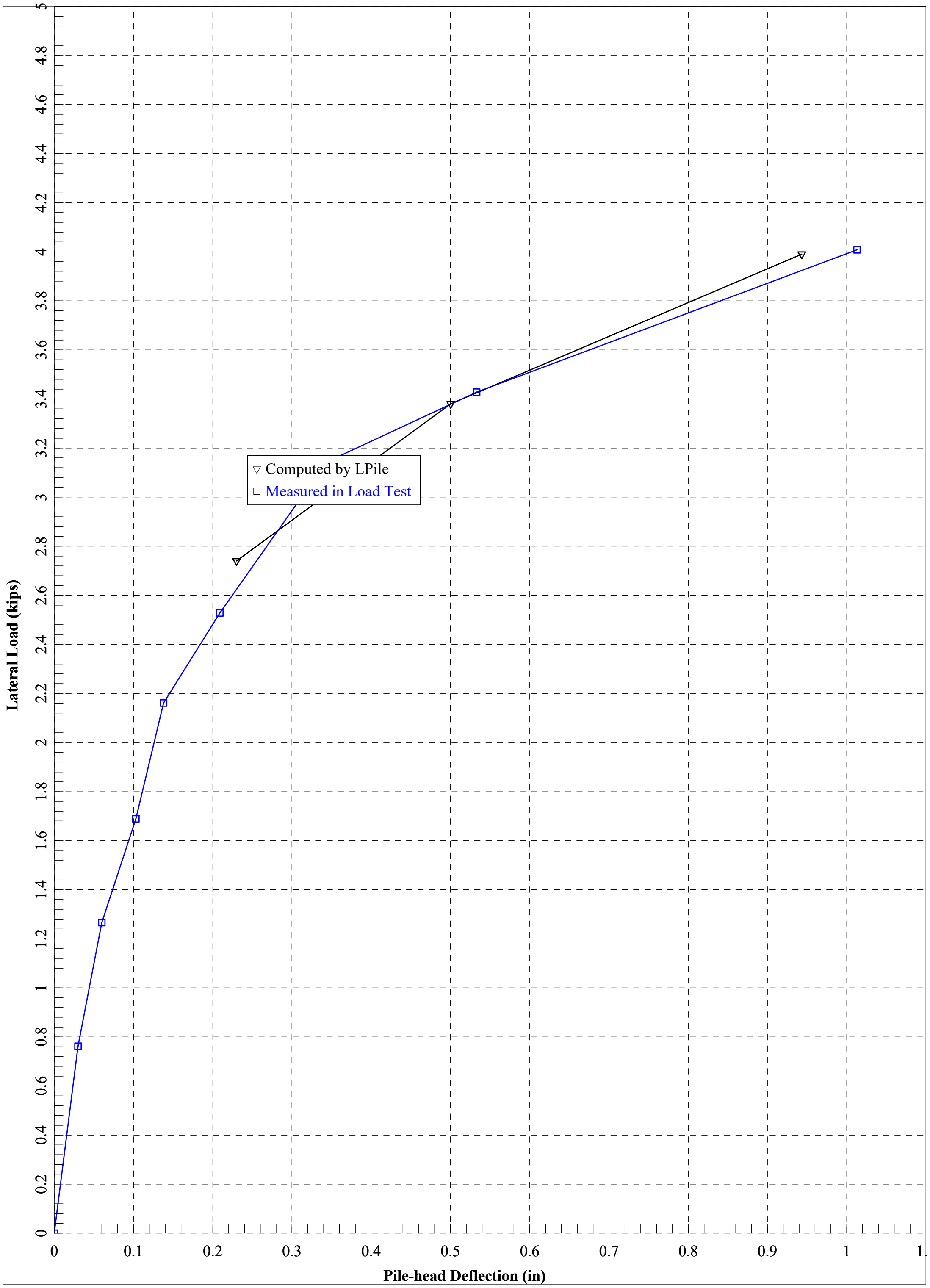



Lateral Pile Deflection (inches)
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
1.2
Depth (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
1940 lbs
2360 lbs
3010 lbs
Stf. Cl. NW
Stf. Cl. NW
Stf. Cl. NW

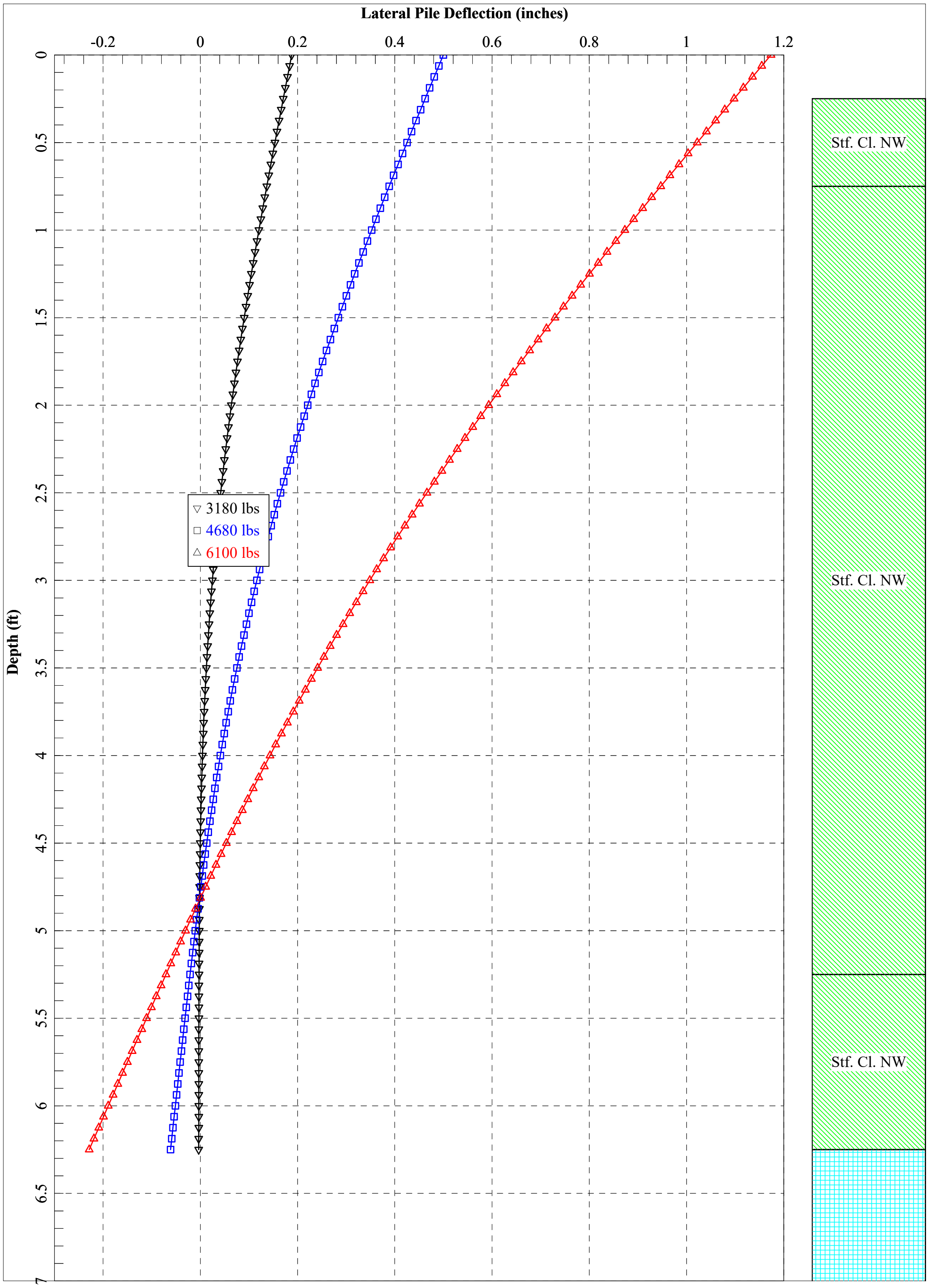

Computed by LPile
Measured in Load Test
Lateral Load (kips)
Pile-head Deflection (in)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2
1.3


Lateral Pile Deflection (inches)
-0.3
-0.2
-0.1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Depth (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
2740 lbs
3380 lbs
3990 lbs
Stf. Cl. NW
Stf. Cl. NW

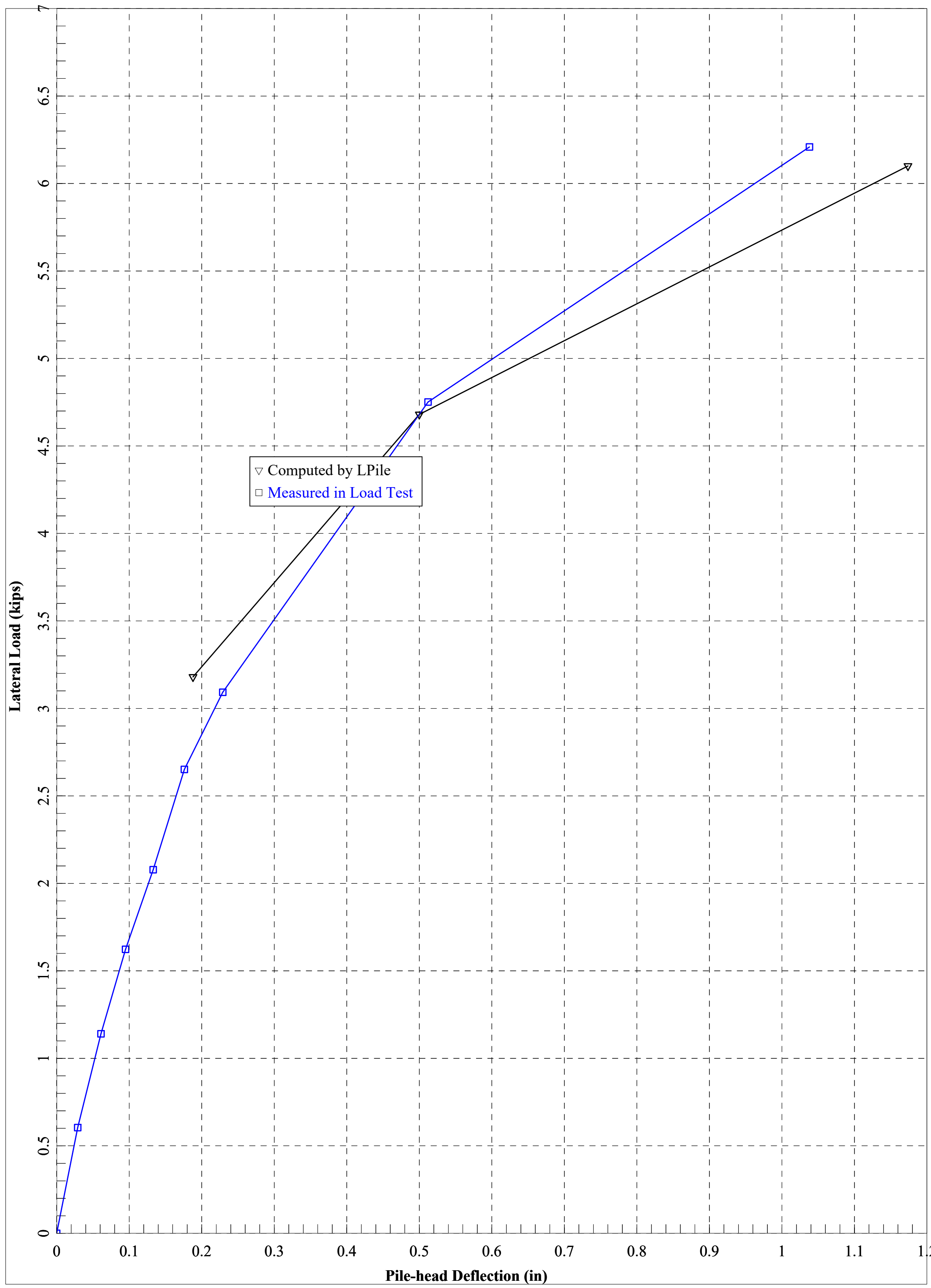
G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-2A - 4ft



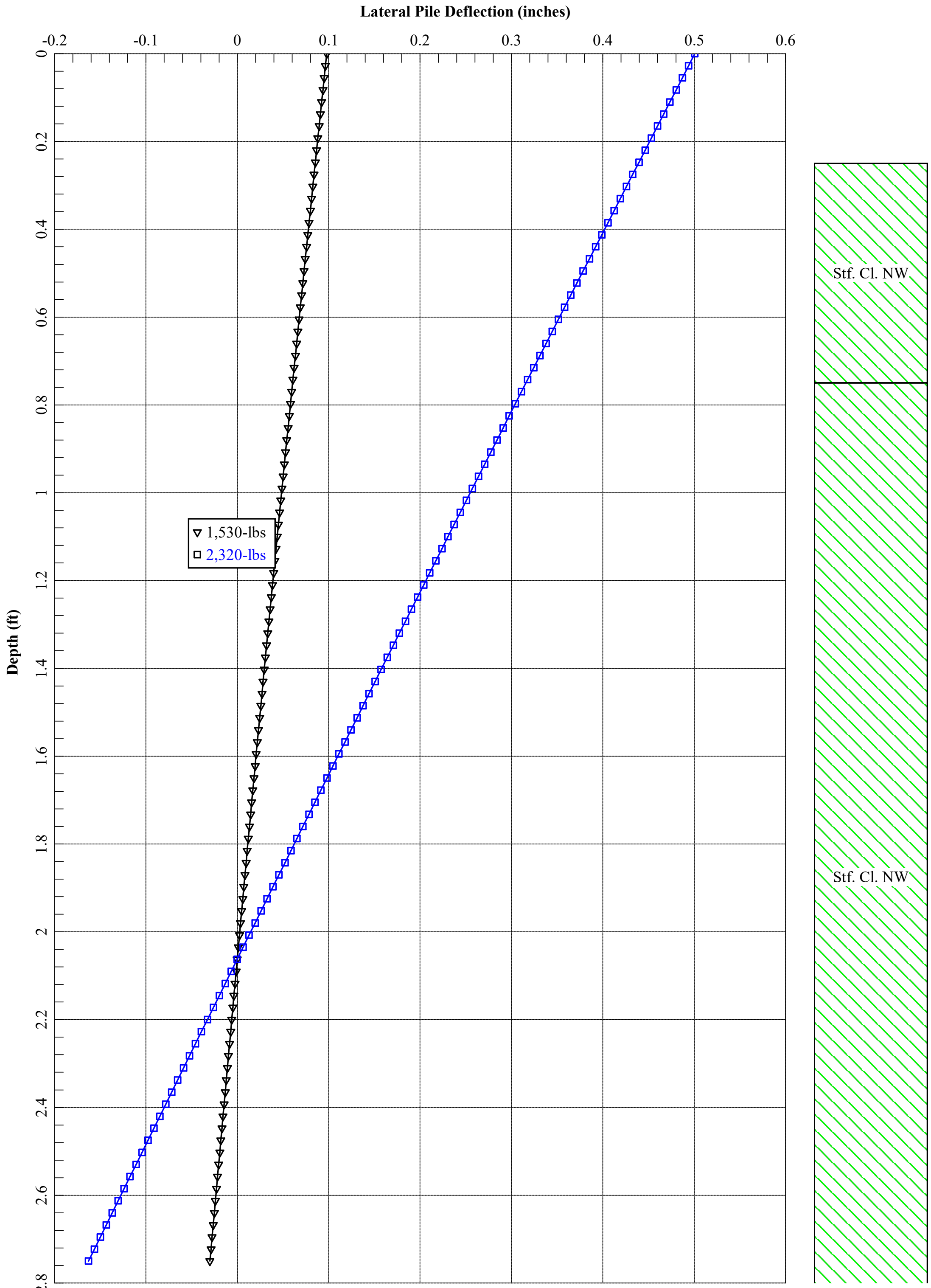
G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-2B - 6ft



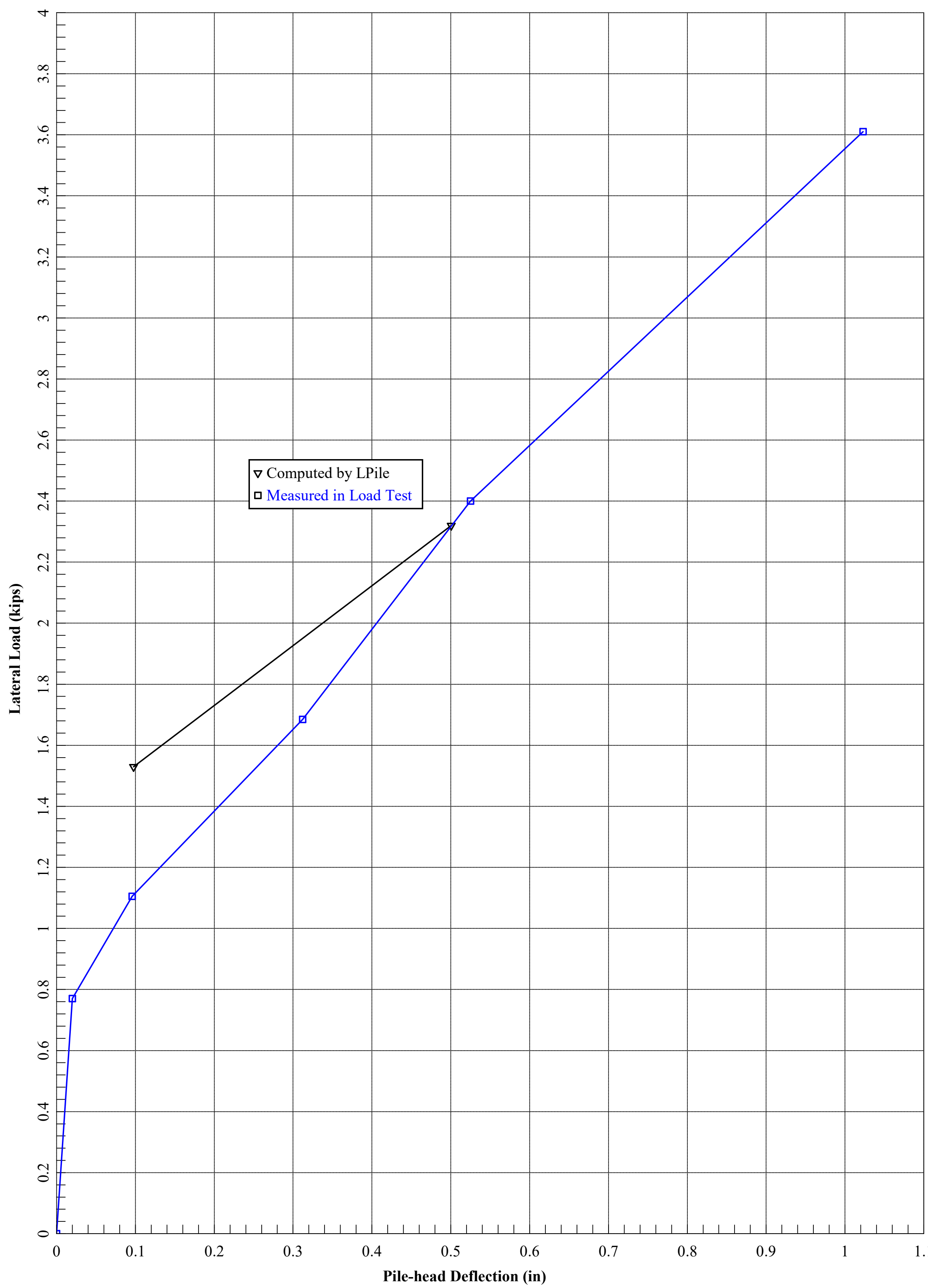
G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-2B - 6ft

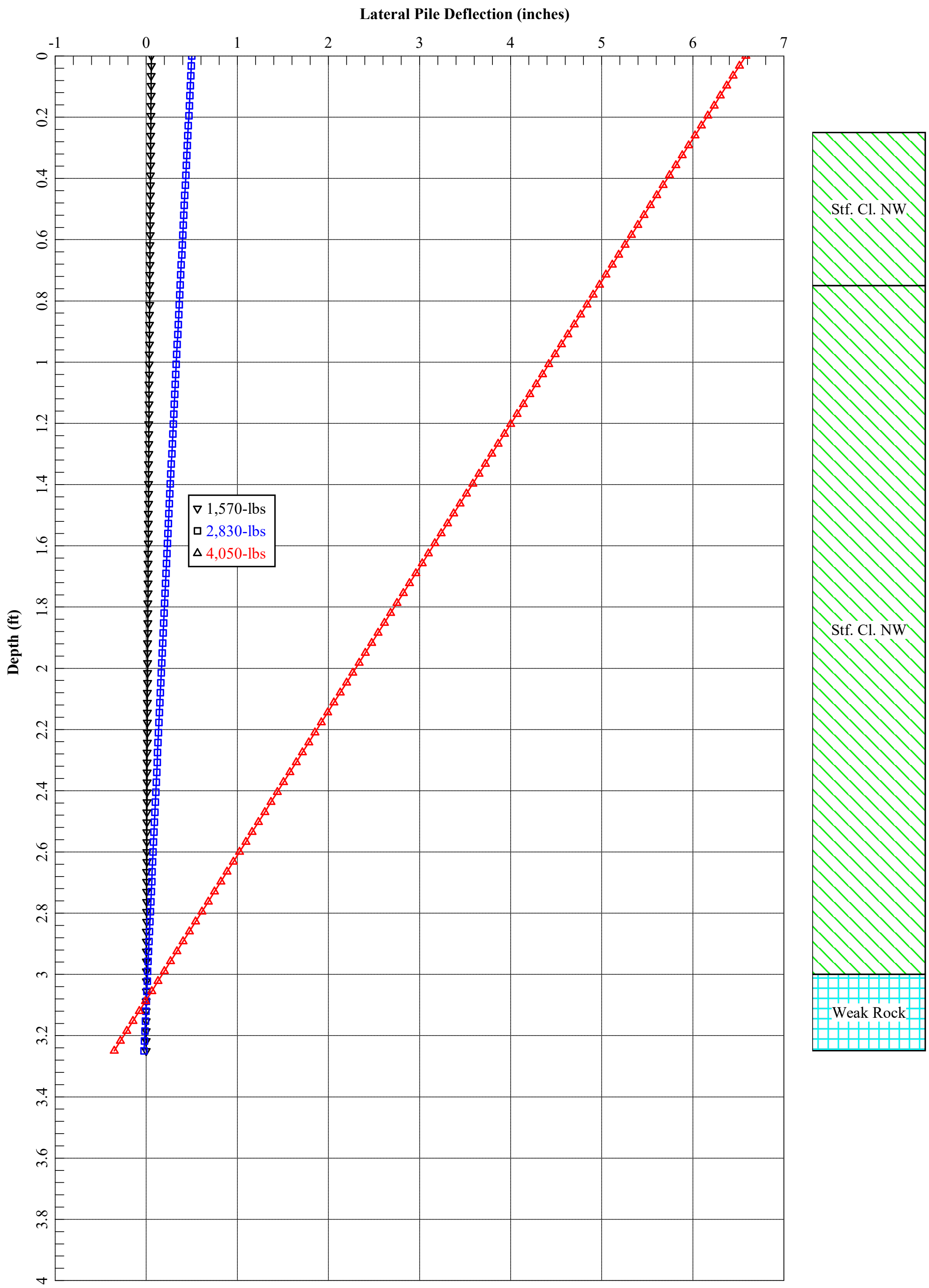


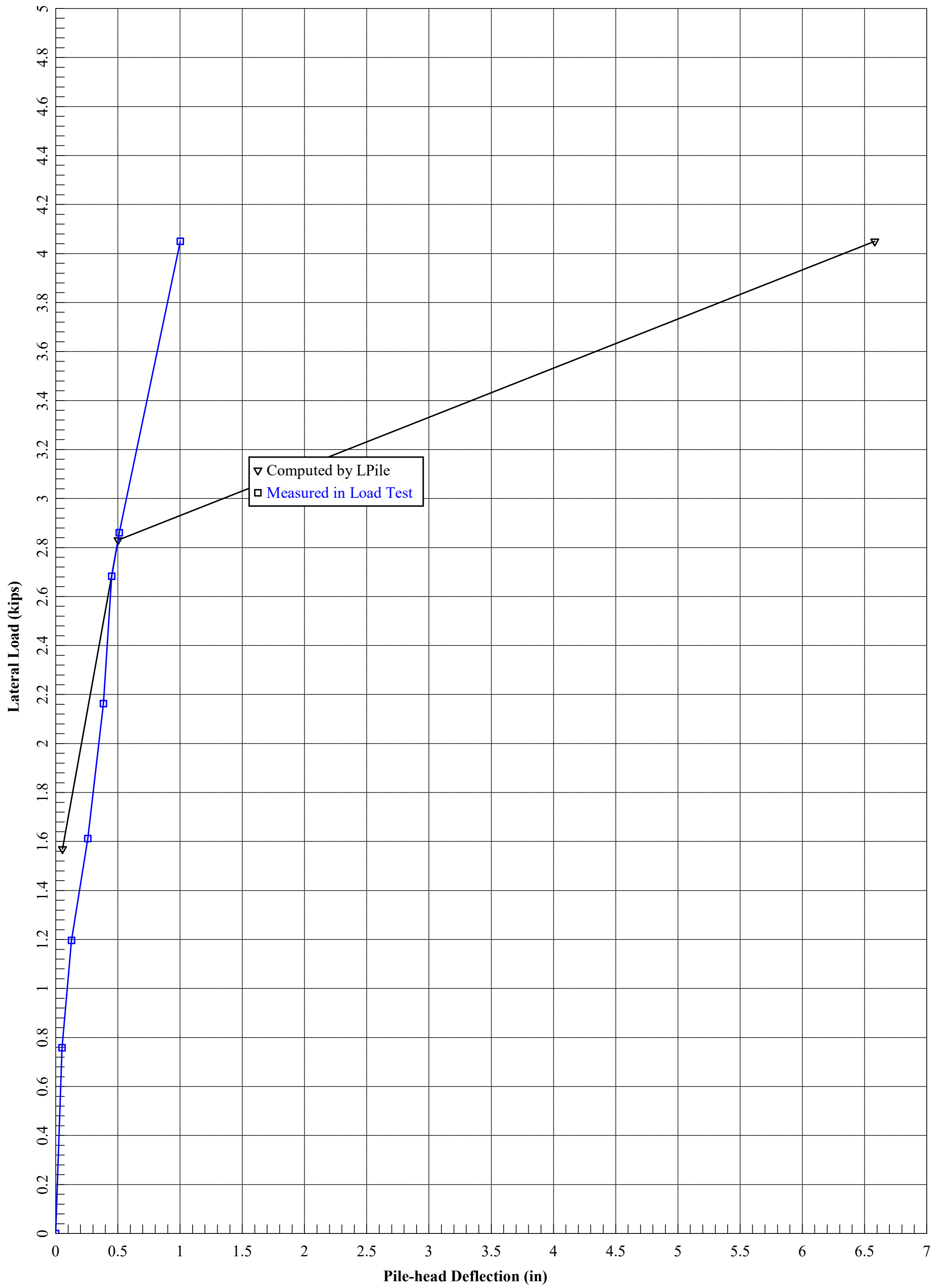
G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-3A - 2.5ft

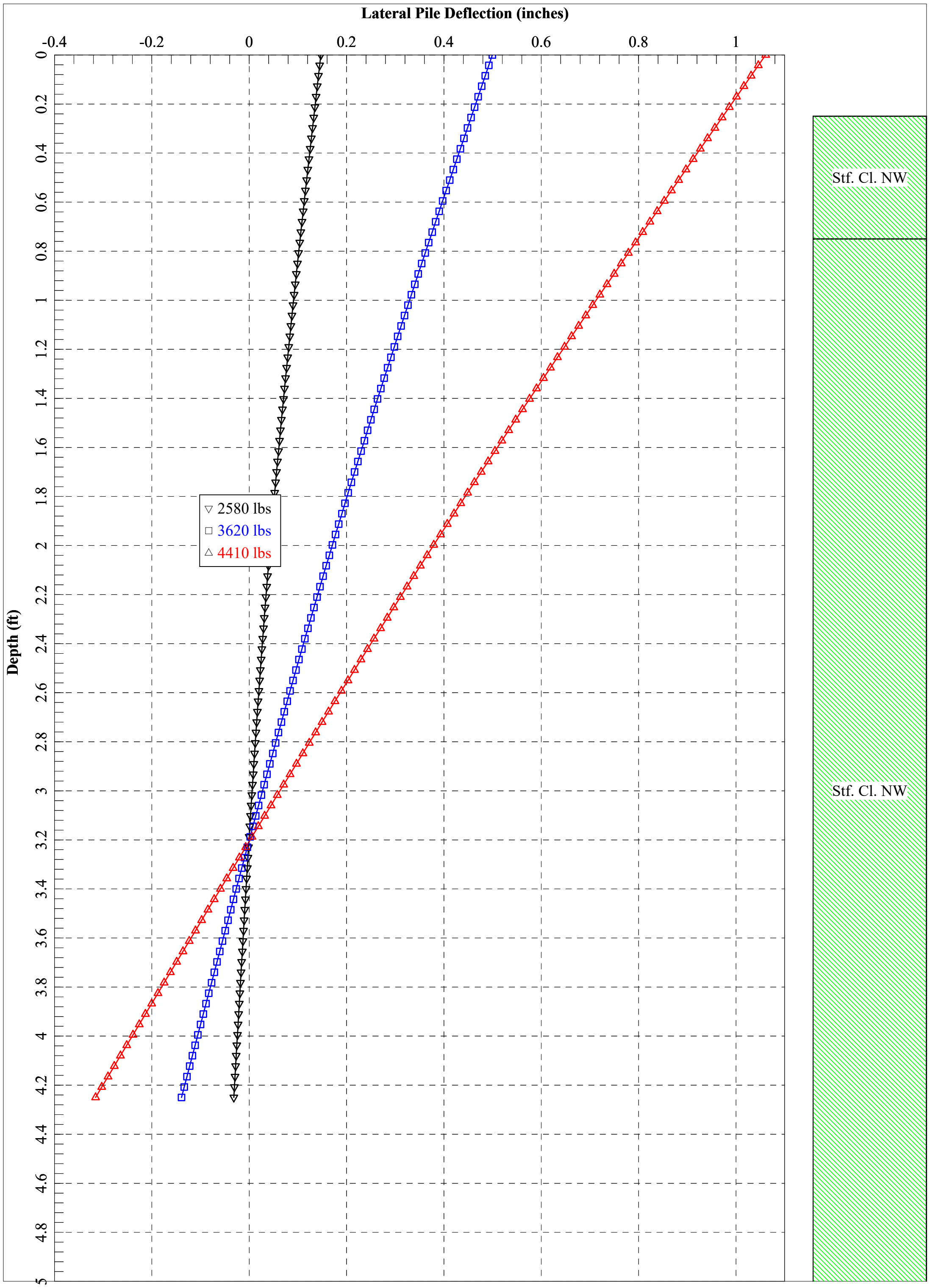


G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-3A - 2.5ft

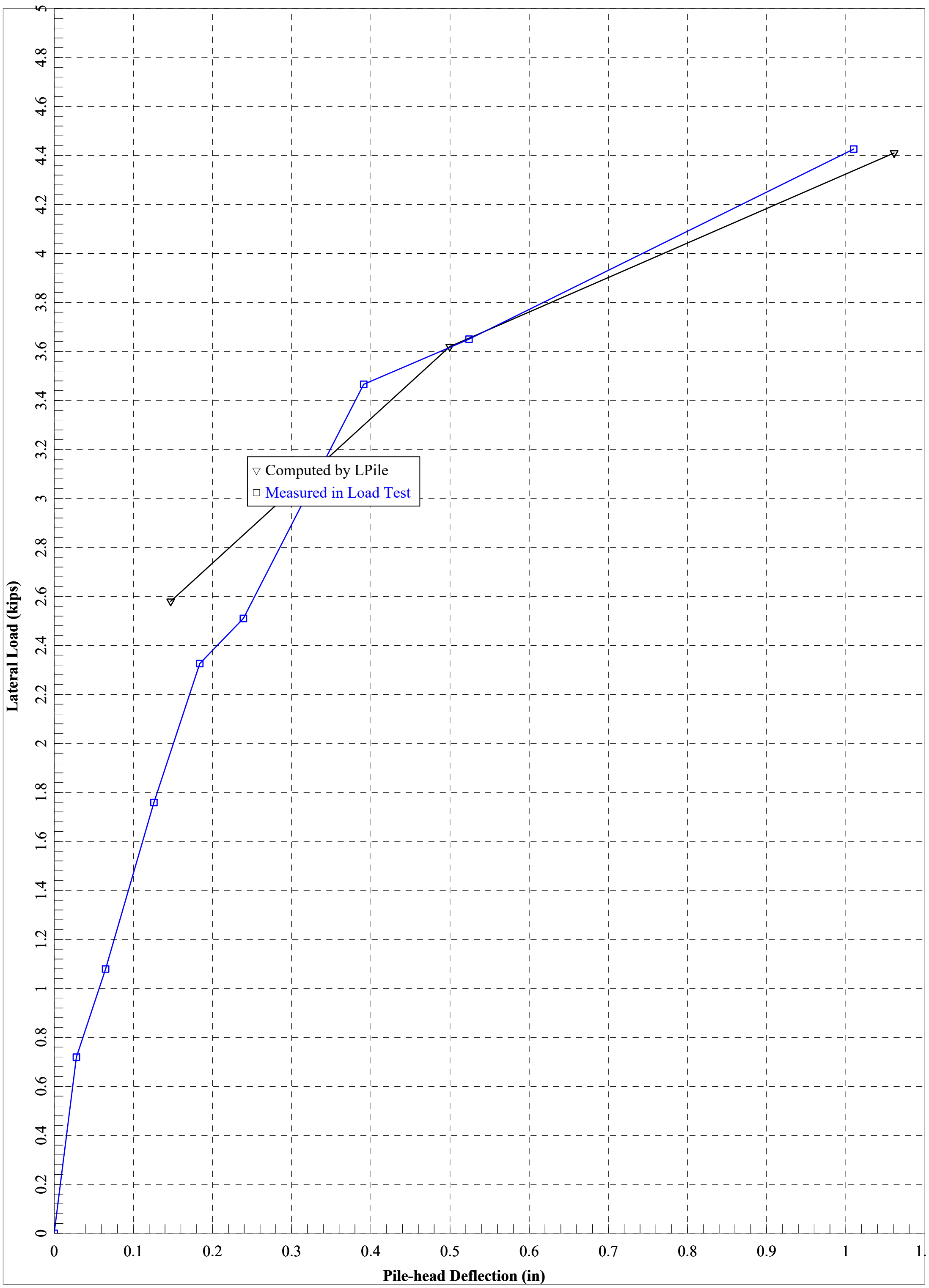



Lateral Pile Deflection (inches)
-1
0
1
2
3
4
5
6
7
Depth (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
1,570-lbs
2,830-lbs
4,050-lbs
Stf. Cl. NW
Stf. Cl. NW
Weak Rock

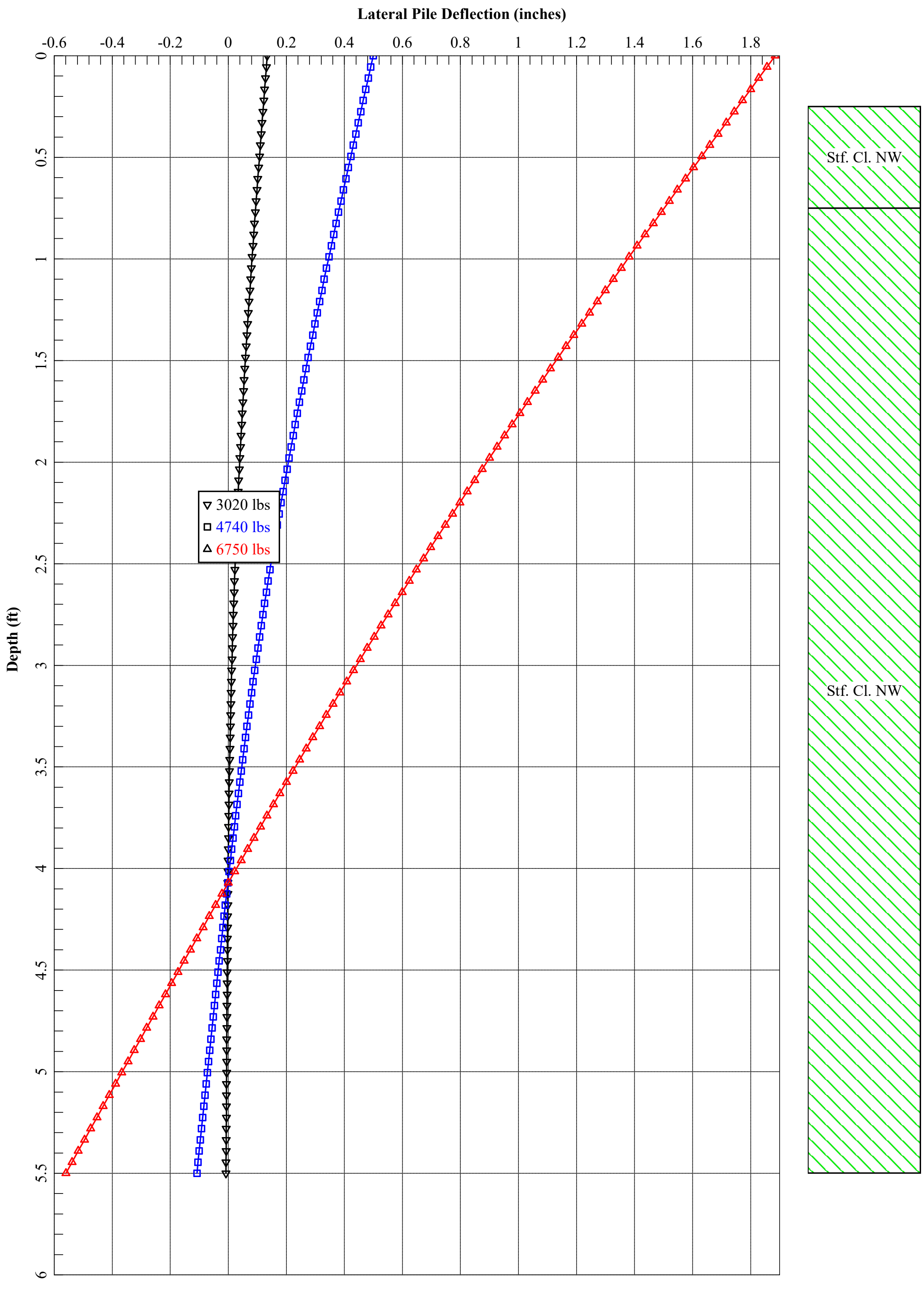

Computed by LPile
Measured in Load Test
Lateral Load (kips)
Pile-head Deflection (in)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
0.5
1.5
2.5
3.5
4.5
5
5.5
6
6.5
7

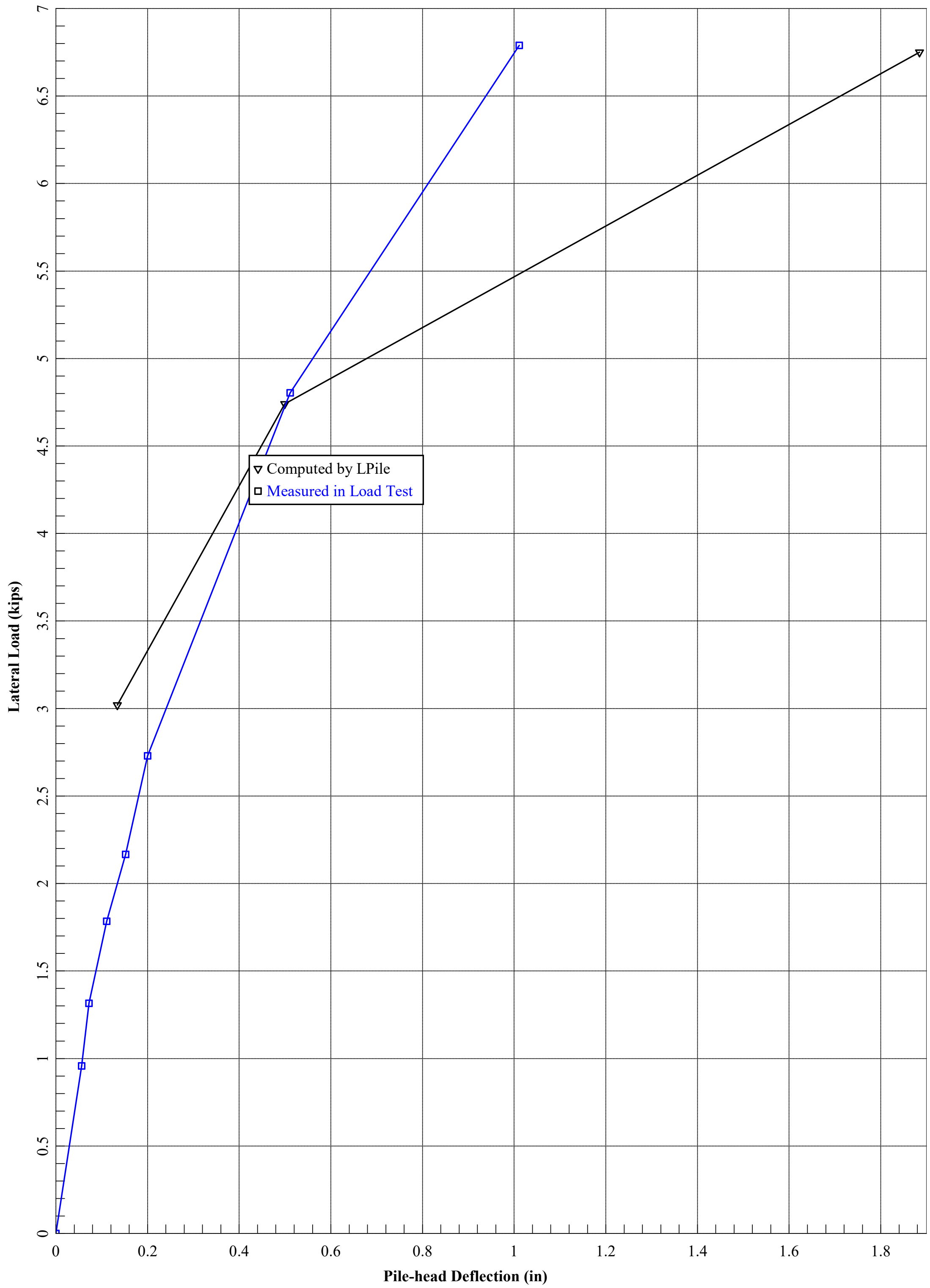

Lateral Pile Deflection (inches)
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
Depth (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
2580 lbs
3620 lbs
4410 lbs
Stf. Cl. NW
Stf. Cl. NW

G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-4A - 4ft

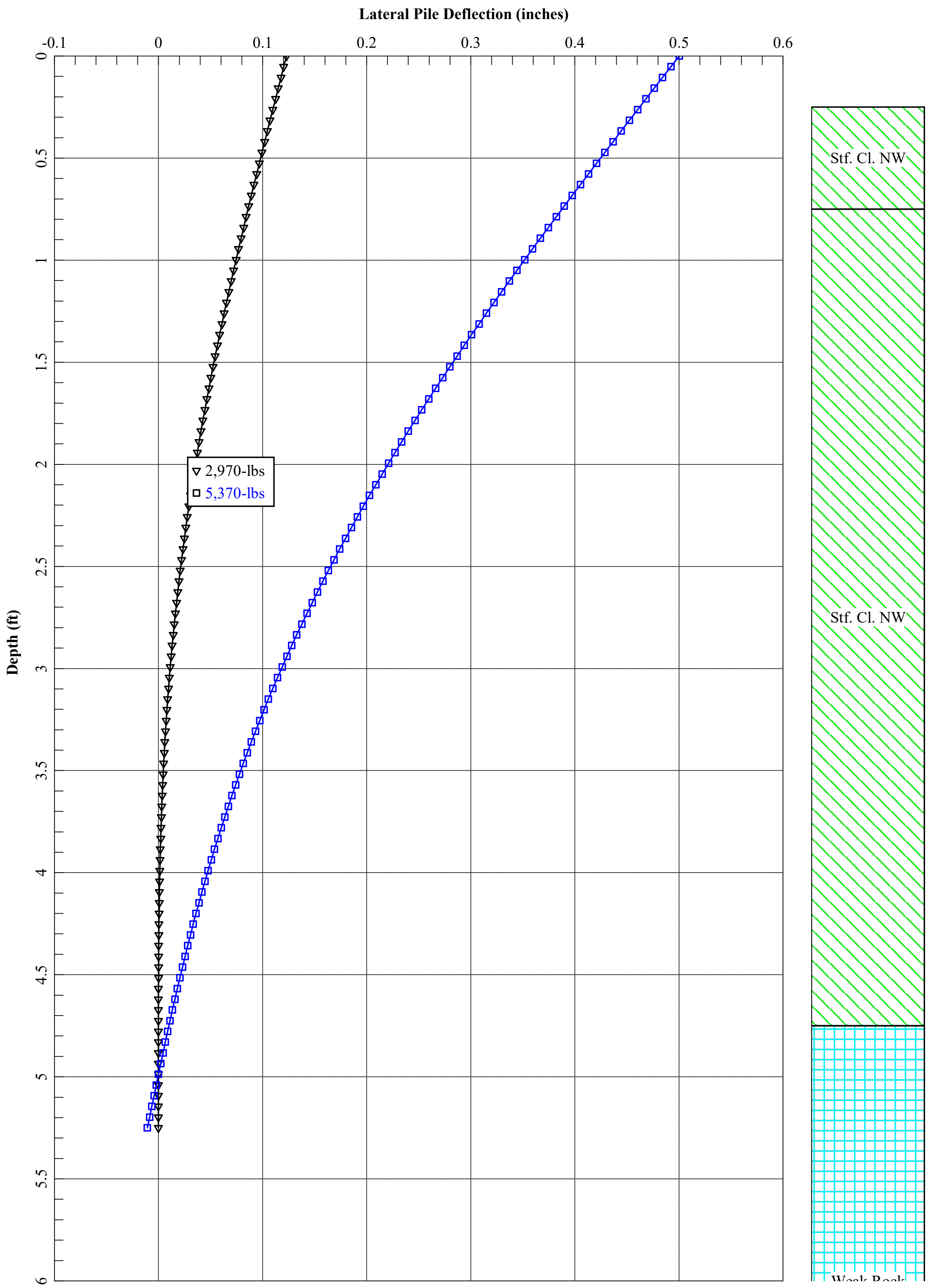


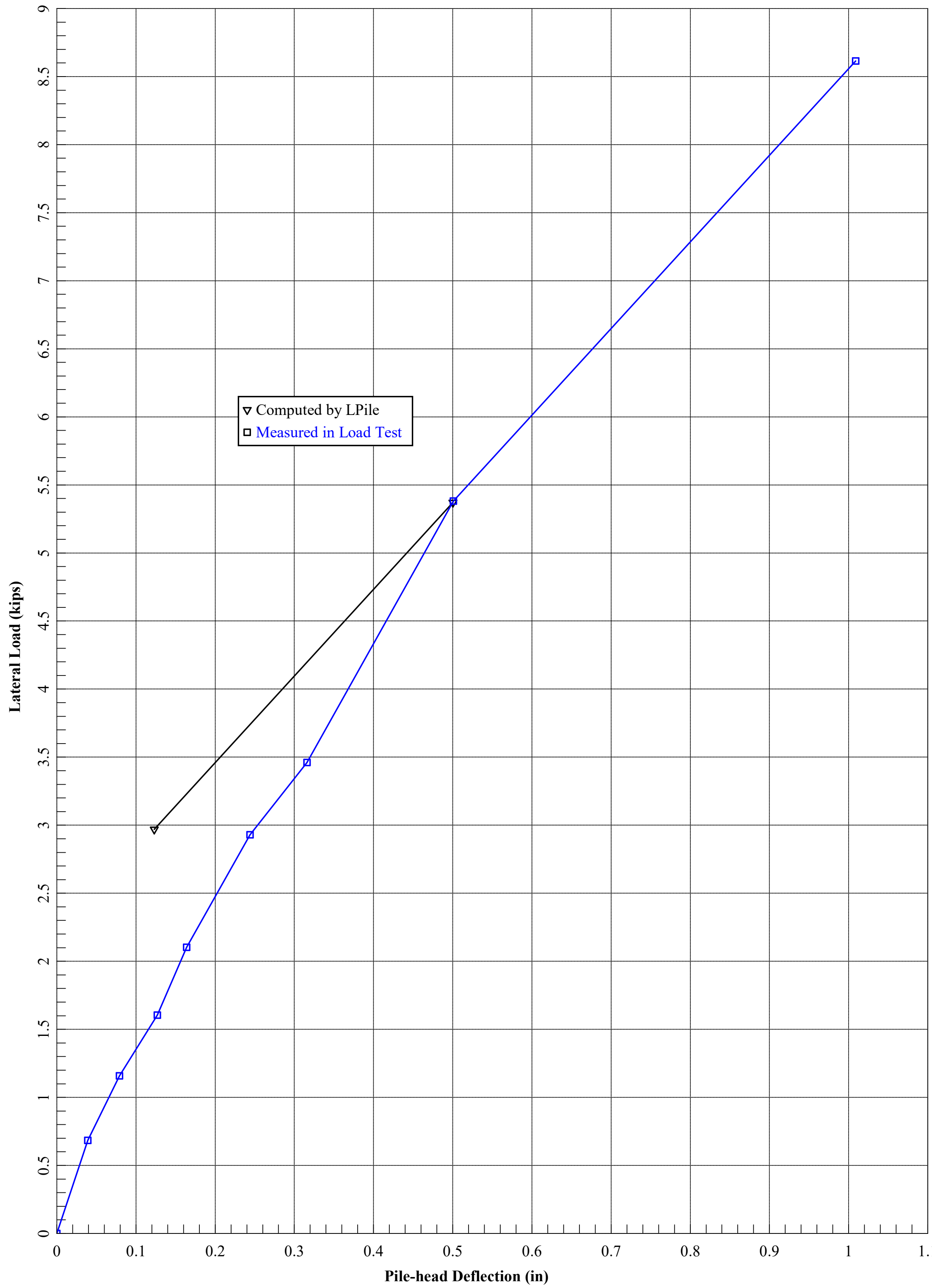
G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-4B - 5.25ft



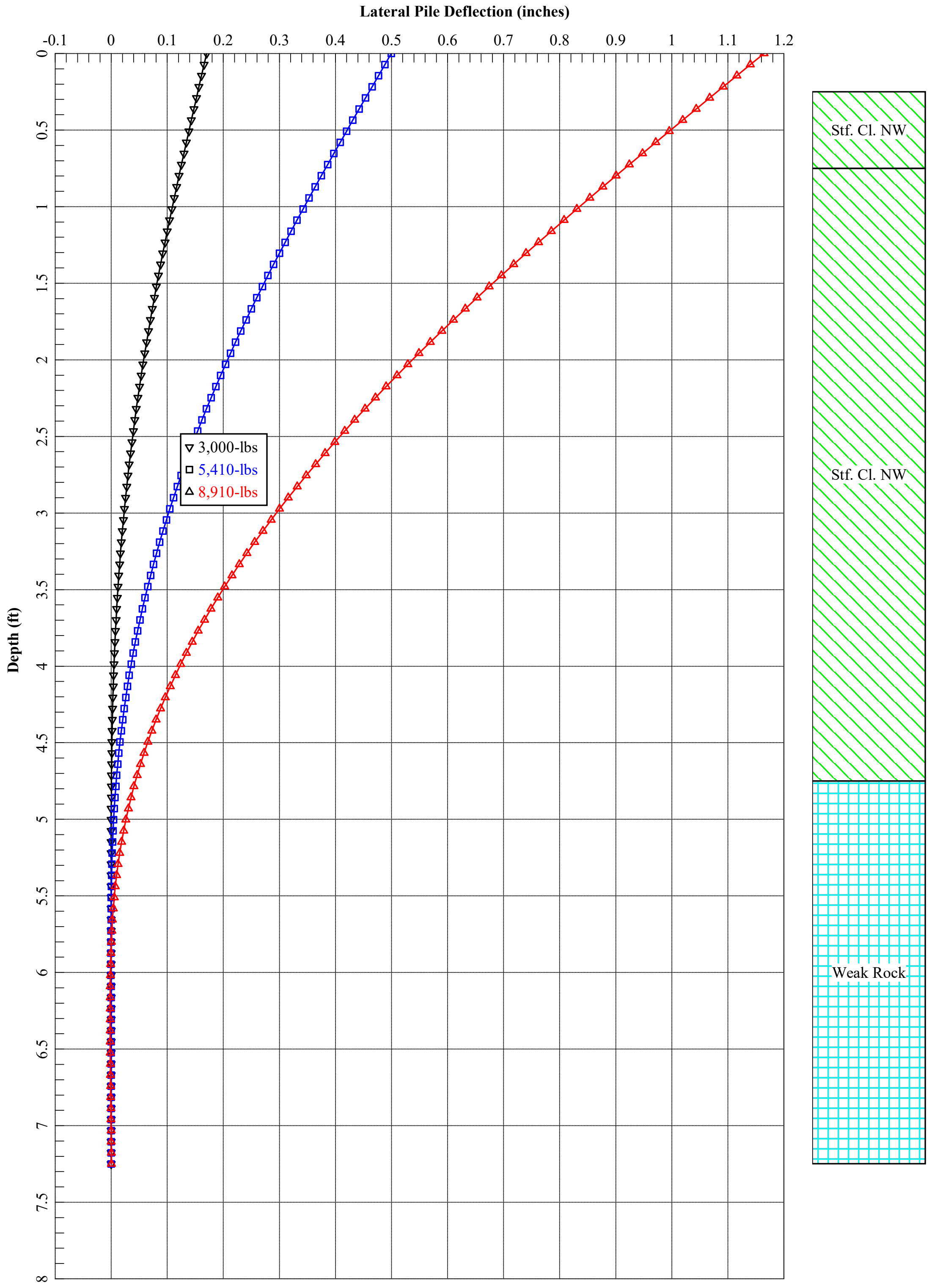

Computed by LPile
Measured in Load Test
Lateral Load (kips)
Pile-head Deflection (in)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8

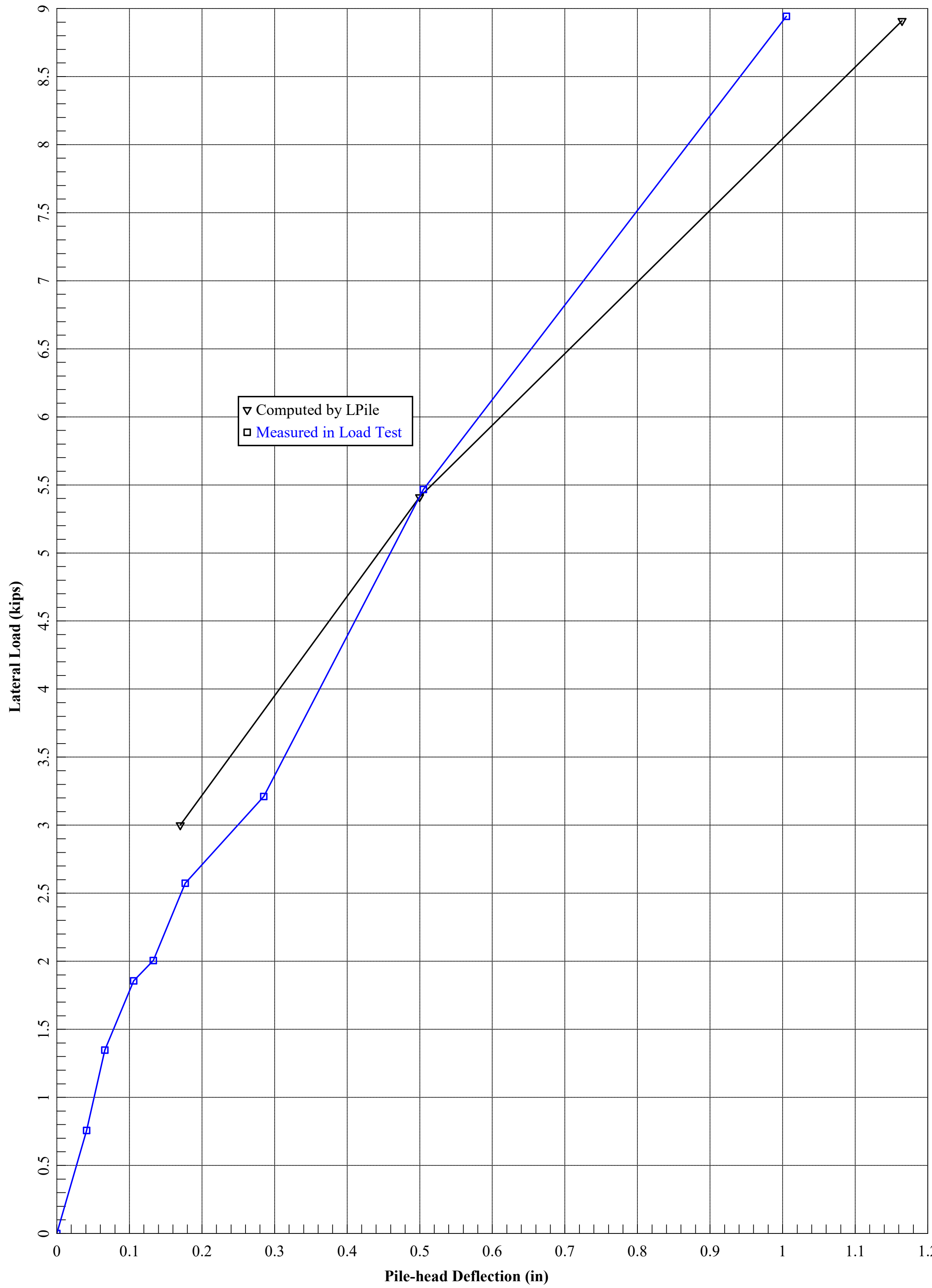
G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-5A - 5ft

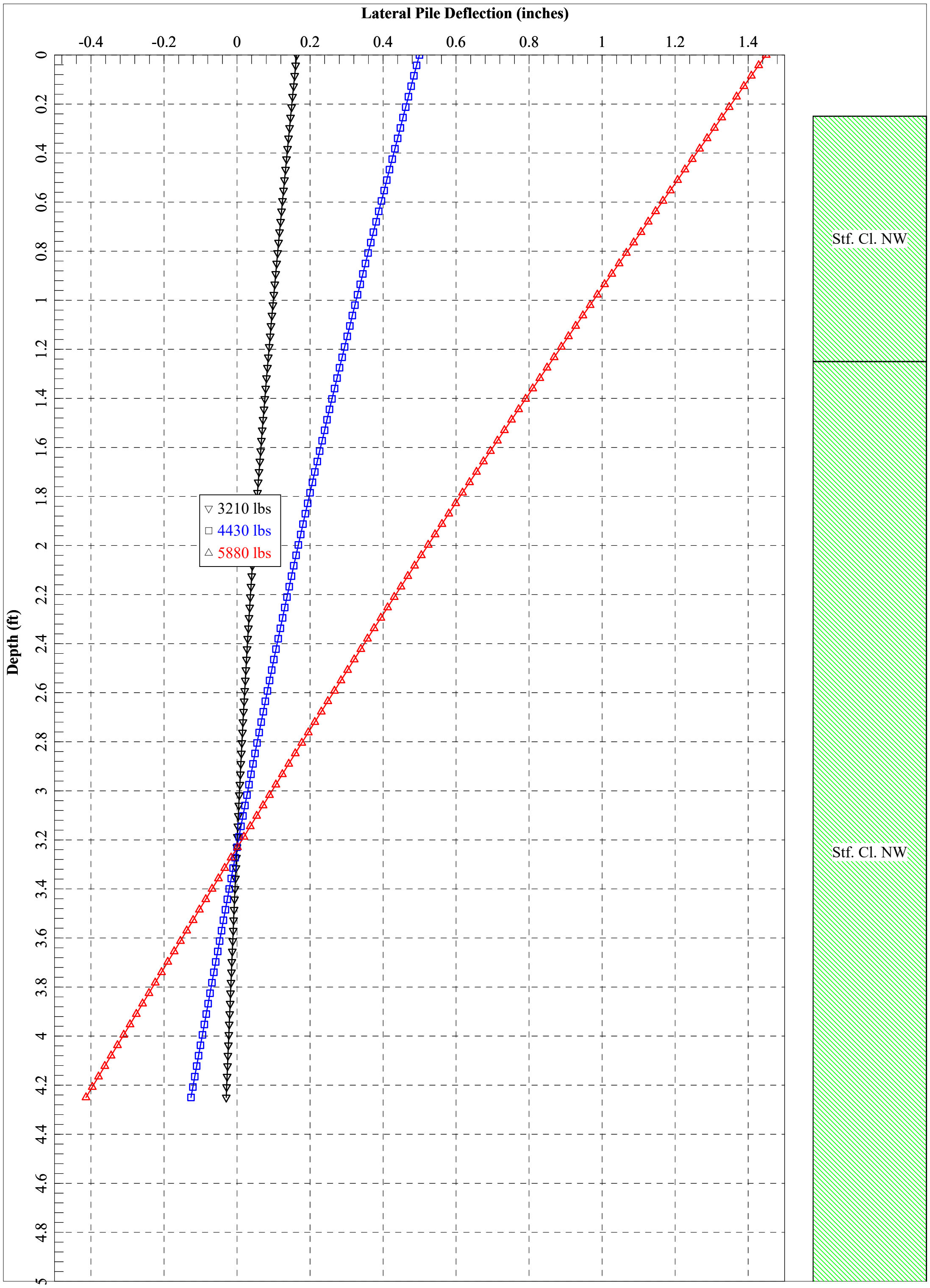



Computed by LPile
Measured in Load Test
Lateral Load (kips)
Pile-head Deflection (in)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
8
8.5
9
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1

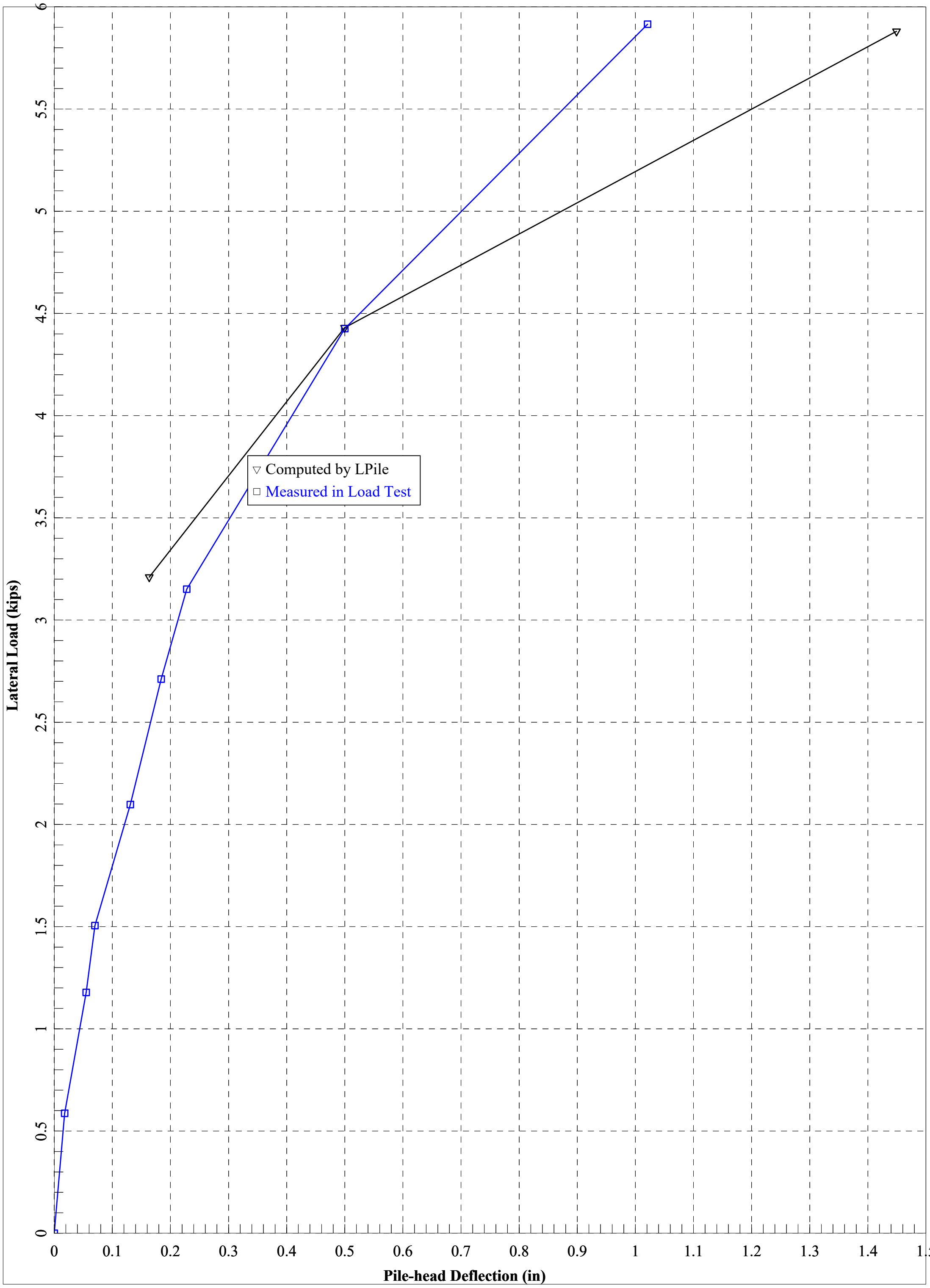
G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-5B - 7ft



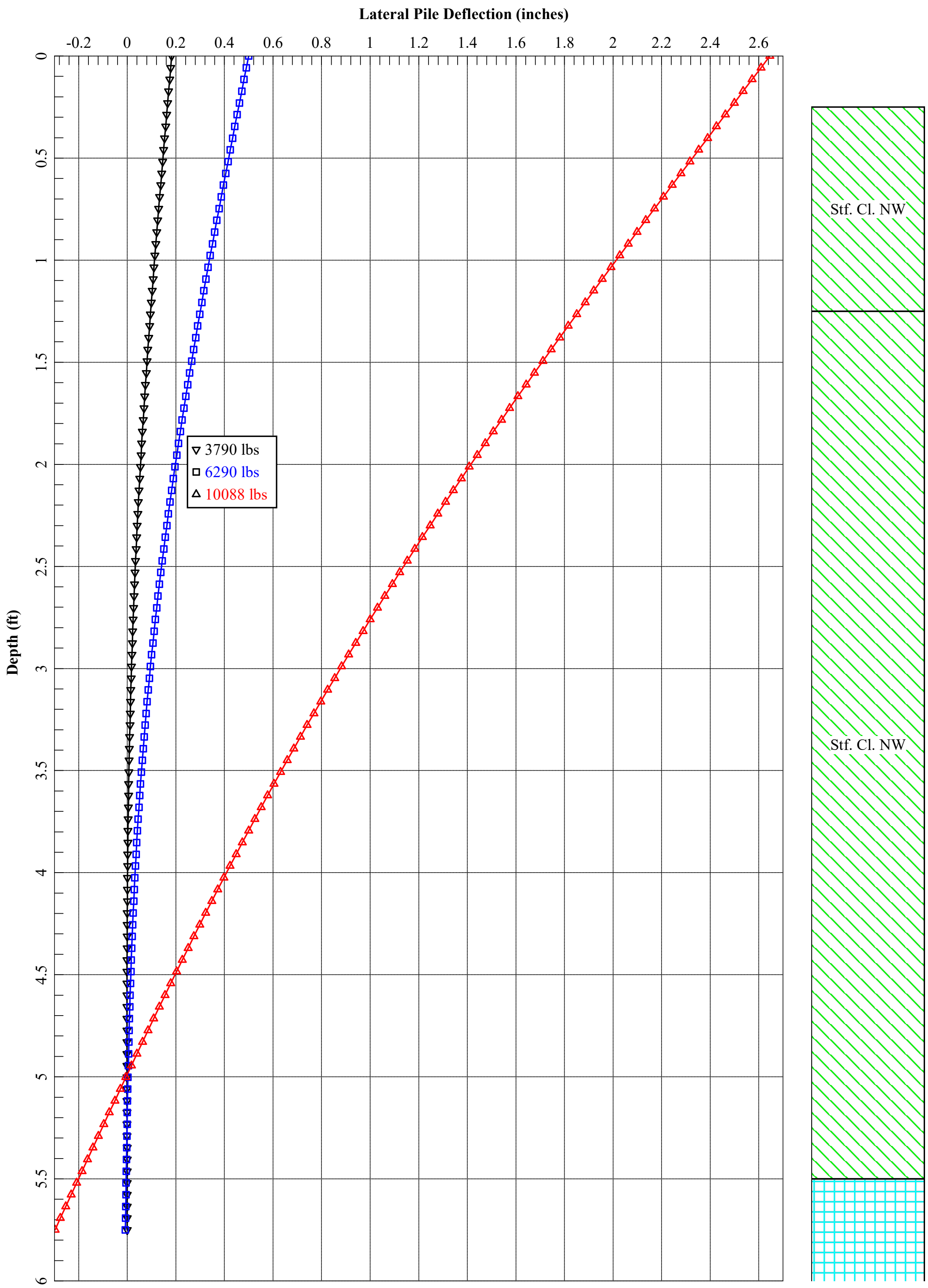

Computed by LPile
Measured in Load Test
Lateral Load (kips)
Pile-head Deflection (in)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
8
8.5
9
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2


Lateral Pile Deflection (inches)
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
1.2
1.4
Depth (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
4.2
4.4
4.6
4.8
5
3210 lbs
4430 lbs
5880 lbs
Stf. Cl. NW
Stf. Cl. NW

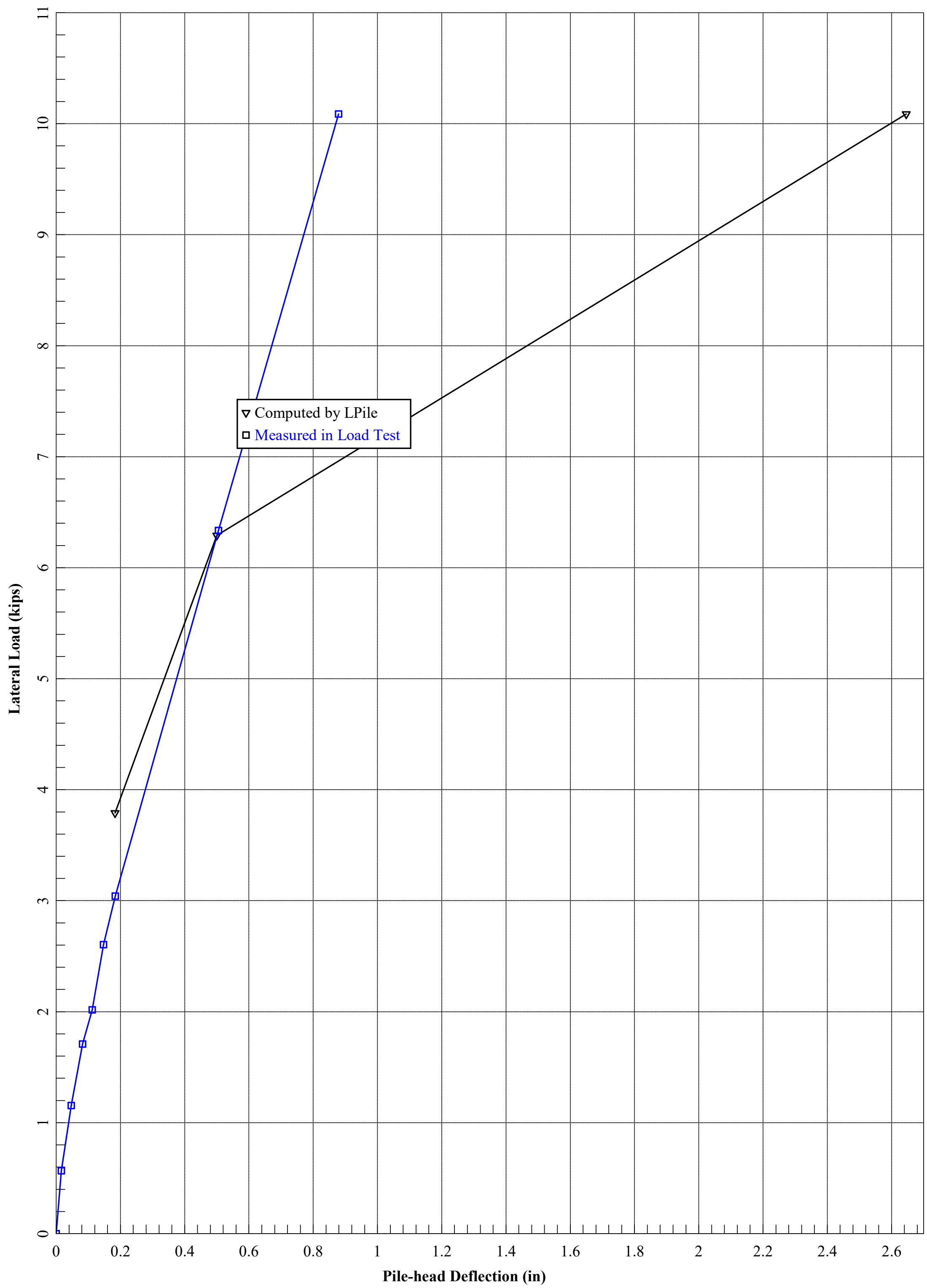
G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-6A - 4ft



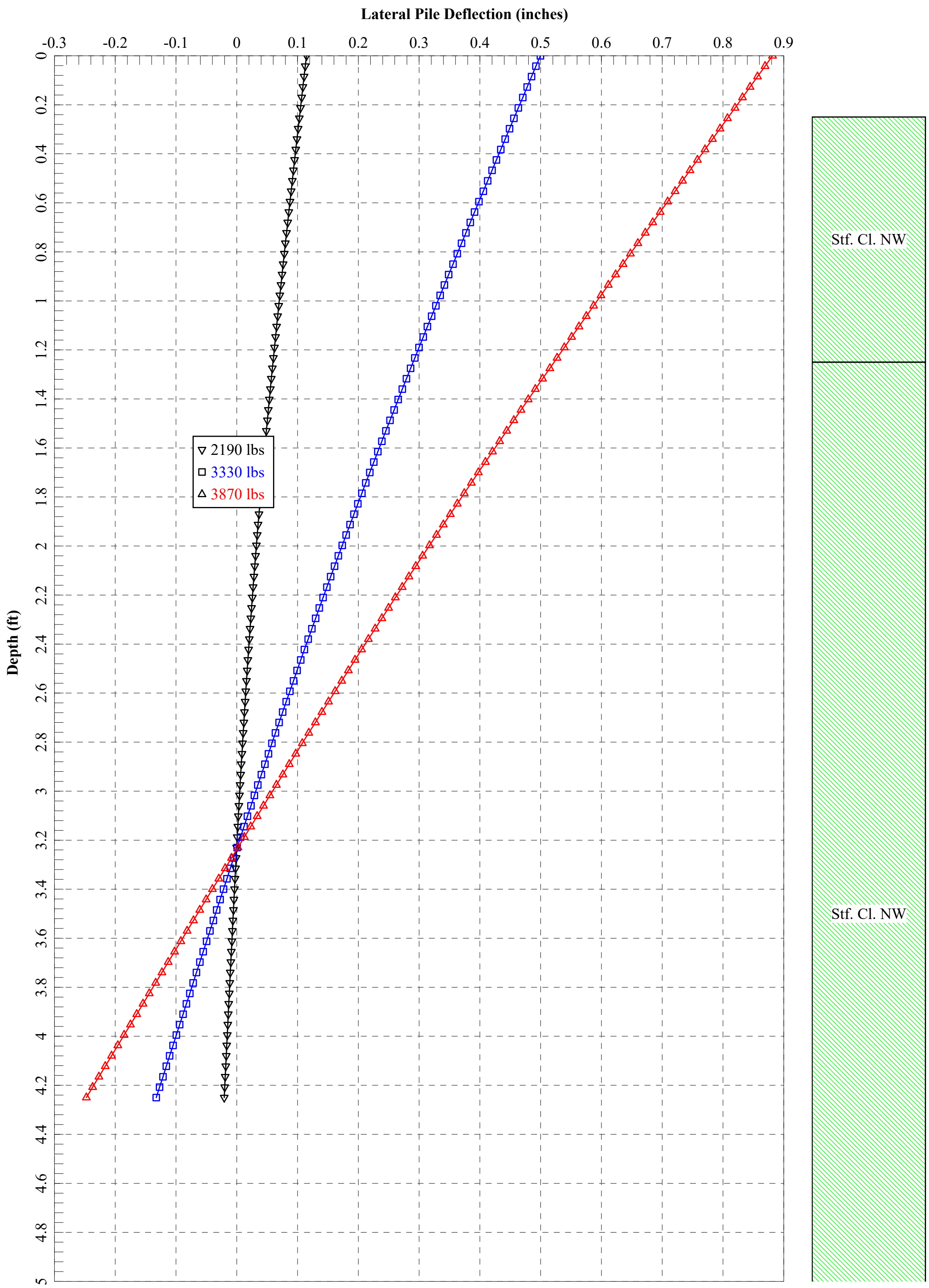
G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-6B - 5.5ft

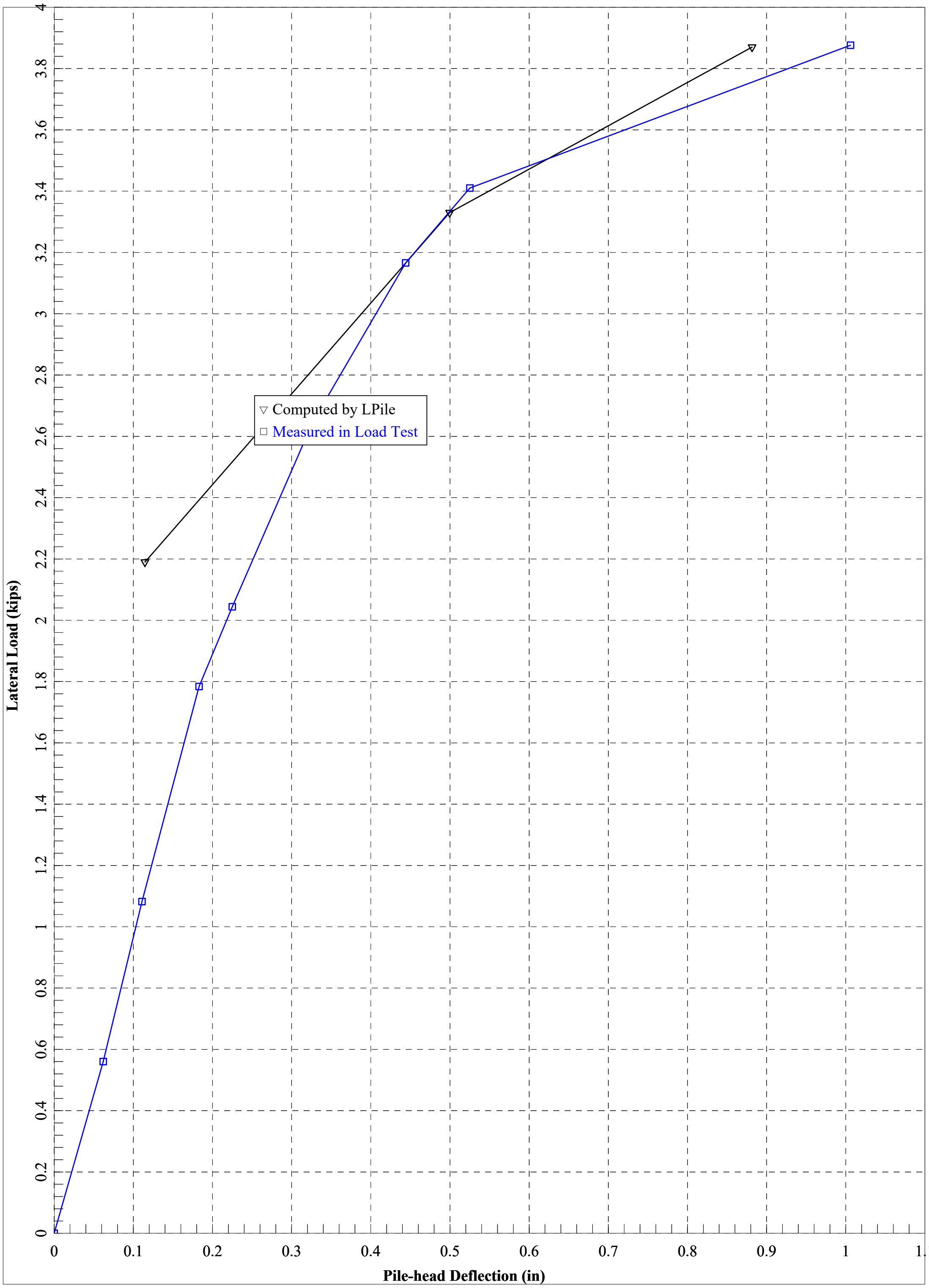


G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-6B - 5.5ft

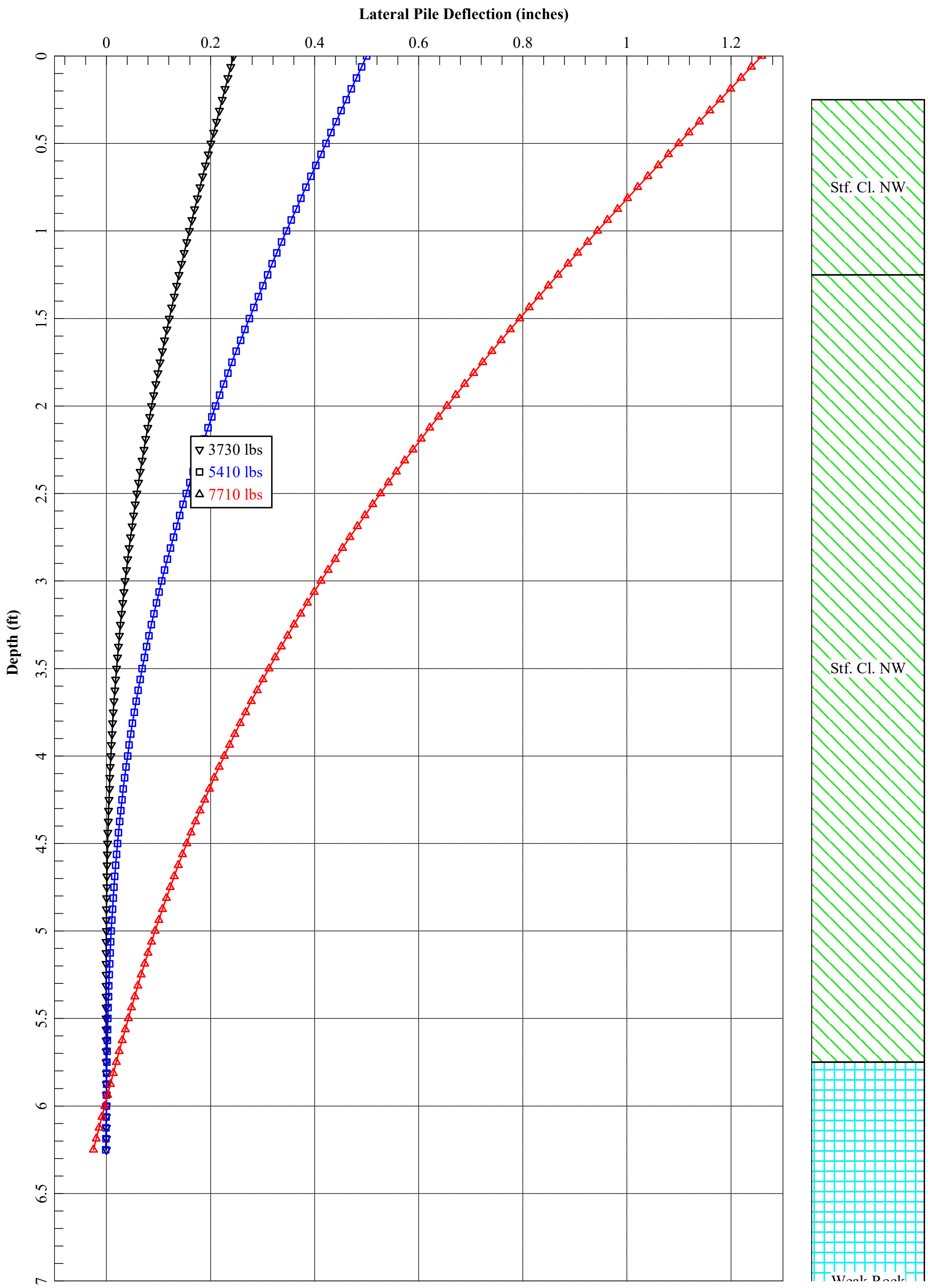


G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-7A - 4ft

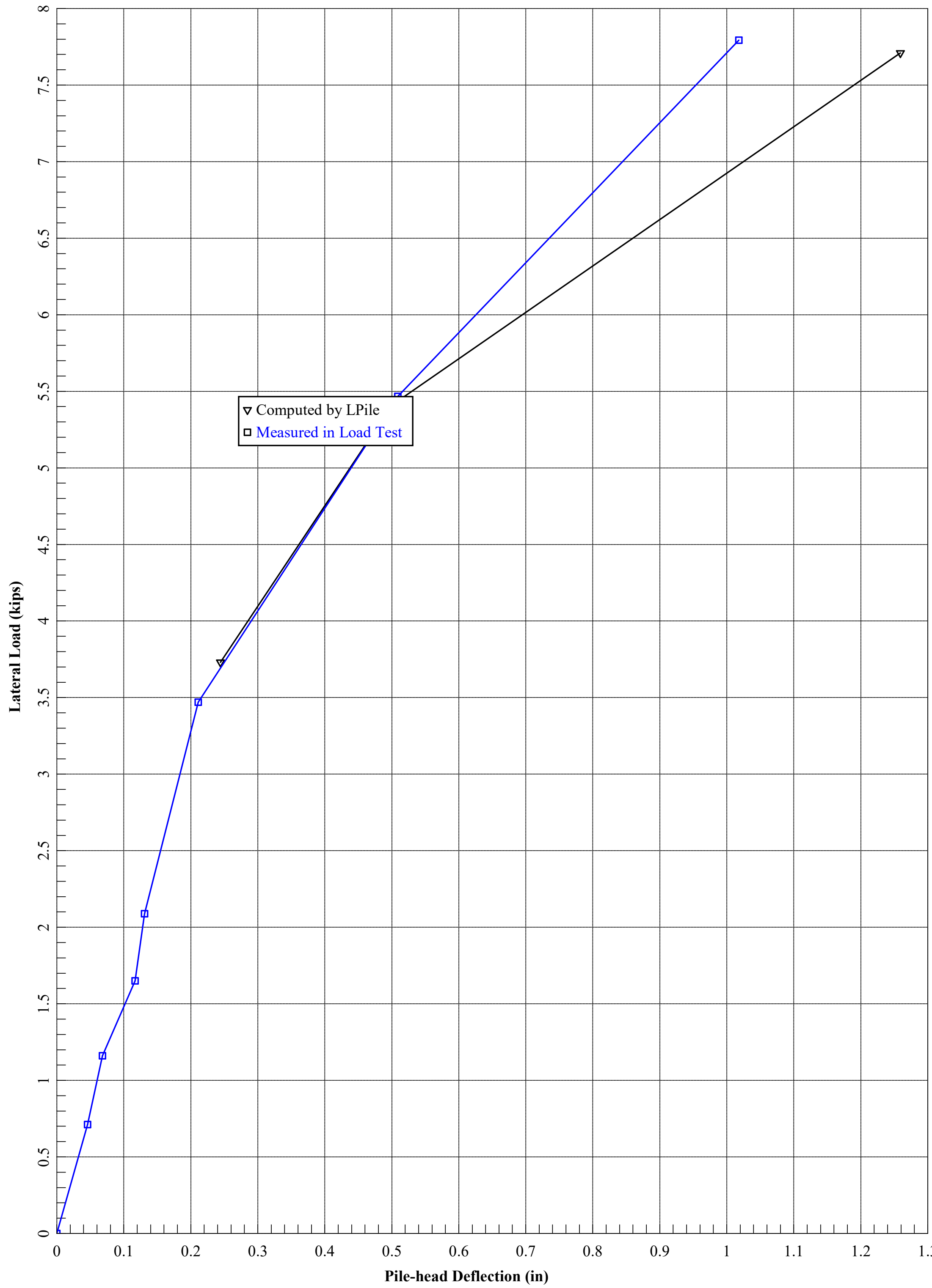



Computed by LPile
Measured in Load Test
Lateral Load (kips)
Pile-head Deflection (in)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1

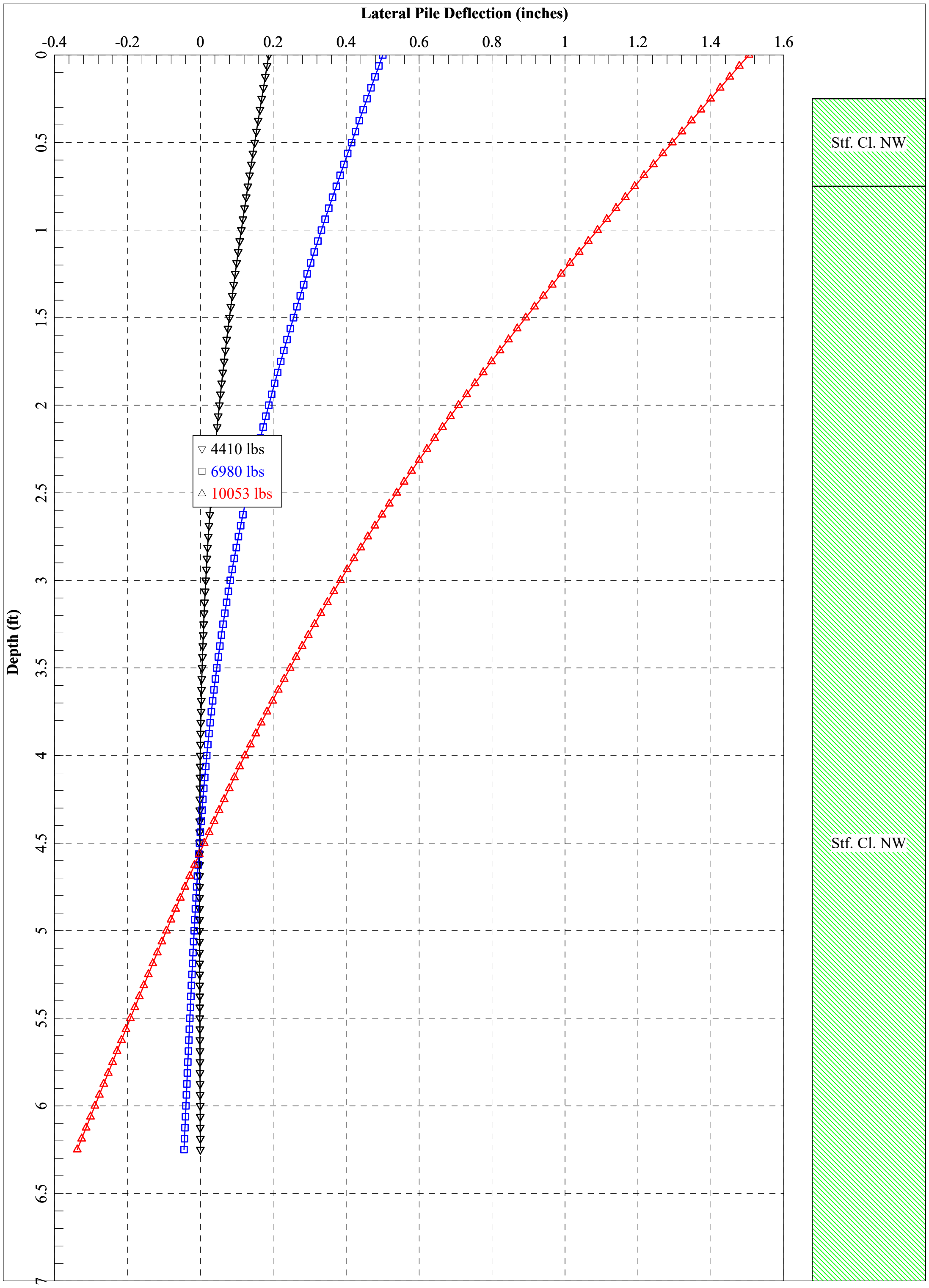
G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-7B - 6ft



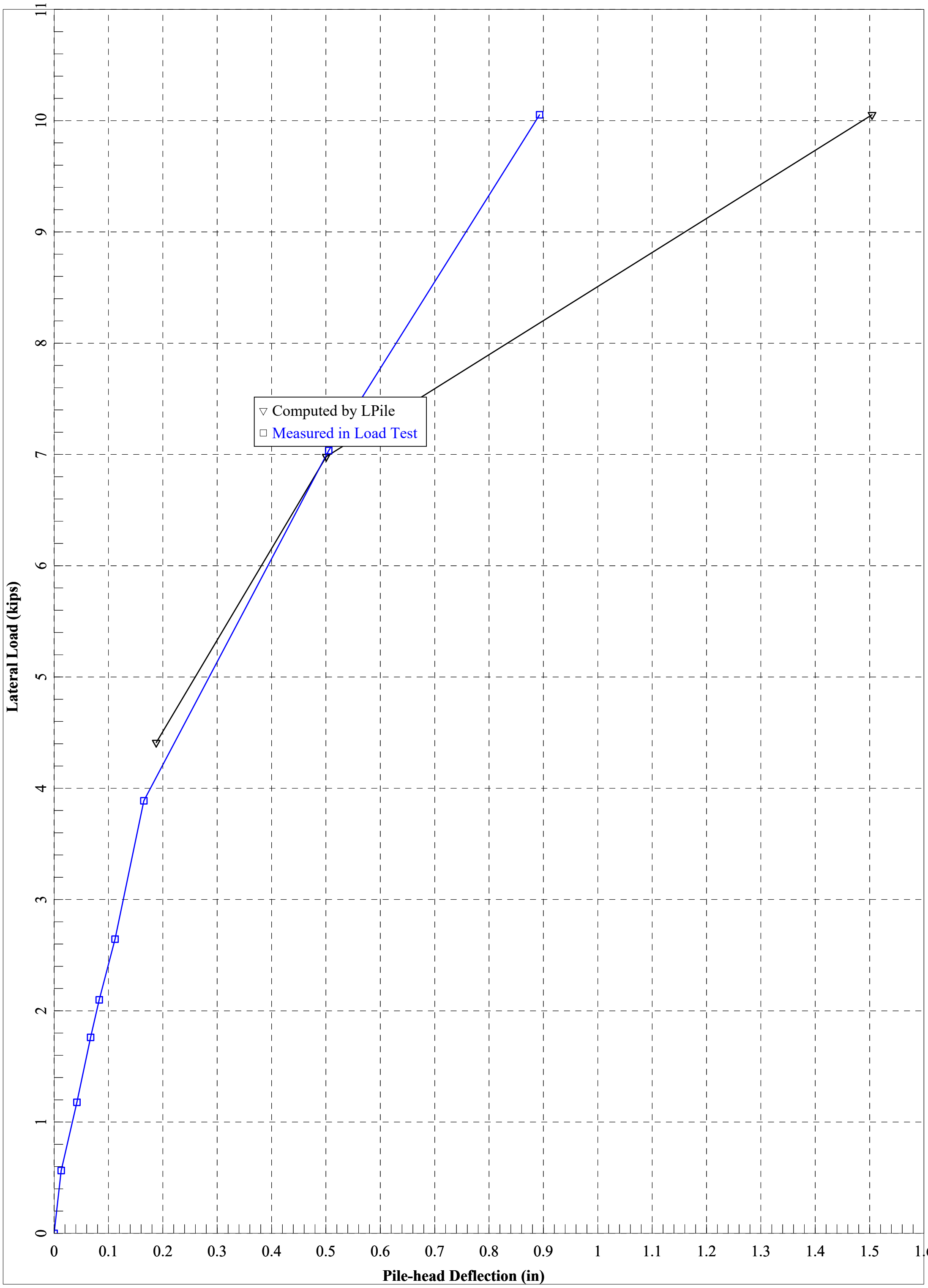
G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-7B - 6ft



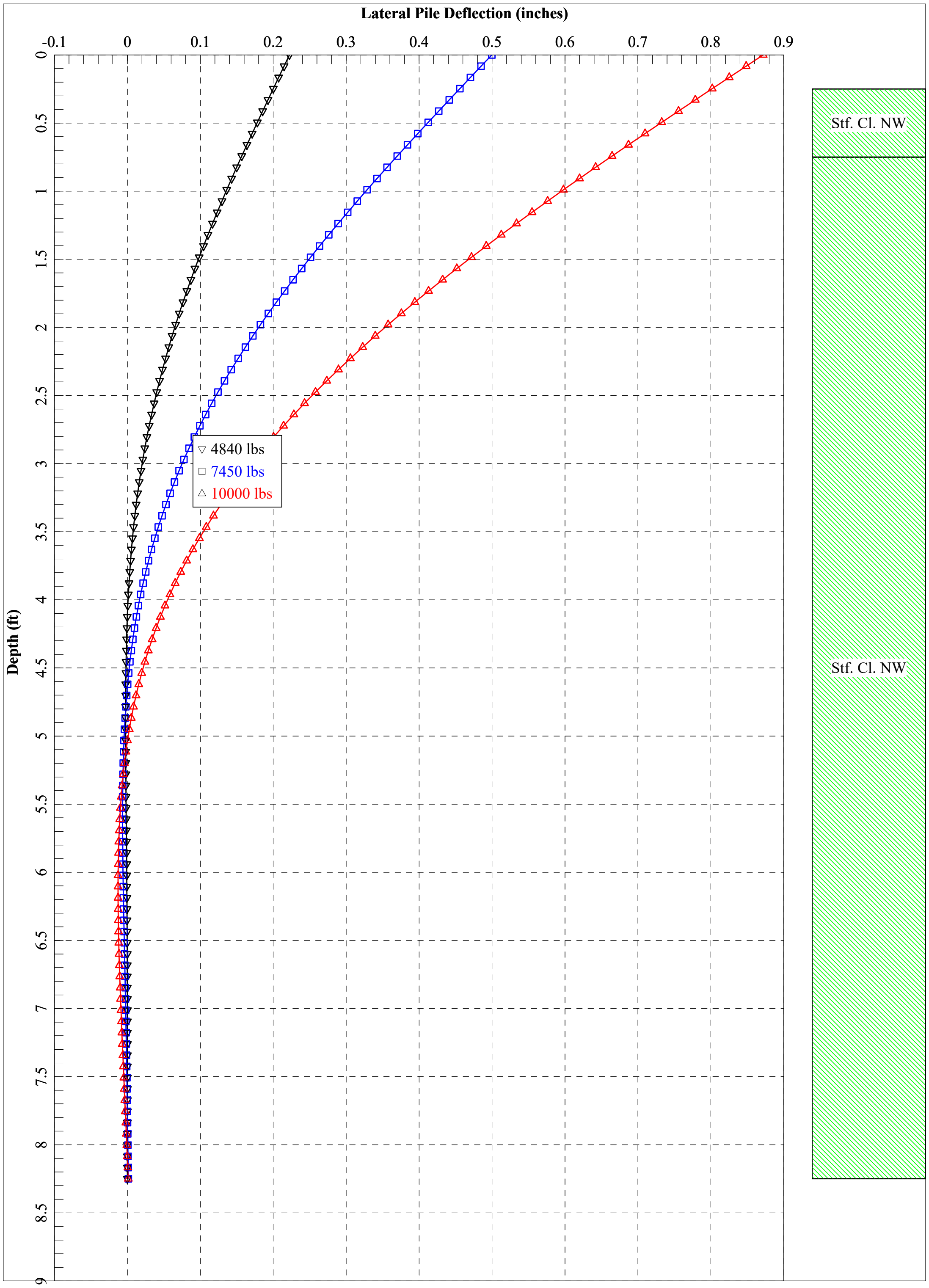
G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-8A - 6ft

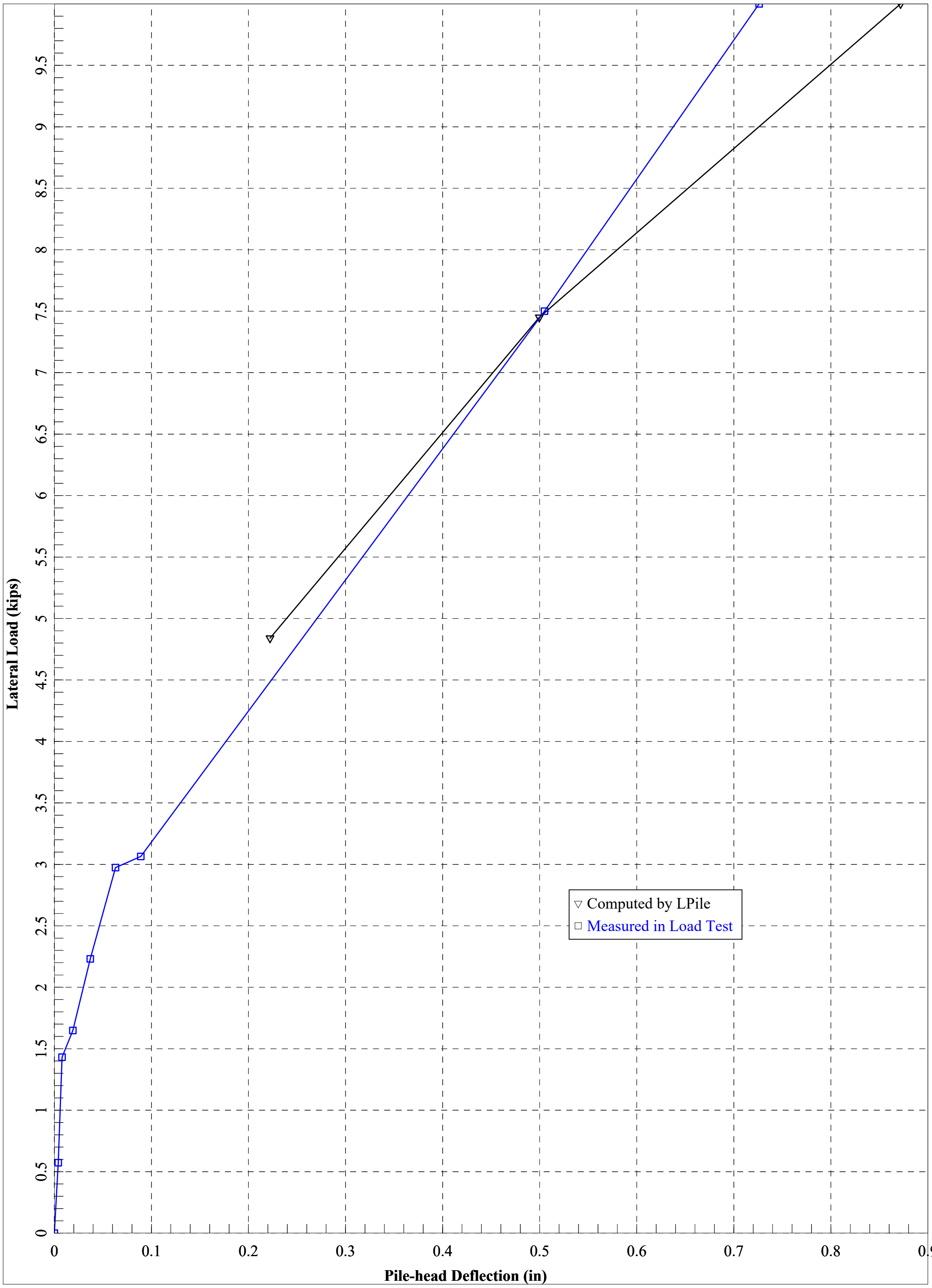


G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-8A - 6ft

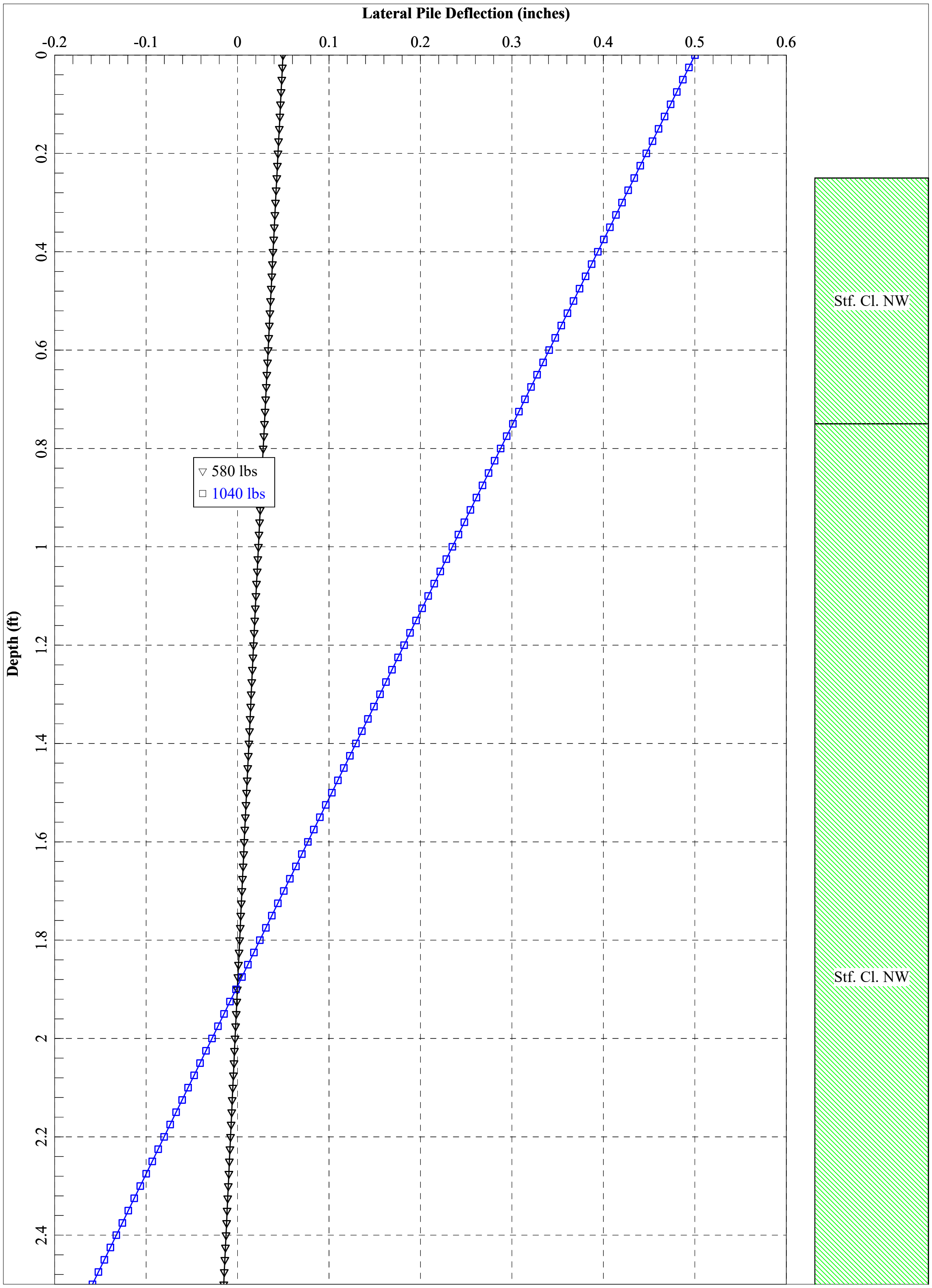


G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-8B - 8ft

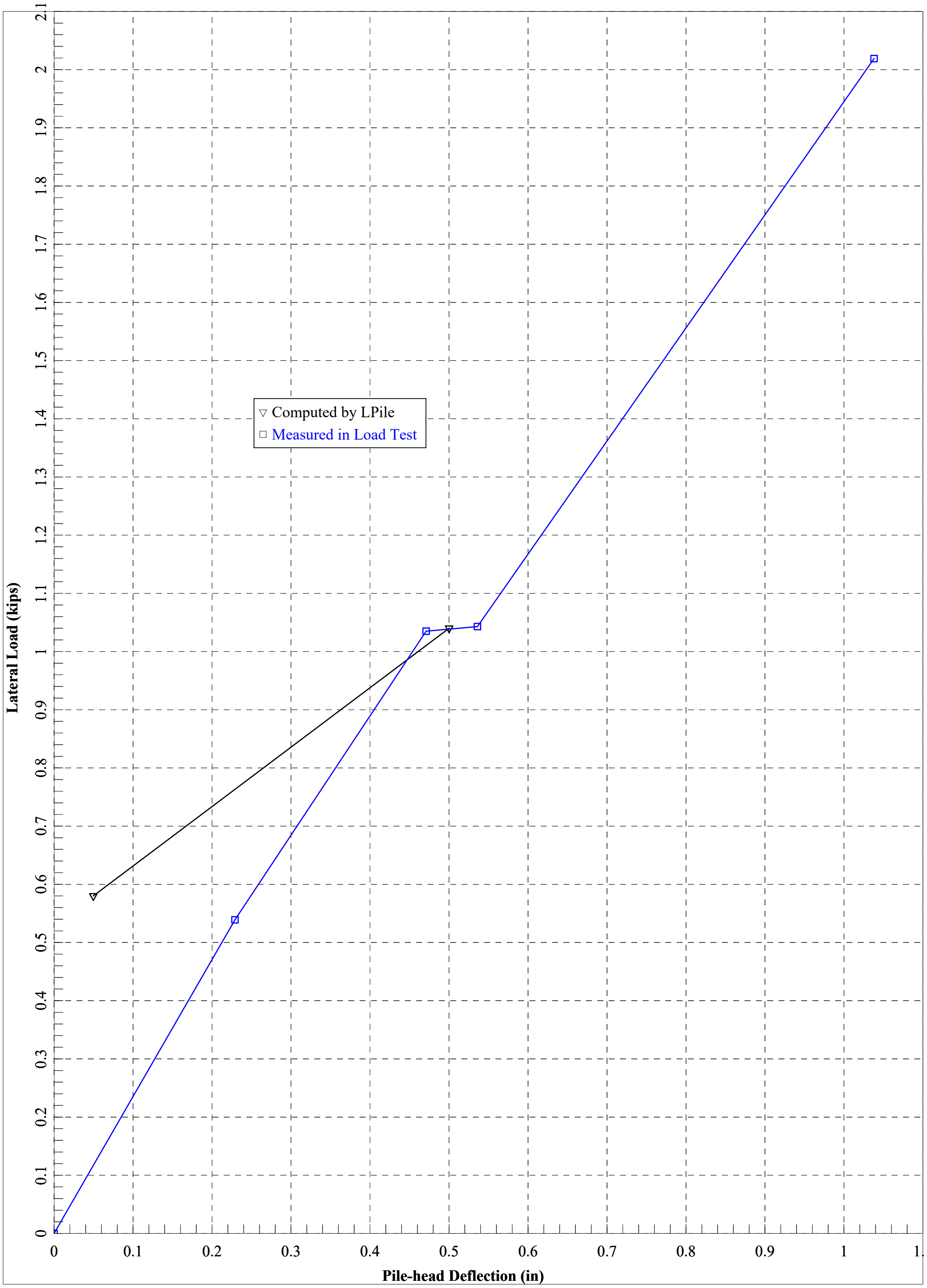



Lateral Load (kips)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
8
8.5
9
9.5
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
Pile-head Deflection (in)
Computed by LPile
Measured in Load Test

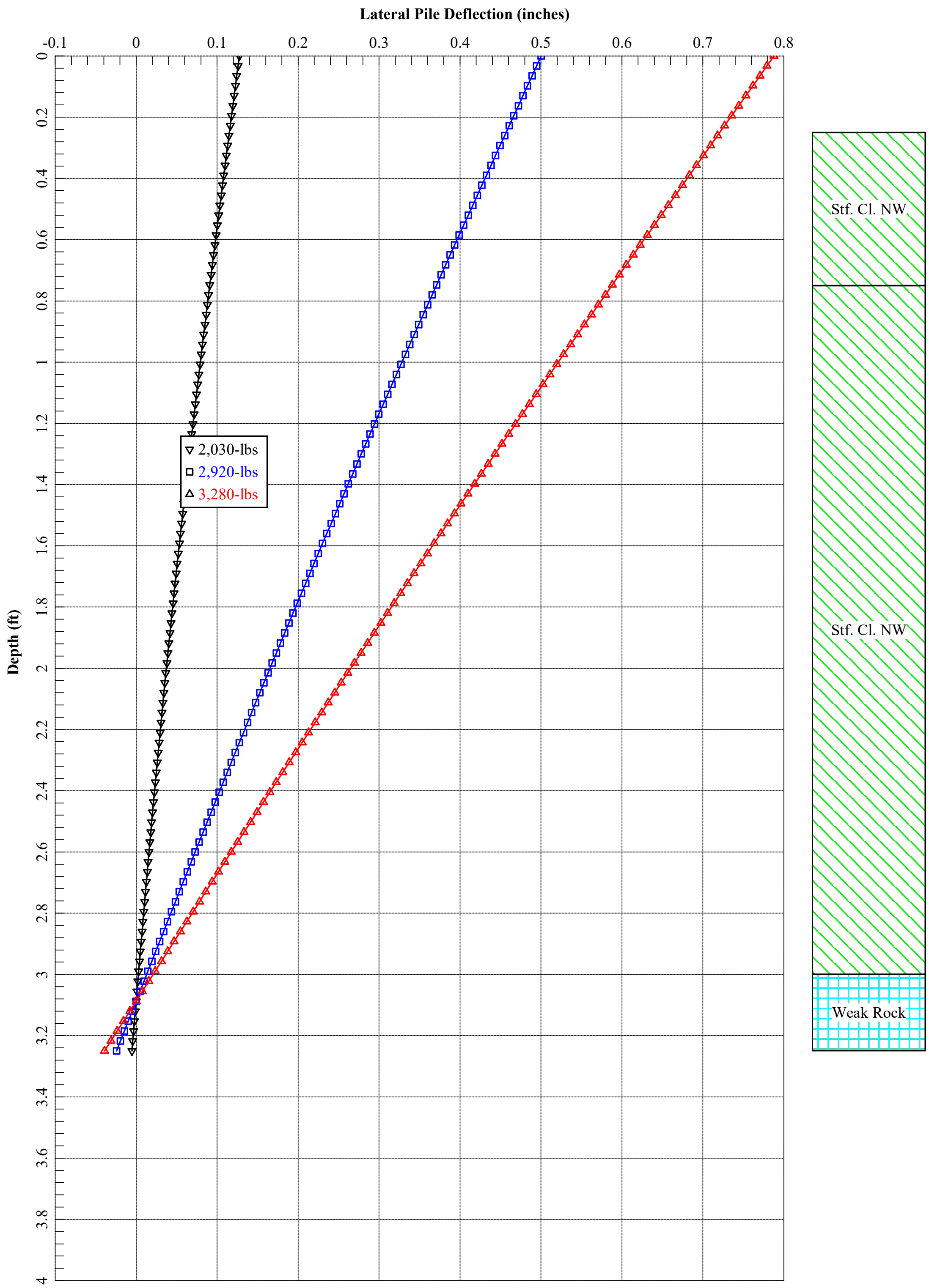
G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-9A - 2.25ft



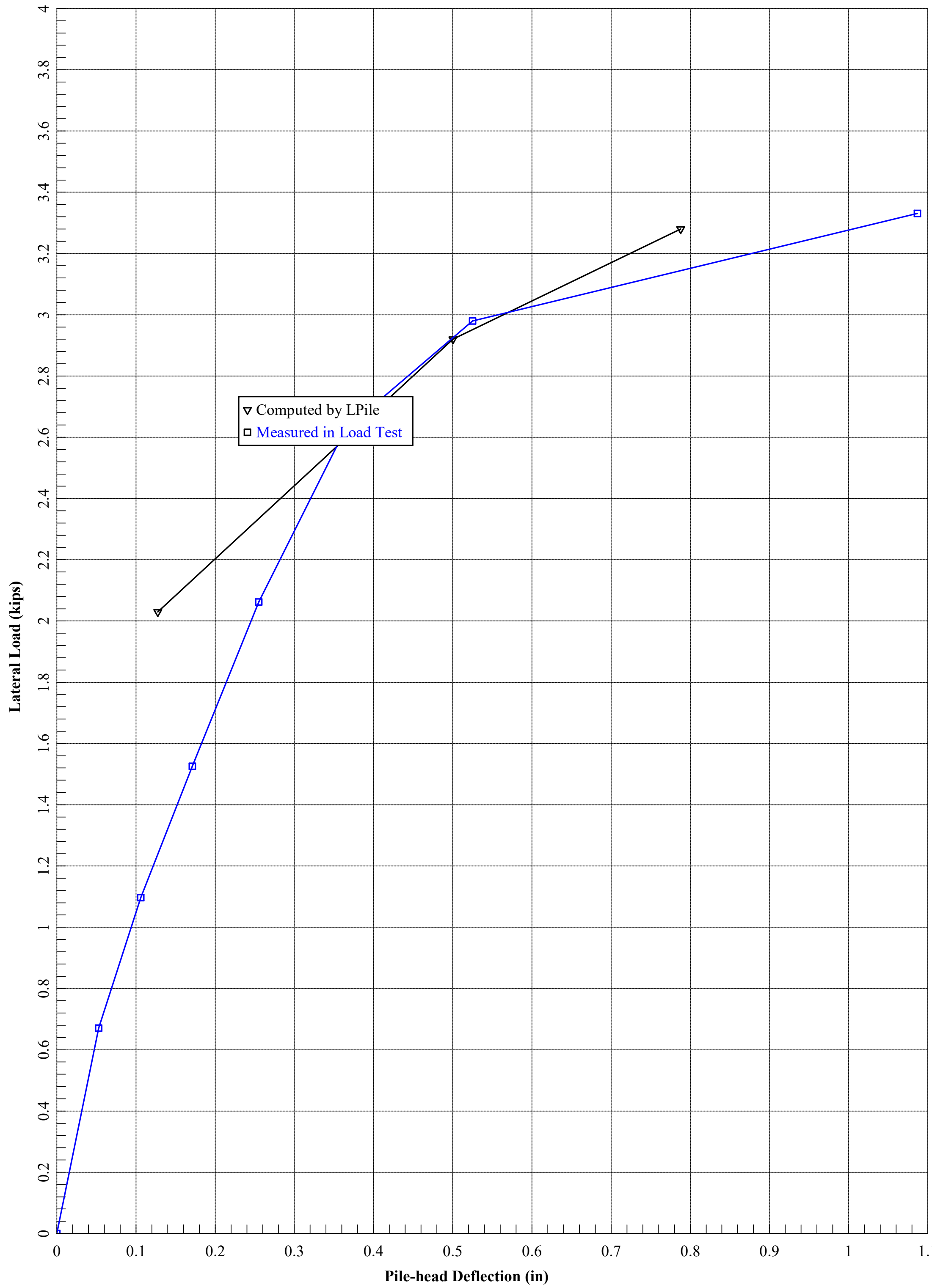
G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-9A - 2.25ft

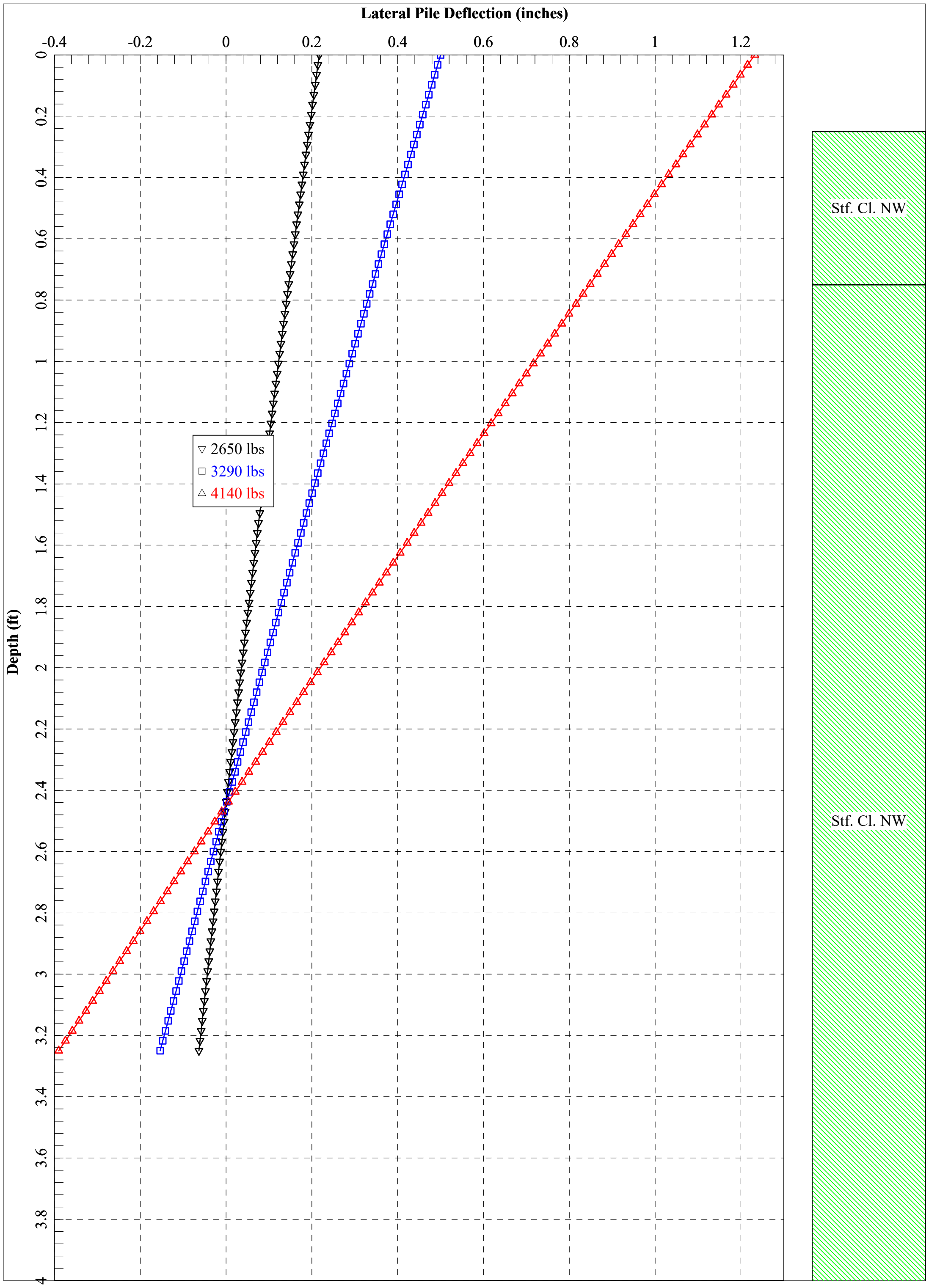


G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-9B - 3ft

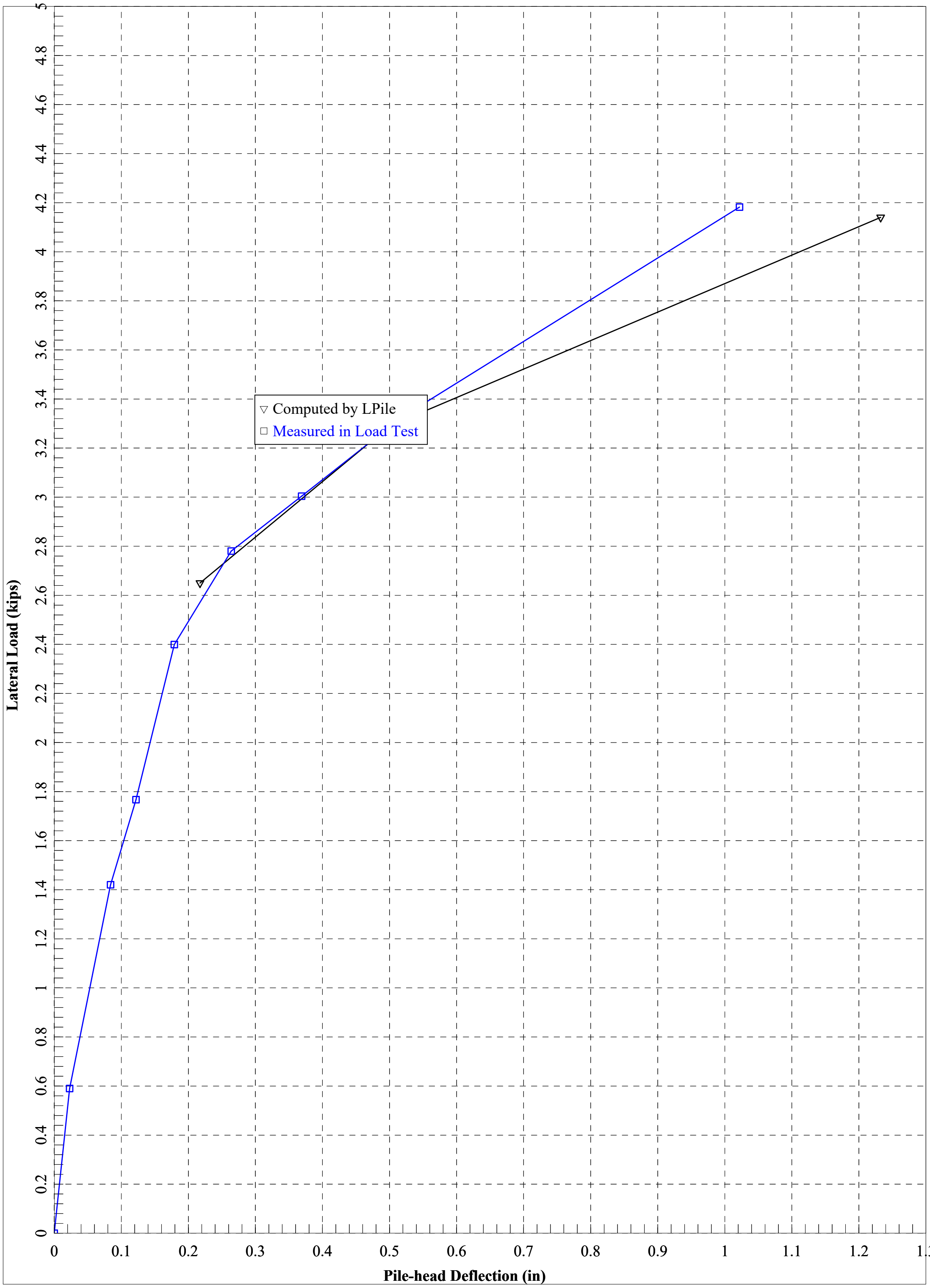


G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-9B - 3ft

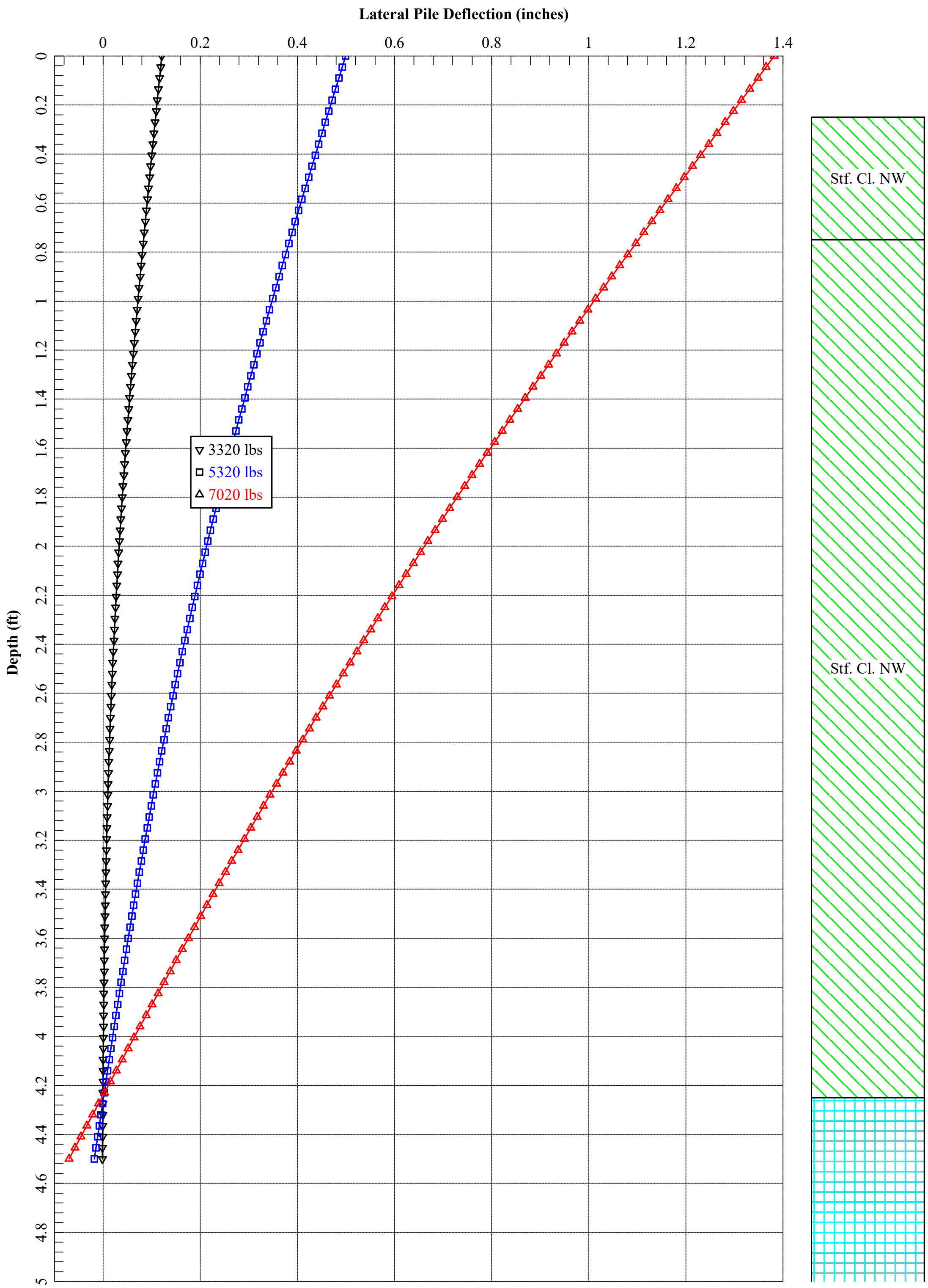


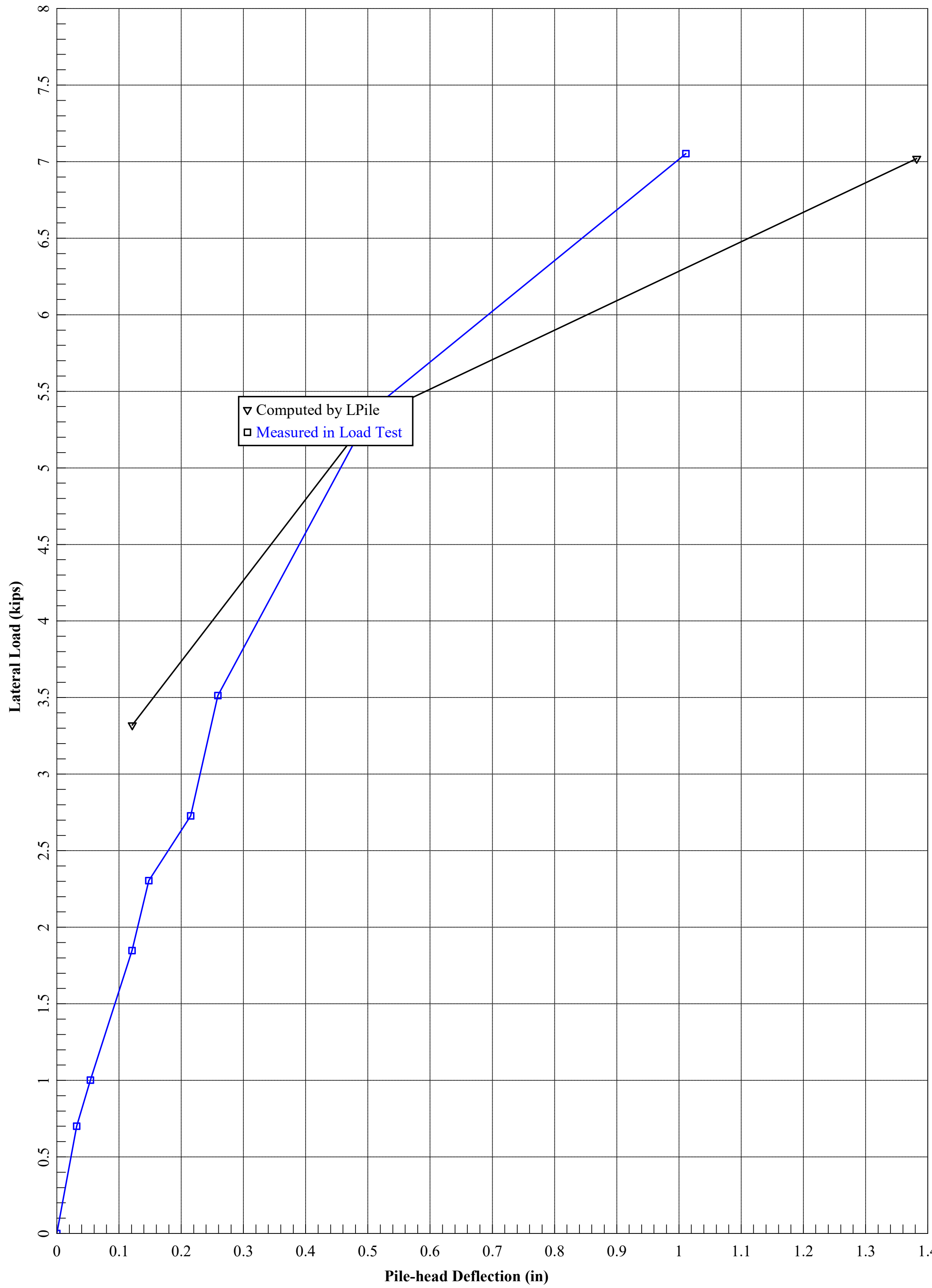

Lateral Pile Deflection (inches)
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
1.2
Depth (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
2650 lbs
3290 lbs
4140 lbs
Stf. Cl. NW
Stf. Cl. NW

G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-10A - 3ft

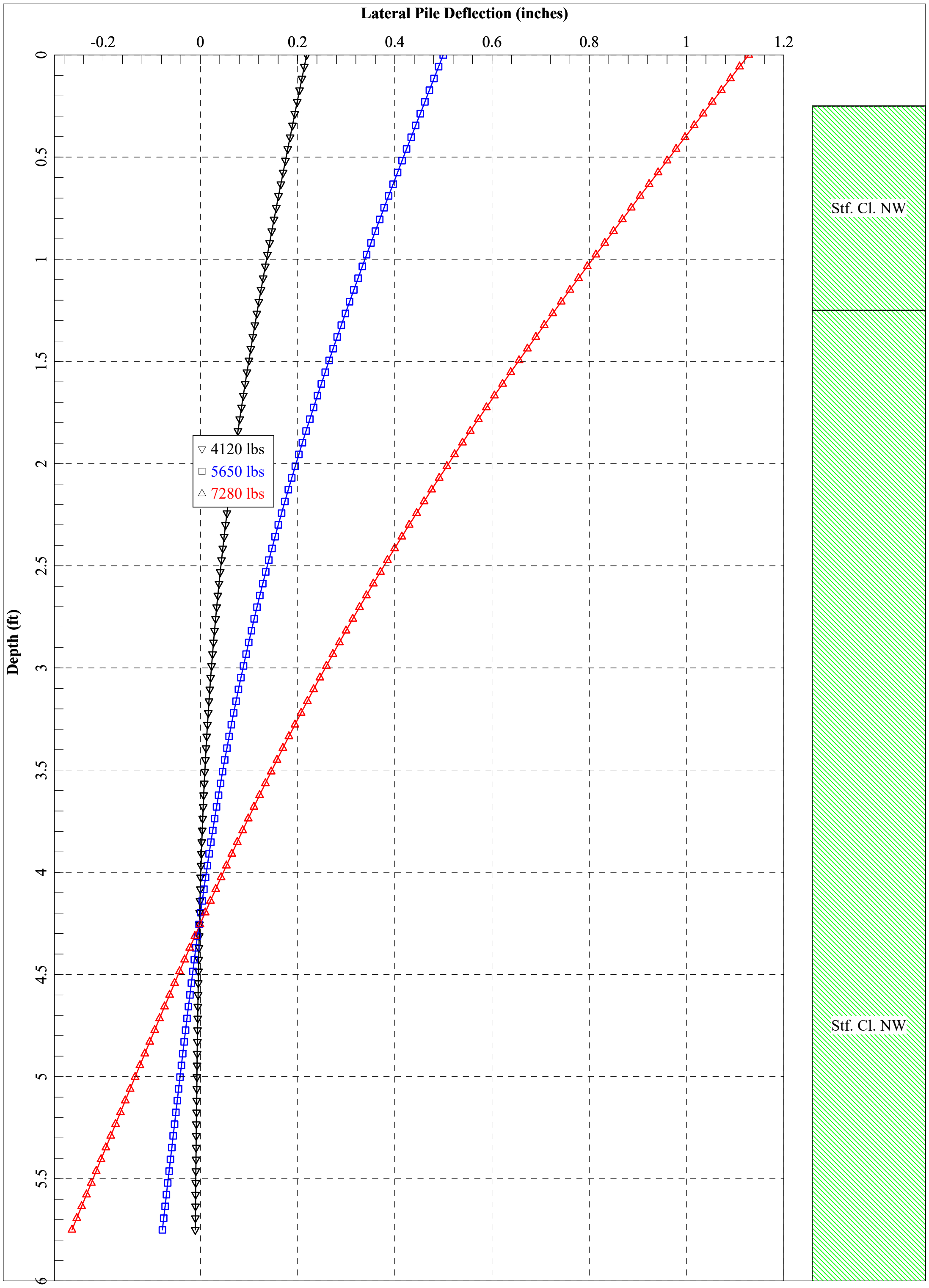


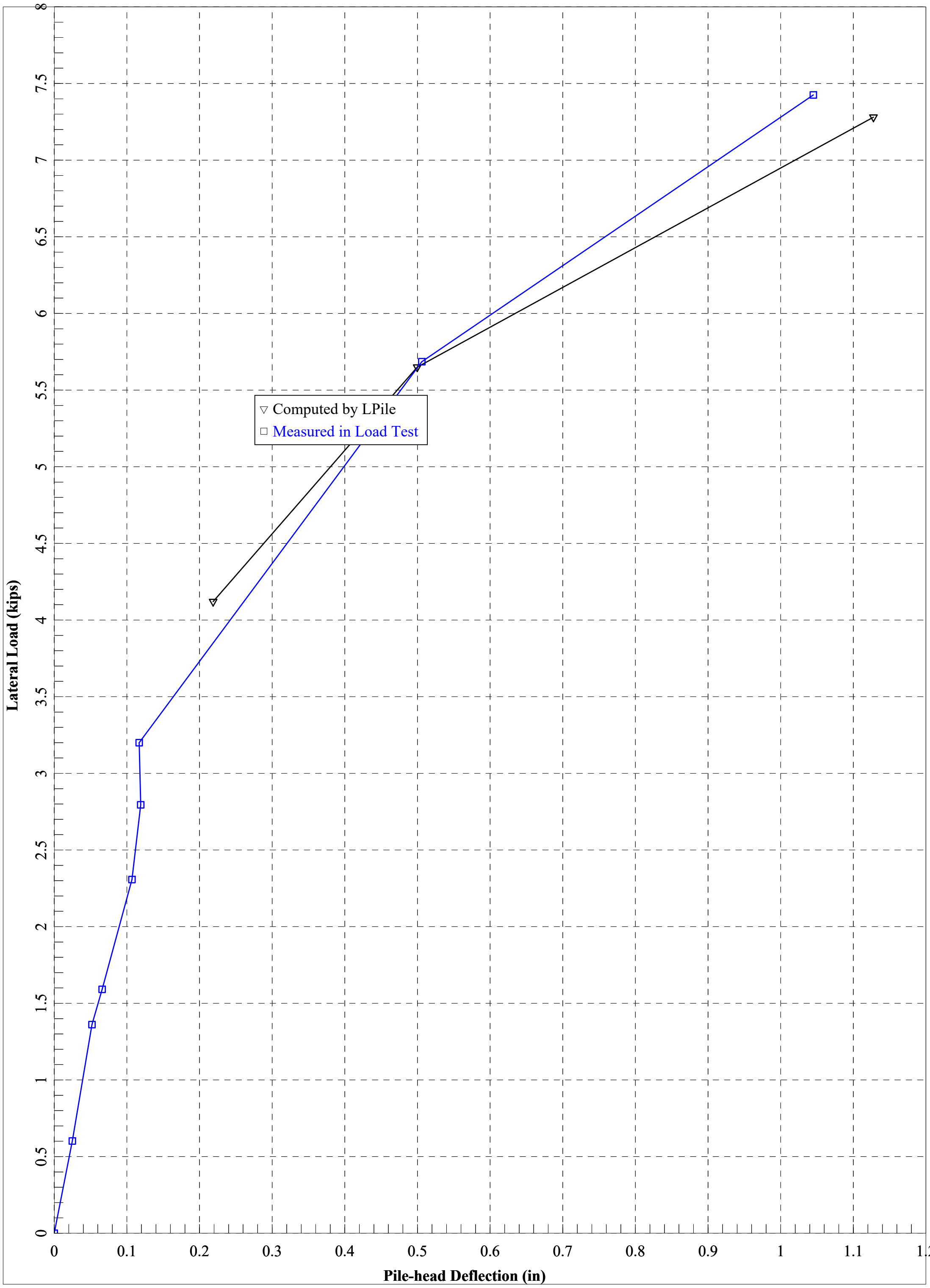
G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-10B - 4.25ft



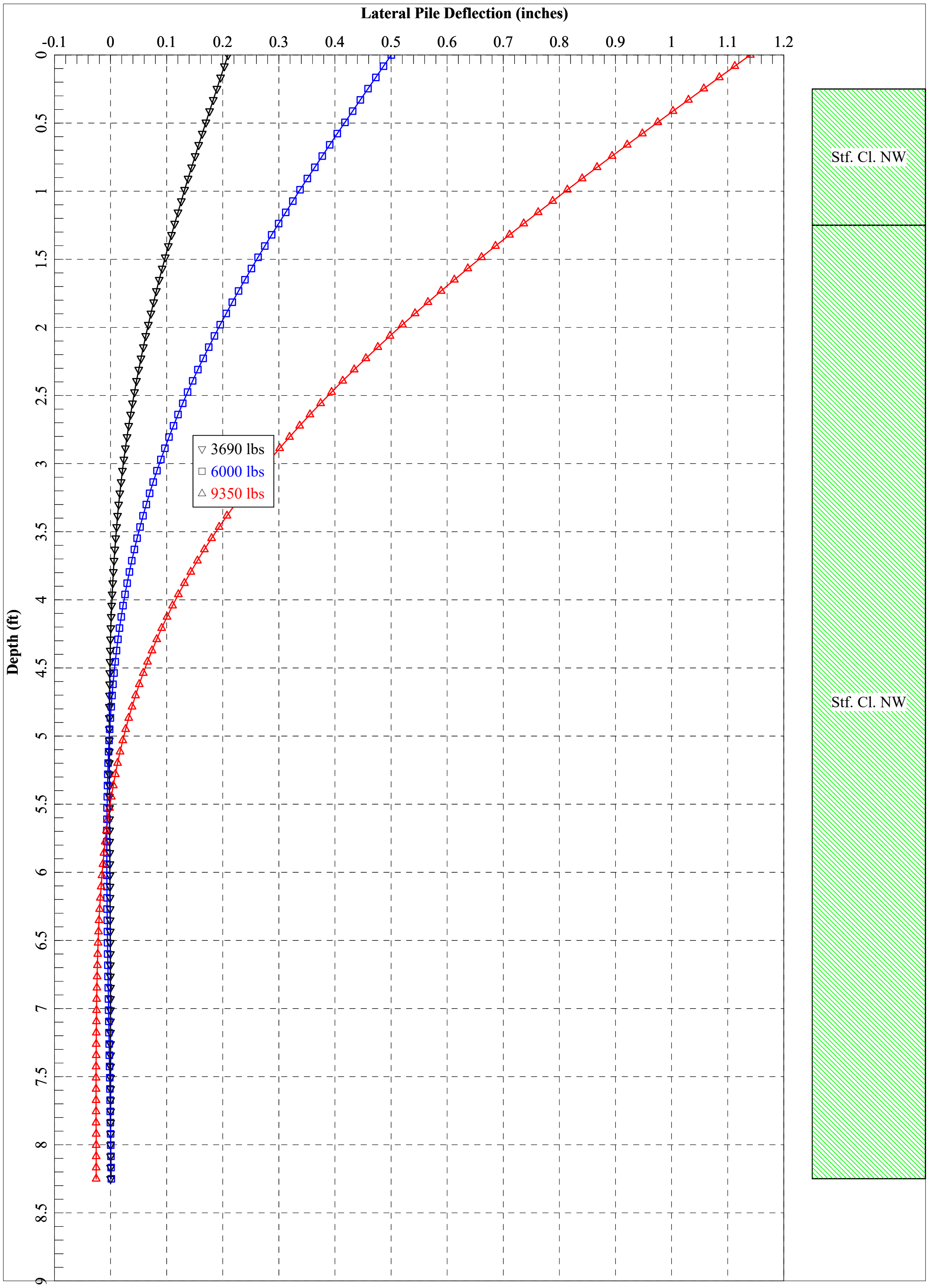

Lateral Load (kips)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
8
Computed by LPile
Measured in Load Test
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2
1.3
1.4
Pile-head Deflection (in)

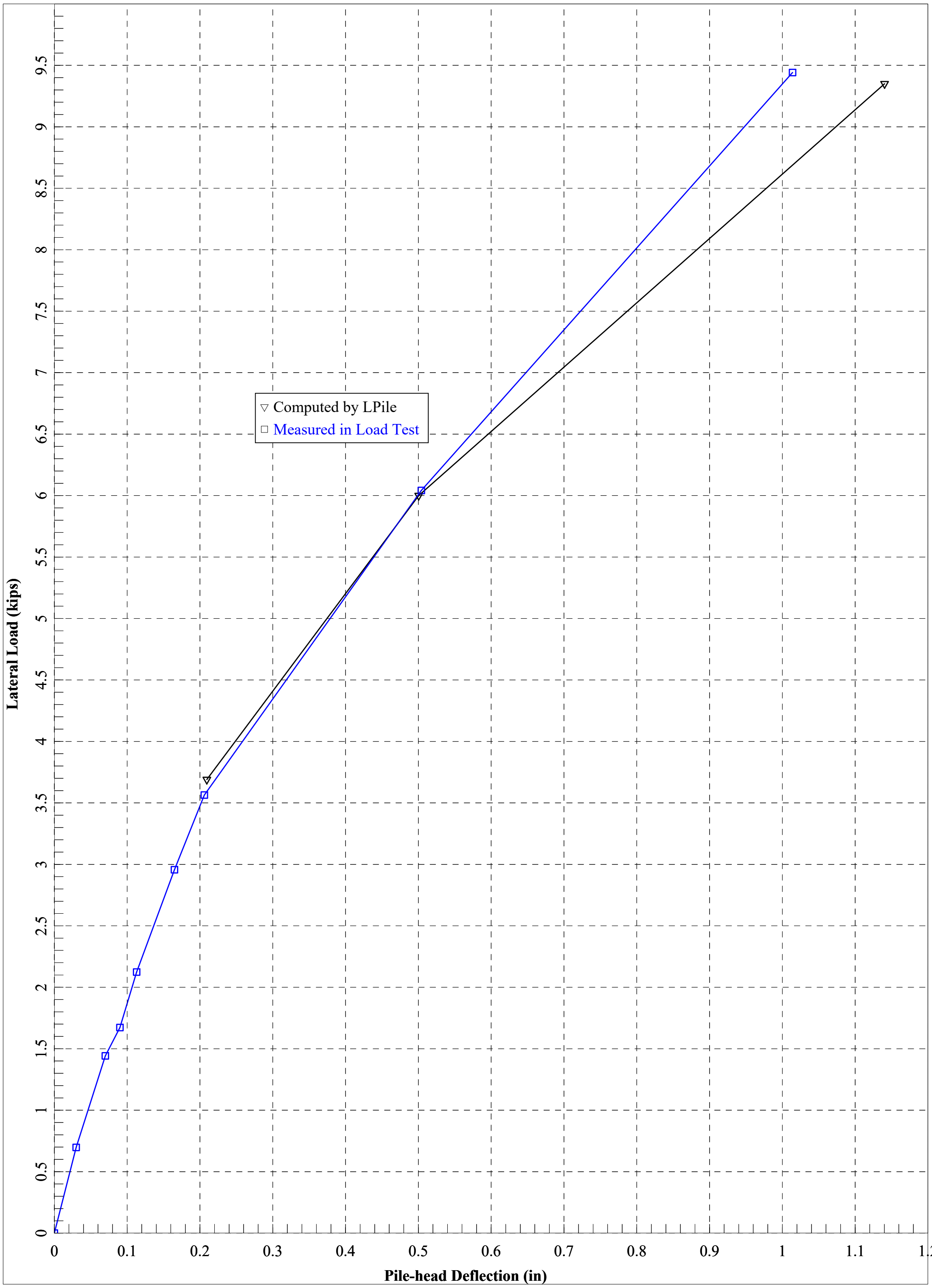
G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-11A - 5.5ft



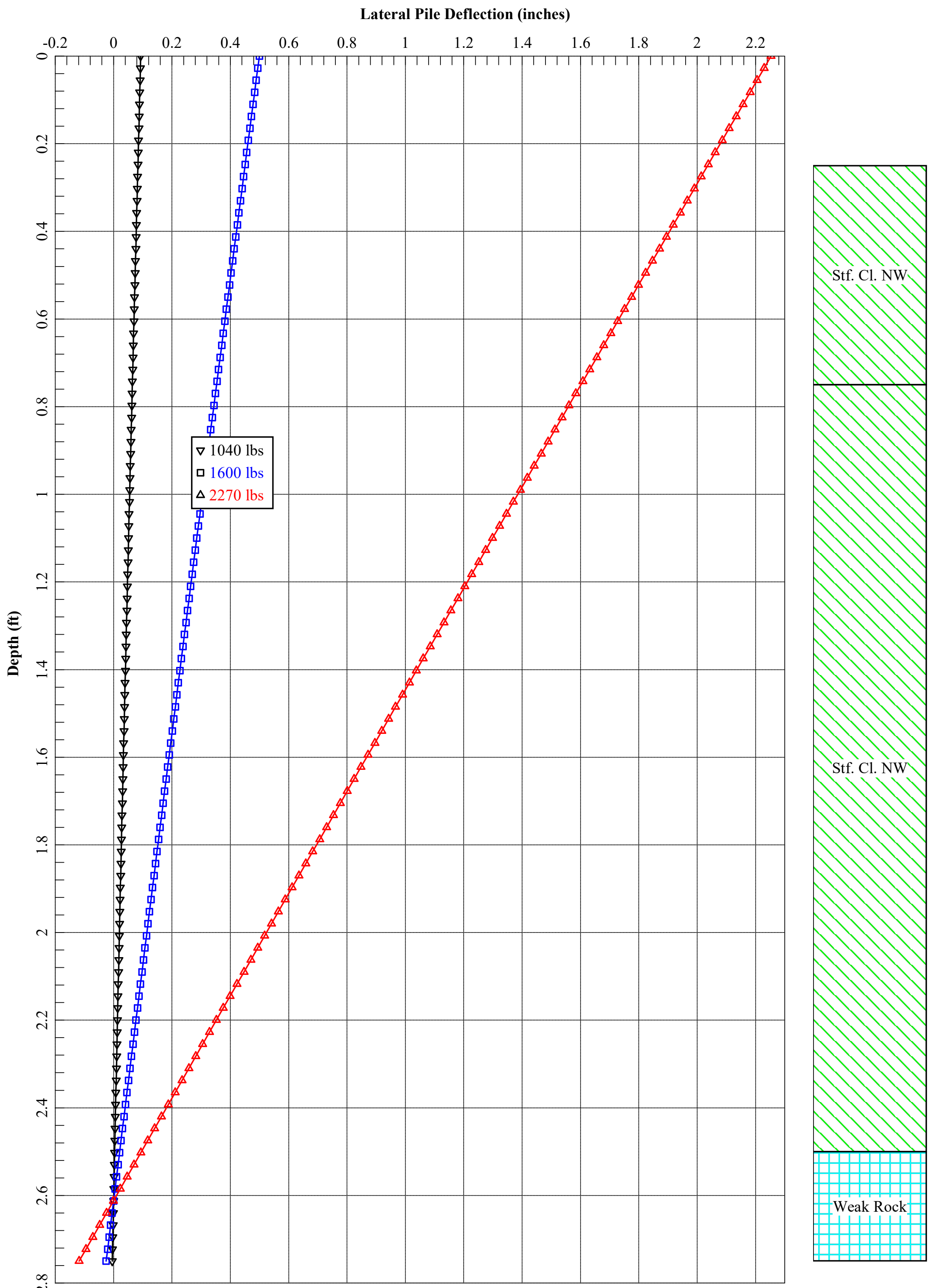

Computed by LPile
Measured in Load Test
Lateral Load (kips)
Pile-head Deflection (in)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
8
0.1
0.2
0.3
0.4
0.6
0.7
0.8
0.9
1.1
1.2

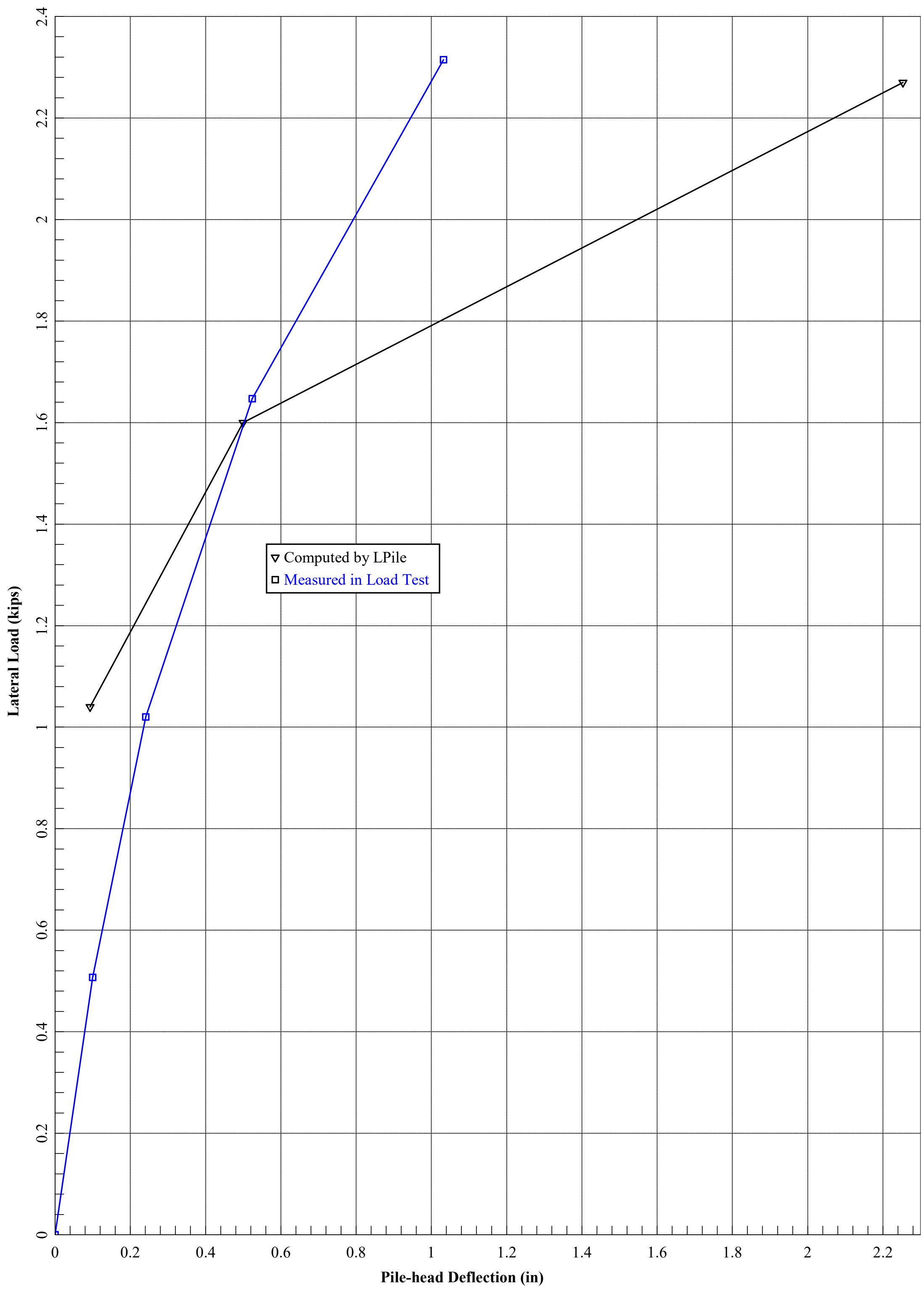
G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-11B - 8ft



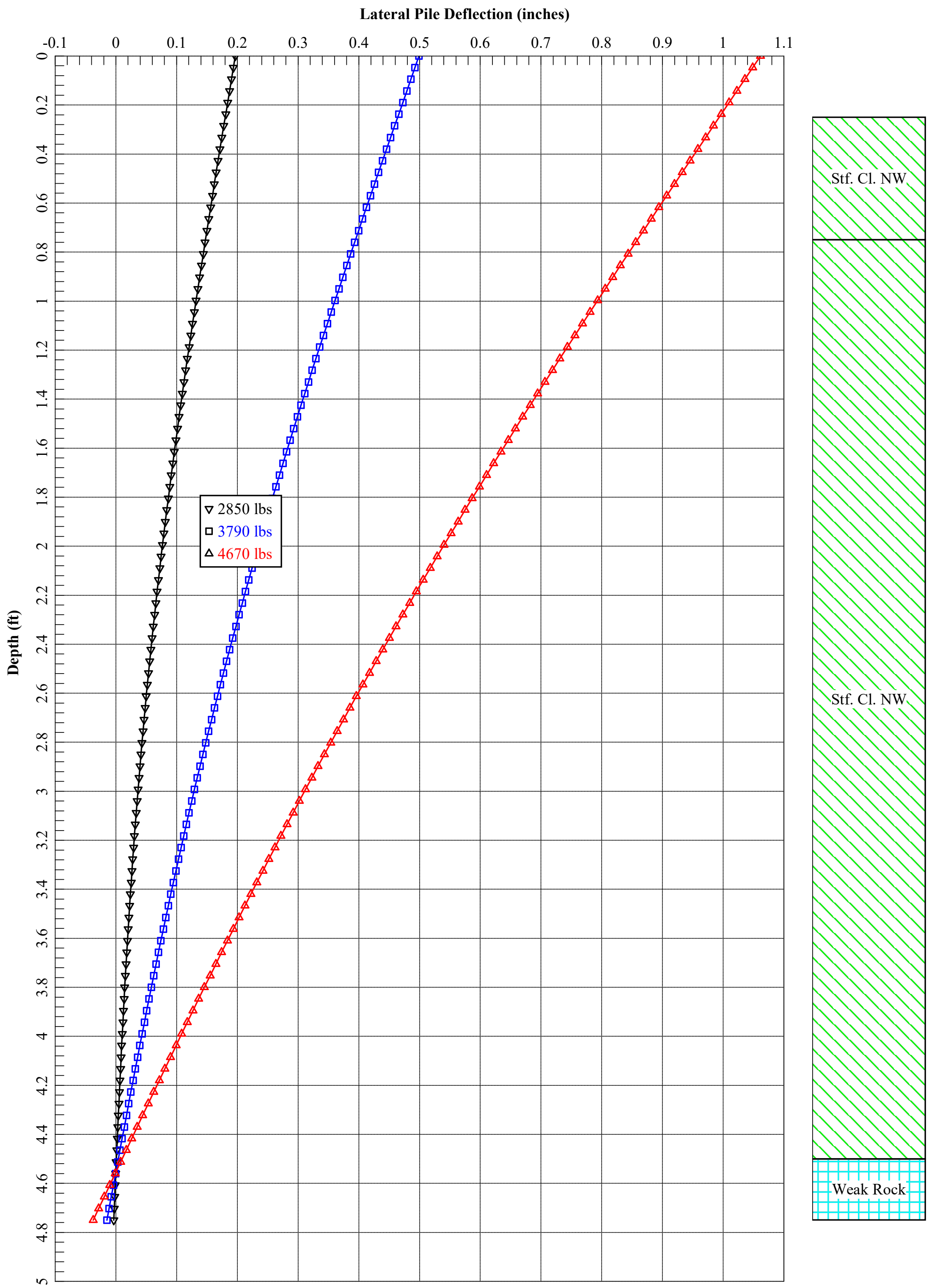

Computed by LPile
Measured in Load Test
Lateral Load (kips)
Pile-head Deflection (in)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
8
8.5
9
9.5

G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-12A - 2.5ft

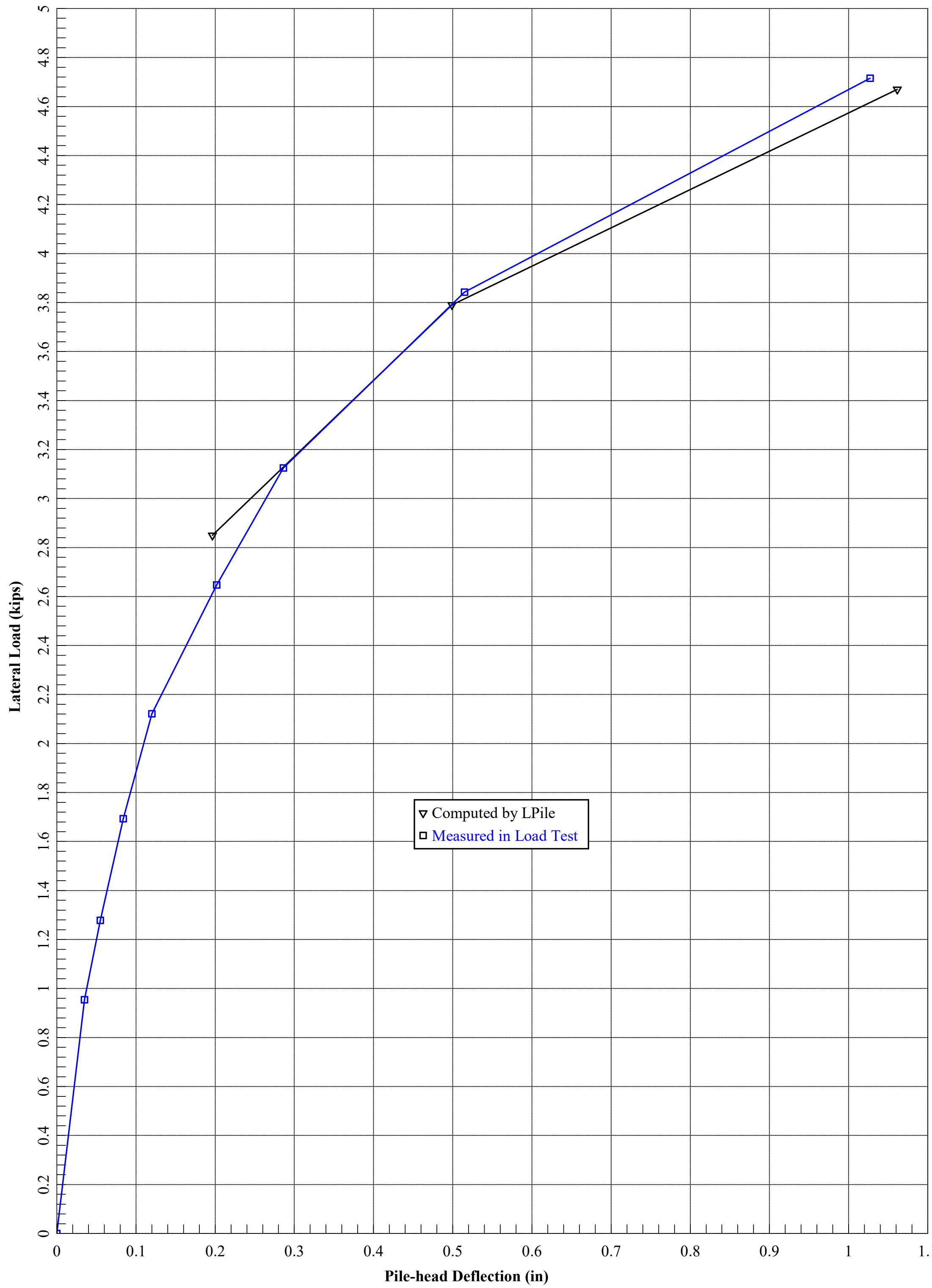



Lateral Load (kips)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
Pile-head Deflection (in)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
Computed by LPile
Measured in Load Test

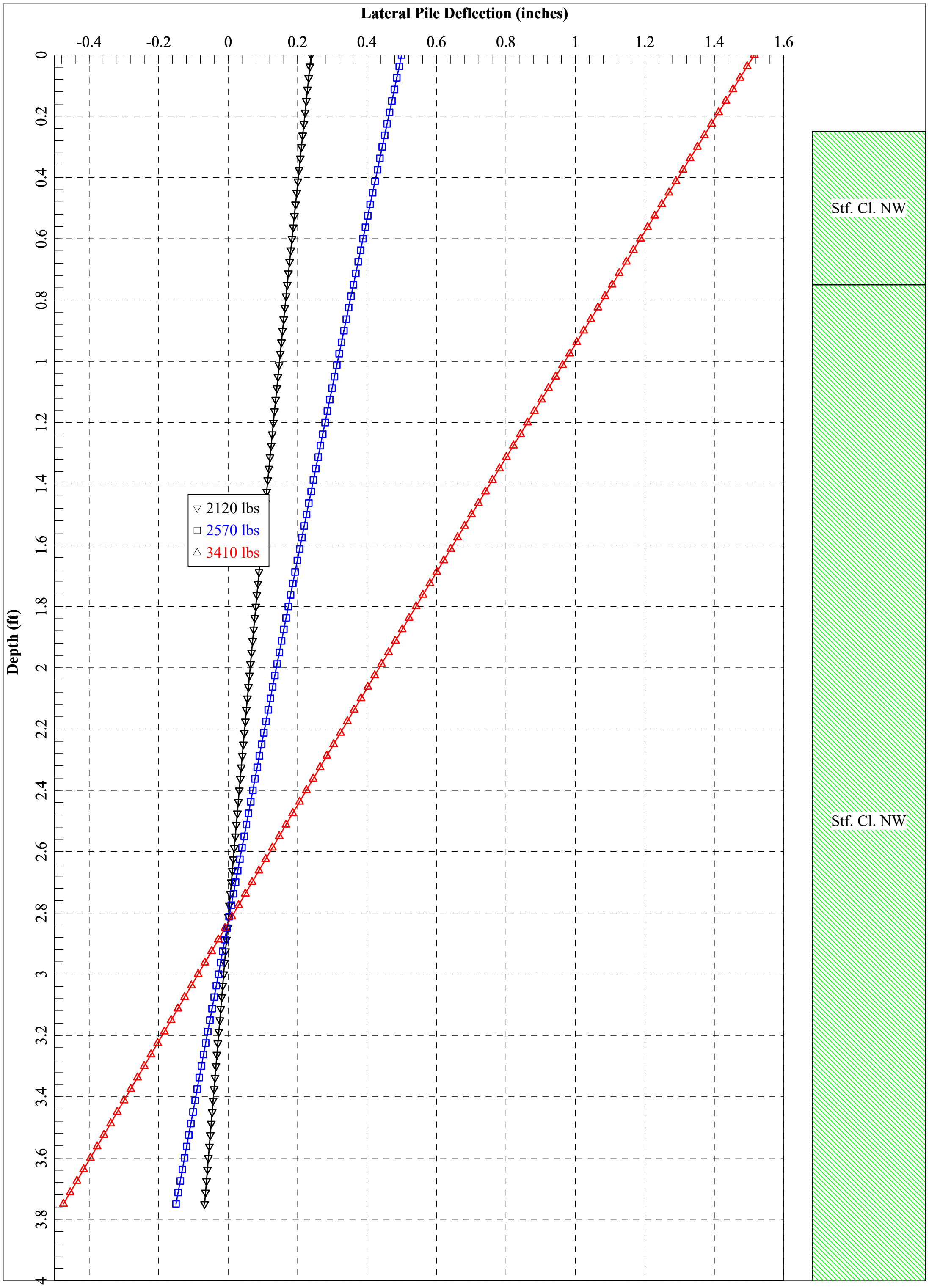
G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-12B - 4.5ft



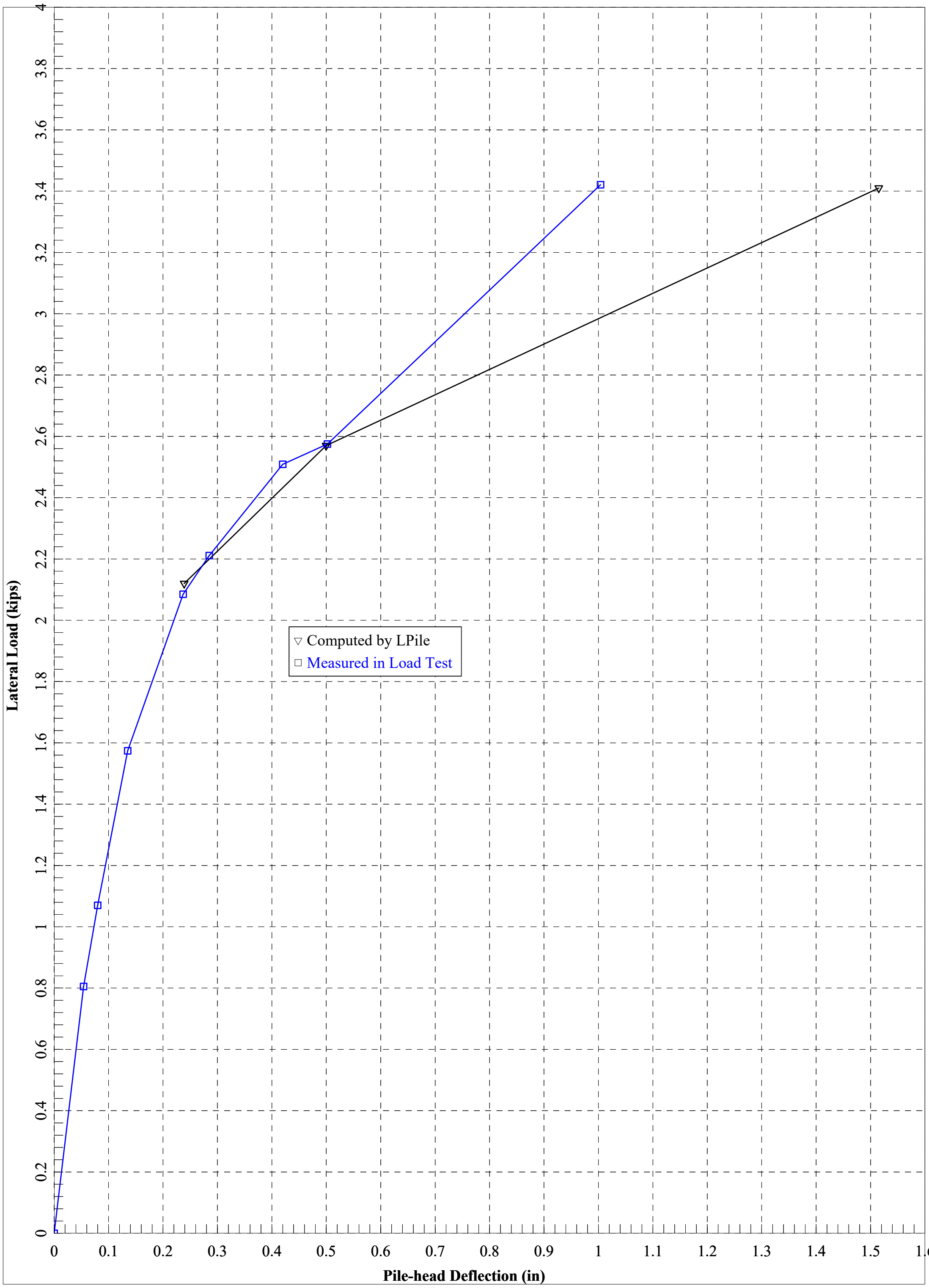
G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-12B - 4.5ft



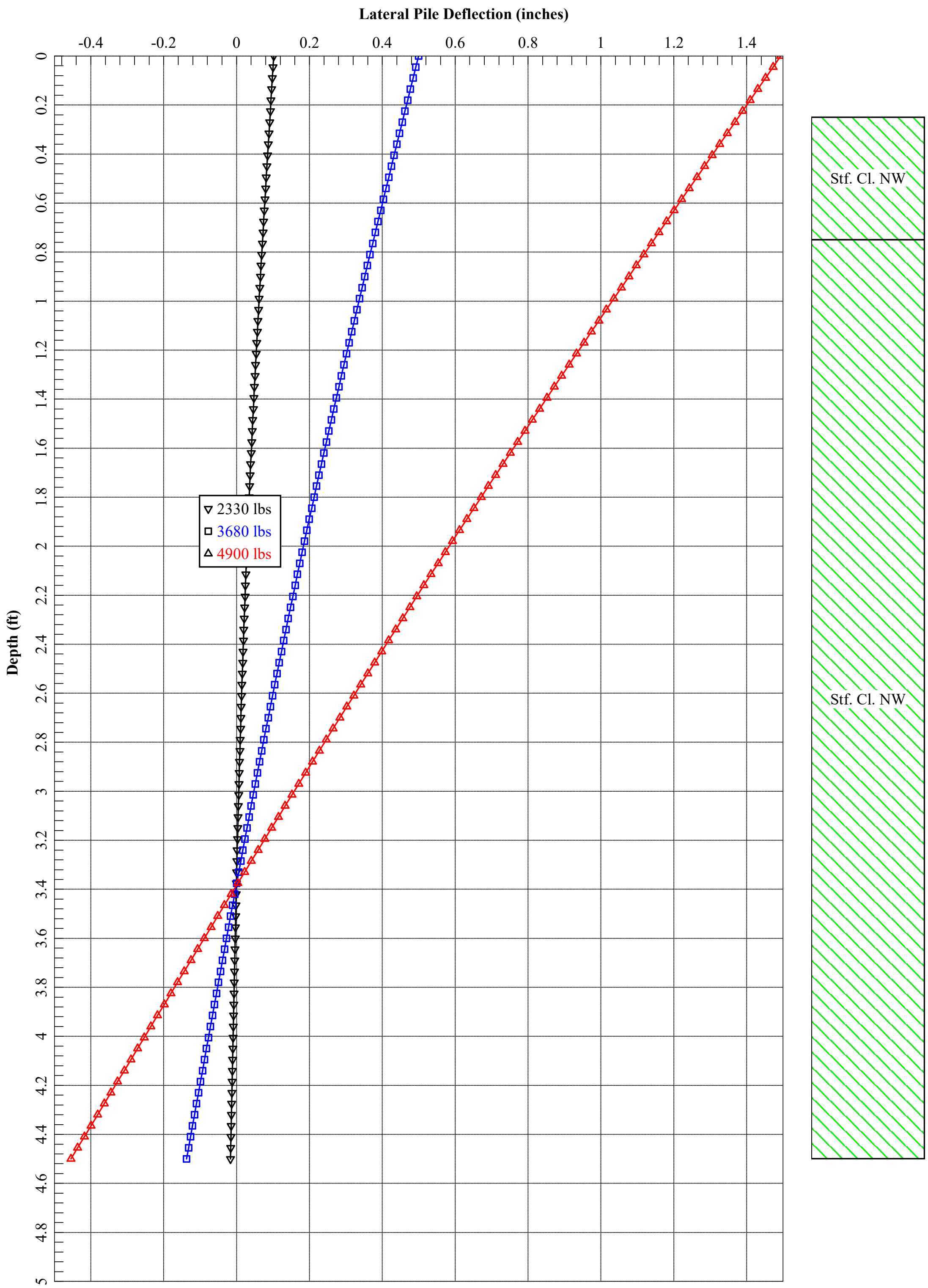
G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-13A - 3.5ft



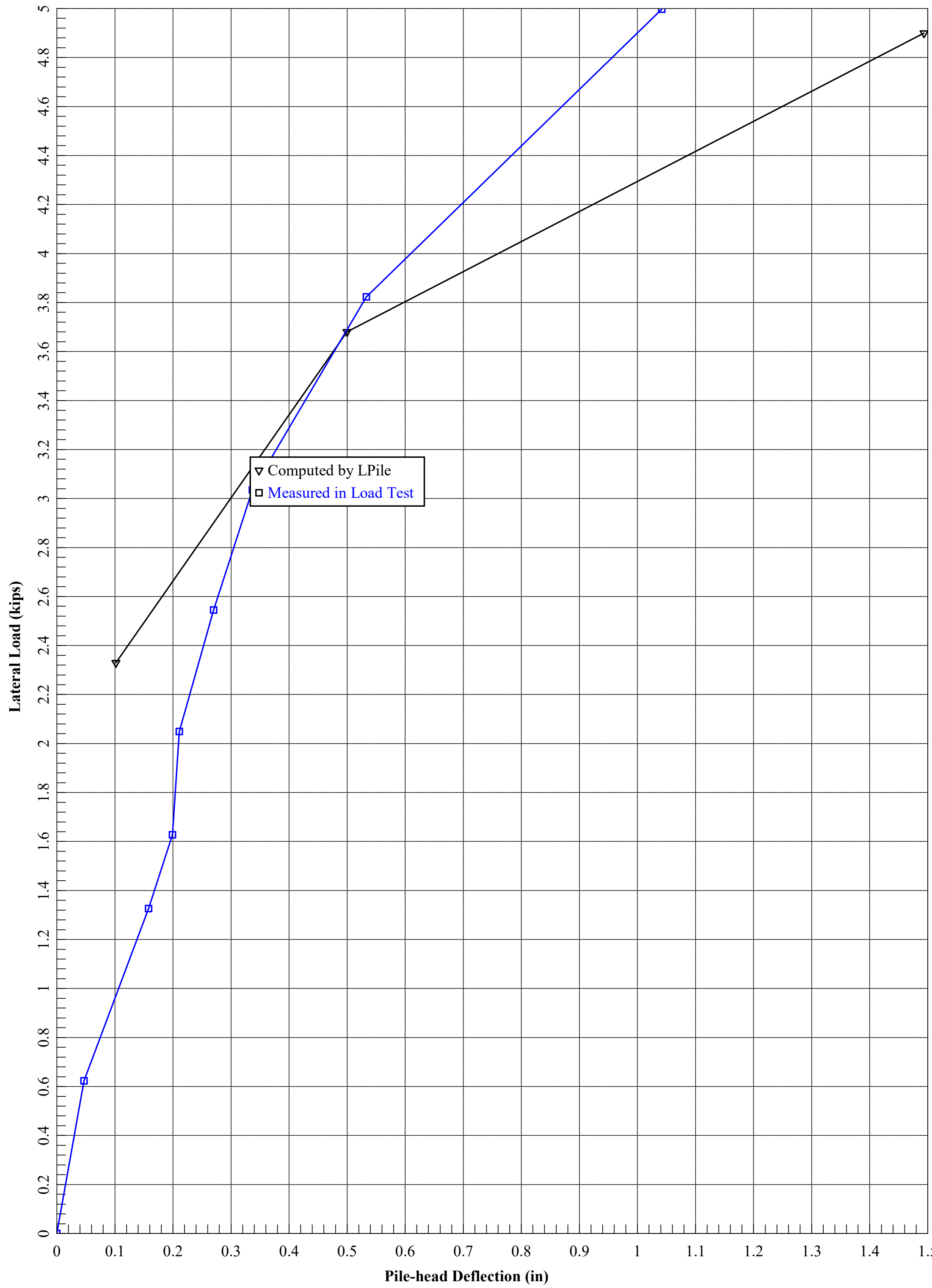
G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-13A - 3.5ft



G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-13B - 4.25ft



G2 Consulting Group, LLC
Mercer County Solar Power Plant
TP-13B - 4.25ft



```
===============================================================================

                    LPile for Windows, Version 2016-09.011

                Analysis of Individual Piles and Drilled Shafts
               Subjected to Lateral Loading Using the p-y Method
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                              All Rights Reserved

===============================================================================

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G2 Consulting Group, LLC

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is a violation of the software license agreement.

-------------------------------------------------------------------------------
                            Files Used for Analysis
-------------------------------------------------------------------------------

Path to file locations:
\\troy\geotechnical\2019 Geotechnical\003 Ann Arbor\193508 (j) Merccer Co Solar KY - Savion\Analysis\LPile\Cap Areas\

Name of input data file:
Capacity Area No. 1 - 3ft.lp9d

Name of output report file:
Capacity Area No. 1 - 3ft.lp9o

Name of plot output file:
Capacity Area No. 1 - 3ft.lp9p

Name of runtime message file:
Capacity Area No. 1 - 3ft.lp9r


-------------------------------------------------------------------------------
                           Date and Time of Analysis
-------------------------------------------------------------------------------

               Date:  December 27, 2019          Time:  16:05:02


-------------------------------------------------------------------------------
                                 Problem Title
-------------------------------------------------------------------------------

Project Name: Mercer County Solar Power Plant

Job Number: 193508

Client: Savion, LLC

Engineer: KAC

Description: Capacity Area 1 - 3ft



-------------------------------------------------------------------------------
                          Program Options and Settings
-------------------------------------------------------------------------------

Computational Options:
 - Use unfactored loads in computations (conventional analysis)
Engineering Units Used for Data Input and Computations:
 - US Customary System Units (pounds, feet, inches)

Analysis Control Options:
 - Maximum number of iterations allowed               =          500
 - Deflection tolerance for convergence               =   1.0000E-05 in
 - Maximum allowable deflection                       =     100.0000 in
 - Number of pile increments                          =          100

Loading Type and Number of Cycles of Loading:
 - Cyclic loading specified
 - Number of cycles of loading                        =         1000 cycles
 - Use of p-y modification factors for p-y curves not selected
 - Analysis uses layering correction (Method of Georgiadis)
```

```
 - Layering correction is not computed if soil above is of same type
 - No distributed lateral loads are entered
 - Loading by lateral soil movements acting on pile not selected
 - Input of shear resistance at the pile tip not selected
 - Computation of pile-head foundation stiffness matrix not selected
 - Push-over analysis of pile not selected
 - Buckling analysis of pile not selected

Output Options:
 - Output files use decimal points to denote decimal symbols.
 - Values of pile-head deflection, bending moment, shear force, and
   soil reaction are printed for full length of pile.
 - Printing Increment (nodal spacing of output points) = 1
 - No p-y curves to be computed and reported for user-specified depths
 - Print using wide report formats



--------------------------------------------------------------------------------
                    Pile Structural Properties and Geometry
--------------------------------------------------------------------------------

Number of pile sections defined                         =           1
Total length of pile                                    =       3.250 ft
Depth of ground surface below top of pile               =      0.2500 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over
the length of the pile. A summary of values of pile diameter vs. depth follows.

            Depth Below          Pile
Point       Pile Head          Diameter
 No.          feet              inches
-----      -------------     -------------
  1            0.000            3.9400
  2            3.250            3.9400


Input Structural Properties for Pile Sections:
----------------------------------------------

Pile Section No. 1:

   Section 1 is an elastic pile
   Cross-sectional Shape                               = Strong H-Pile
   Length of section                                   =     3.250000 ft
   Flange Width                                        =     3.940000 in
   Section Depth                                       =     5.900000 in
   Flange Thickness                                    =     0.215000 in
   Web Thickness                                       =     0.170000 in
   Section Area                                        =     2.680000 sq. in
   Moment of Inertia                                   =    16.400000 in^4
   Elastic Modulus                                     =    29000000. psi



--------------------------------------------------------------------------------
                      Ground Slope and Pile Batter Angles
--------------------------------------------------------------------------------

Ground Slope Angle                                      =       0.000 degrees
                                                        =       0.000 radians

Pile Batter Angle                                       =       0.000 degrees
                                                        =       0.000 radians


--------------------------------------------------------------------------------
                      Soil and Rock Layering Information
--------------------------------------------------------------------------------

The soil profile is modelled using 2 layers

Layer 1 is stiff clay without free water

   Distance from top of pile to top of layer           =     0.250000 ft
   Distance from top of pile to bottom of layer        =     2.250000 ft
   Effective unit weight at top of layer               =   115.000000 pcf
   Effective unit weight at bottom of layer            =   115.000000 pcf
   Undrained cohesion at top of layer                  =   500.000000 psf
   Undrained cohesion at bottom of layer               =   500.000000 psf
   Epsilon-50 at top of layer                          =     0.020000
   Epsilon-50 at bottom of layer                       =     0.020000


Layer 2 is weak rock, p-y criteria by Reese, 1997

   Distance from top of pile to top of layer           =     2.250000 ft
```

```
   Distance from top of pile to bottom of layer       =    4.250000 ft
   Effective unit weight at top of layer              =  150.000000 pcf
   Effective unit weight at bottom of layer           =  150.000000 pcf
   Uniaxial compressive strength at top of layer      =  150.000000 psi
   Uniaxial compressive strength at bottom of layer   =  150.000000 psi
   Initial modulus of rock at top of layer            =     100000. psi
   Initial modulus of rock at bottom of layer         =     100000. psi
   RQD of rock at top of layer                        =      0.0000 %
   RQD of rock at bottom of layer                     =      0.0000 %
   k rm of rock at top of layer                       =   0.0005000
   k rm of rock at bottom of layer                    =   0.0005000
```

(Depth of the lowest soil layer extends 1.000 ft below the pile tip)

**** Warning - Possible Input Data Error ****

Values entered for effective unit weight of rock were outside the limits of 50 pcf to 150 pcf.

The maximum input value, in layer 1, for effective unit weight = 150.00 pcf

This data may be erroneous. Please check your data.

Summary of Input Soil Properties

Layer Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Undrained Cohesion psf	Uniaxial qu psi	RQD %	E50 or krm	Rock Mass Modulus psi
1	Stiff Clay	0.2500	115.0000	500.0000	--	--	0.02000	--
	w/o Free Water	2.2500	115.0000	500.0000	--	--	0.02000	--
2	Weak	2.2500	150.0000	--	150.0000	0.00	5.00E-04	100000.
	Rock	4.2500	150.0000	--	150.0000	0.00	5.00E-04	100000.

Cyclic Loading Type

Cyclic loading criteria were used for computation of p-y curves for all analyses.

Number of cycles of loading = 1000

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	4	y = 0.500000 in	M = 0.0000 in-lbs	0.0000000	N.A.

V = shear force applied normal to pile axis
M = bending moment applied to pile head
y = lateral deflection normal to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applied to pile head
Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).
Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Moment-curvature properties were derived from elastic section properties

---

Layering Correction Equivalent Depths of Soil & Rock Layers

Top of   Equivalent

Layer No.	Layer Below Pile Head ft	Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.2500	0.00	N.A.	No	0.00	1703.
2	2.2500	2.0000	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 0.0 in-lbs
Axial load at pile head = 0.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness in-lb^2	Soil Res. p lb/inch	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.5000	0.00	1991.	-0.01503	0.00	4.76E+08	0.00	0.00	0.00
0.03250	0.4941	776.4463	1991.	-0.01503	93.2682	4.76E+08	0.00	0.00	0.00
0.06500	0.4883	1553.	1991.	-0.01503	186.5365	4.76E+08	0.00	0.00	0.00
0.09750	0.4824	2329.	1991.	-0.01503	279.8047	4.76E+08	0.00	0.00	0.00
0.1300	0.4766	3106.	1991.	-0.01503	373.0730	4.76E+08	0.00	0.00	0.00
0.1625	0.4707	3882.	1991.	-0.01502	466.3412	4.76E+08	0.00	0.00	0.00
0.1950	0.4648	4659.	1991.	-0.01502	559.6095	4.76E+08	0.00	0.00	0.00
0.2275	0.4590	5435.	1991.	-0.01502	652.8777	4.76E+08	0.00	0.00	0.00
0.2600	0.4531	6212.	1987.	-0.01501	746.1459	4.76E+08	-19.6505	16.9130	0.00
0.2925	0.4473	6985.	1979.	-0.01501	839.0552	4.76E+08	-19.9565	17.4011	0.00
0.3250	0.4414	7755.	1971.	-0.01500	931.5998	4.76E+08	-20.2594	17.8994	0.00
0.3575	0.4356	8523.	1964.	-0.01499	1024.	4.76E+08	-20.5593	18.4083	0.00
0.3900	0.4297	9287.	1955.	-0.01499	1116.	4.76E+08	-20.8561	18.9280	0.00
0.4225	0.4239	10048.	1947.	-0.01498	1207.	4.76E+08	-21.1497	19.4590	0.00
0.4550	0.4180	10806.	1939.	-0.01497	1298.	4.76E+08	-21.4400	20.0017	0.00
0.4875	0.4122	11560.	1931.	-0.01496	1389.	4.76E+08	-21.7271	20.5565	0.00
0.5200	0.4064	12312.	1922.	-0.01495	1479.	4.76E+08	-22.0108	21.1239	0.00
0.5525	0.4005	13060.	1913.	-0.01494	1569.	4.76E+08	-22.2912	21.7042	0.00
0.5850	0.3947	13804.	1905.	-0.01493	1658.	4.76E+08	-22.5681	22.2981	0.00
0.6175	0.3889	14545.	1896.	-0.01492	1747.	4.76E+08	-22.8415	22.9059	0.00
0.6500	0.3831	15283.	1887.	-0.01490	1836.	4.76E+08	-23.1114	23.5284	0.00
0.6825	0.3773	16017.	1878.	-0.01489	1924.	4.76E+08	-23.3776	24.1659	0.00
0.7150	0.3715	16747.	1869.	-0.01488	2012.	4.76E+08	-23.6402	24.8192	0.00
0.7475	0.3657	17474.	1859.	-0.01486	2099.	4.76E+08	-23.8989	25.4888	0.00
0.7800	0.3599	18198.	1850.	-0.01485	2186.	4.76E+08	-24.1539	26.1755	0.00
0.8125	0.3541	18917.	1840.	-0.01483	2272.	4.76E+08	-24.4050	26.8800	0.00
0.8450	0.3483	19633.	1831.	-0.01482	2358.	4.76E+08	-24.6521	27.6029	0.00
0.8775	0.3425	20345.	1821.	-0.01480	2444.	4.76E+08	-24.8952	28.3451	0.00
0.9100	0.3368	21054.	1811.	-0.01479	2529.	4.76E+08	-25.1341	29.1074	0.00
0.9425	0.3310	21758.	1802.	-0.01477	2614.	4.76E+08	-25.3688	29.8908	0.00
0.9750	0.3252	22459.	1792.	-0.01475	2698.	4.76E+08	-25.5993	30.6961	0.00
1.0075	0.3195	23156.	1782.	-0.01473	2782.	4.76E+08	-25.8253	31.5243	0.00
1.0400	0.3138	23849.	1772.	-0.01471	2865.	4.76E+08	-26.0469	32.3766	0.00
1.0725	0.3080	24538.	1761.	-0.01469	2948.	4.76E+08	-26.2639	33.2541	0.00
1.1050	0.3023	25223.	1751.	-0.01467	3030.	4.76E+08	-26.4763	34.1579	0.00
1.1375	0.2966	25904.	1741.	-0.01465	3112.	4.76E+08	-26.6838	35.0894	0.00
1.1700	0.2909	26580.	1730.	-0.01463	3193.	4.76E+08	-26.8865	36.0499	0.00
1.2025	0.2852	27253.	1720.	-0.01461	3274.	4.76E+08	-27.0842	37.0409	0.00
1.2350	0.2795	27922.	1709.	-0.01458	3354.	4.76E+08	-27.2768	38.0641	0.00
1.2675	0.2738	28586.	1698.	-0.01456	3434.	4.76E+08	-27.4641	39.1210	0.00
1.3000	0.2681	29247.	1688.	-0.01454	3513.	4.76E+08	-27.6460	40.2136	0.00
1.3325	0.2625	29903.	1677.	-0.01451	3592.	4.76E+08	-27.8225	41.3437	0.00
1.3650	0.2568	30555.	1666.	-0.01449	3670.	4.76E+08	-27.9932	42.5135	0.00
1.3975	0.2512	31202.	1655.	-0.01446	3748.	4.76E+08	-28.1582	43.7253	0.00
1.4300	0.2455	31846.	1644.	-0.01444	3825.	4.76E+08	-28.3171	44.9815	0.00
1.4625	0.2399	32485.	1633.	-0.01441	3902.	4.76E+08	-28.4699	46.2847	0.00
1.4950	0.2343	33119.	1622.	-0.01438	3978.	4.76E+08	-28.6164	47.6378	0.00
1.5275	0.2287	33750.	1611.	-0.01436	4054.	4.76E+08	-28.7564	49.0440	0.00
1.5600	0.2231	34376.	1599.	-0.01433	4129.	4.76E+08	-28.8896	50.5067	0.00
1.5925	0.2175	34997.	1588.	-0.01430	4204.	4.76E+08	-29.0159	52.0296	0.00
1.6250	0.2119	35614.	1577.	-0.01427	4278.	4.76E+08	-29.1350	53.6166	0.00
1.6575	0.2064	36227.	1565.	-0.01424	4352.	4.76E+08	-29.2467	55.2723	0.00
1.6900	0.2008	36835.	1554.	-0.01421	4425.	4.76E+08	-29.3508	57.0015	0.00
1.7225	0.1953	37439.	1543.	-0.01418	4497.	4.76E+08	-29.4469	58.8096	0.00
1.7550	0.1898	38038.	1531.	-0.01415	4569.	4.76E+08	-29.5348	60.7024	0.00
1.7875	0.1842	38633.	1519.	-0.01412	4641.	4.76E+08	-29.6141	62.6865	0.00
1.8200	0.1787	39224.	1508.	-0.01409	4712.	4.76E+08	-29.6846	64.7691	0.00
1.8525	0.1733	39809.	1496.	-0.01405	4782.	4.76E+08	-29.7457	66.9583	0.00
1.8850	0.1678	40391.	1485.	-0.01402	4852.	4.76E+08	-29.7972	69.2629	0.00
1.9175	0.1623	40968.	1473.	-0.01399	4921.	4.76E+08	-29.8387	71.6931	0.00

1.9500	0.1569	41540.	1461.	-0.01395	4990.	4.76E+08	-29.8696	74.2602	0.00
1.9825	0.1514	42107.	1450.	-0.01392	5058.	4.76E+08	-29.8894	76.9767	0.00
2.0150	0.1460	42671.	1438.	-0.01389	5126.	4.76E+08	-29.8976	79.8572	0.00
2.0475	0.1406	43229.	1426.	-0.01385	5193.	4.76E+08	-29.8937	82.9179	0.00
2.0800	0.1352	43783.	1415.	-0.01381	5259.	4.76E+08	-29.8768	86.1777	0.00
2.1125	0.1298	44333.	1403.	-0.01378	5325.	4.76E+08	-29.8464	89.6578	0.00
2.1450	0.1245	44878.	1392.	-0.01374	5391.	4.76E+08	-29.8016	93.3831	0.00
2.1775	0.1191	45418.	1380.	-0.01370	5456.	4.76E+08	-29.7415	97.3822	0.00
2.2100	0.1138	45954.	1368.	-0.01367	5520.	4.76E+08	-29.6650	101.6889	0.00
2.2425	0.1084	46485.	1357.	-0.01363	5584.	4.76E+08	-29.5712	106.3424	0.00
2.2750	0.1031	47012.	1223.	-0.01359	5647.	4.76E+08	-653.9569	2473.	0.00
2.3075	0.09785	47440.	952.4863	-0.01355	5699.	4.76E+08	-735.8481	2933.	0.00
2.3400	0.09257	47755.	649.5370	-0.01351	5736.	4.76E+08	-817.7382	3445.	0.00
2.3725	0.08731	47946.	314.6507	-0.01347	5759.	4.76E+08	-899.6270	4019.	0.00
2.4050	0.08206	48001.	-52.1718	-0.01343	5766.	4.76E+08	-981.5141	4665.	0.00
2.4375	0.07683	47906.	-450.9299	-0.01340	5755.	4.76E+08	-1063.	5398.	0.00
2.4700	0.07161	47649.	-881.6227	-0.01336	5724.	4.76E+08	-1145.	6237.	0.00
2.5025	0.06641	47218.	-1344.	-0.01332	5672.	4.76E+08	-1227.	7206.	0.00
2.5350	0.06123	46600.	-1839.	-0.01328	5598.	4.76E+08	-1309.	8338.	0.00
2.5675	0.05605	45784.	-2365.	-0.01324	5500.	4.76E+08	-1391.	9677.	0.00
2.6000	0.05090	44756.	-2924.	-0.01320	5376.	4.76E+08	-1473.	11285.	0.00
2.6325	0.04576	43503.	-3514.	-0.01317	5226.	4.76E+08	-1555.	13251.	0.00
2.6650	0.04063	42015.	-4136.	-0.01313	5047.	4.76E+08	-1636.	15709.	0.00
2.6975	0.03551	40277.	-4791.	-0.01310	4838.	4.76E+08	-1718.	18871.	0.00
2.7300	0.03041	38278.	-5473.	-0.01307	4598.	4.76E+08	-1784.	22881.	0.00
2.7625	0.02532	36008.	-6169.	-0.01304	4325.	4.76E+08	-1782.	27444.	0.00
2.7950	0.02024	33466.	-6859.	-0.01301	4020.	4.76E+08	-1758.	33871.	0.00
2.8275	0.01517	30658.	-7534.	-0.01298	3683.	4.76E+08	-1704.	43789.	0.00
2.8600	0.01012	27590.	-8179.	-0.01296	3314.	4.76E+08	-1601.	61713.	0.00
2.8925	0.00507	24278.	-8763.	-0.01294	2916.	4.76E+08	-1398.	107562.	0.00
2.9250	2.66E-05	20754.	-9097.	-0.01292	2493.	4.76E+08	-315.9184	4626337.	0.00
2.9575	-0.00501	17182.	-8866.	-0.01290	2064.	4.76E+08	1501.	116873.	0.00
2.9900	-0.01004	13838.	-8214.	-0.01289	1662.	4.76E+08	1846.	71730.	0.00
3.0225	-0.01506	10776.	-7442.	-0.01288	1294.	4.76E+08	2111.	54658.	0.00
3.0550	-0.02008	8034.	-6574.	-0.01287	965.0100	4.76E+08	2341.	45466.	0.00
3.0875	-0.02510	5648.	-5620.	-0.01287	678.4200	4.76E+08	2553.	39662.	0.00
3.1200	-0.03012	3650.	-4585.	-0.01286	438.4696	4.76E+08	2753.	35643.	0.00
3.1525	-0.03513	2071.	-3490.	-0.01286	248.8100	4.76E+08	2866.	31815.	0.00
3.1850	-0.04015	928.3492	-2356.	-0.01286	111.5151	4.76E+08	2948.	28636.	0.00
3.2175	-0.04516	233.7623	-1190.	-0.01286	28.0800	4.76E+08	3030.	26163.	0.00
3.2500	-0.05018	0.00	0.00	-0.01286	0.00	4.76E+08	3074.	11945.	0.00

* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

```
Pile-head deflection            =     0.50000000 inches
Computed slope at pile head     =    -0.01503088 radians
Maximum bending moment          =         48001. inch-lbs
Maximum shear force             =         -9097. lbs
Depth of maximum bending moment =     2.40500000 feet below pile head
Depth of maximum shear force    =     2.92500000 feet below pile head
Number of iterations            =             18
Number of zero deflection points =             1
```

Summary of Pile-head Responses for Conventional Analyses

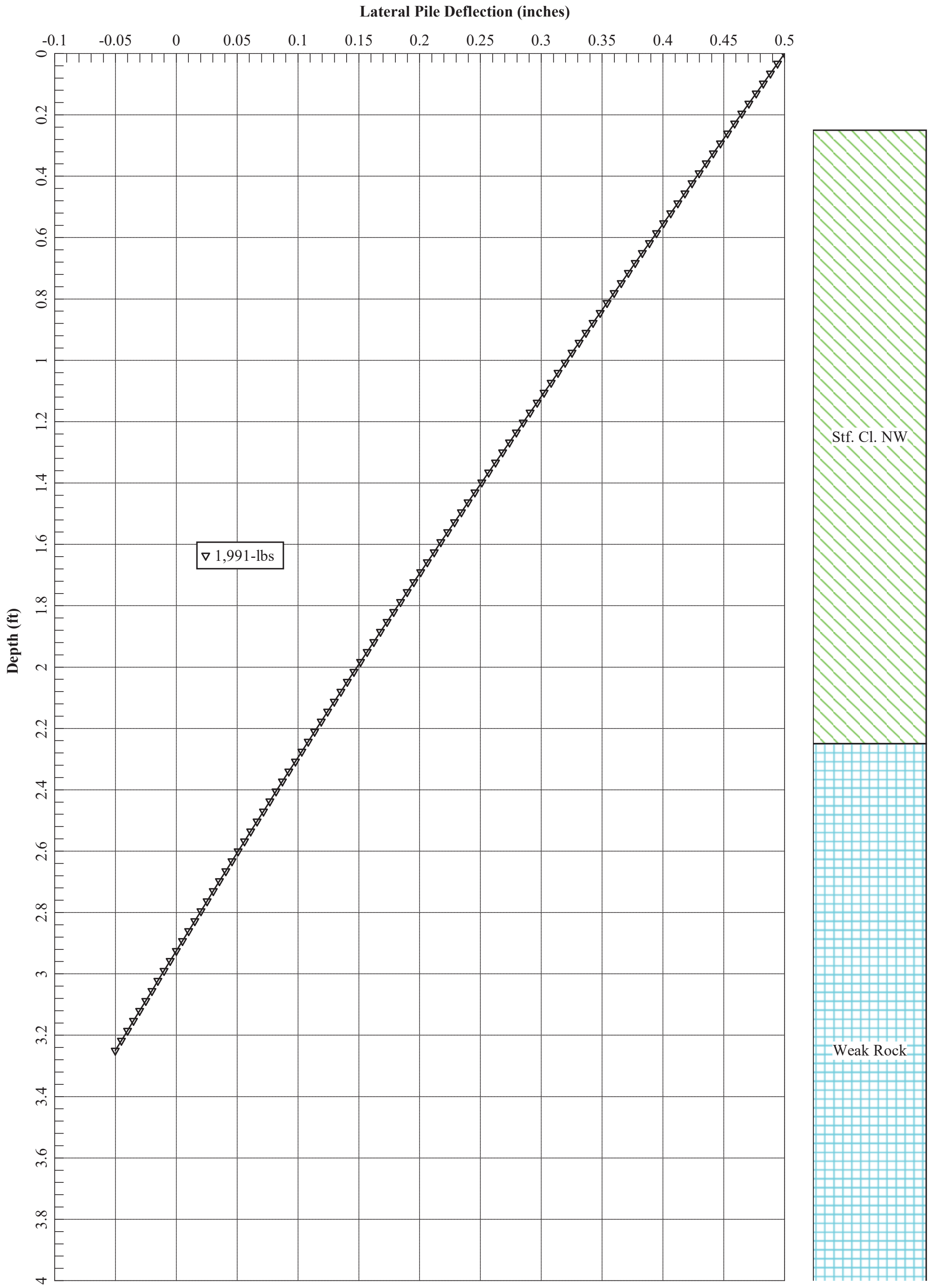
Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	y, in	0.5000	M, in-lb	0.00	0.00	0.5000	-0.01503	-9097.	48001.

Maximum pile-head deflection = 0.5000000000 inches
Maximum pile-head rotation = -0.0150308765 radians = -0.861206 deg.

The analysis ended normally.


Lateral Pile Deflection (inches)
-0.1
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
Depth (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8
4
1,991-lbs
Stf. Cl. NW
Weak Rock

```
===============================================================================

                    LPile for Windows, Version 2016-09.011

                Analysis of Individual Piles and Drilled Shafts
               Subjected to Lateral Loading Using the p-y Method
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===============================================================================

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-------------------------------------------------------------------------------
                            Files Used for Analysis
-------------------------------------------------------------------------------

Path to file locations:
\\troy\geotechnical\2019 Geotechnical\003 Ann Arbor\193508 (j) Merccer Co Solar KY - Savion\Analysis\LPile\Cap Areas\

Name of input data file:
Capacity Area No. 1 - 4ft.lp9d

Name of output report file:
Capacity Area No. 1 - 4ft.lp9o

Name of plot output file:
Capacity Area No. 1 - 4ft.lp9p

Name of runtime message file:
Capacity Area No. 1 - 4ft.lp9r


-------------------------------------------------------------------------------
                           Date and Time of Analysis
-------------------------------------------------------------------------------

              Date:  December 27, 2019          Time:  16:06:08


-------------------------------------------------------------------------------
                                 Problem Title
-------------------------------------------------------------------------------

Project Name: Mercer County Solar Power Plant

Job Number: 193508

Client: Savion, LLC

Engineer: KAC

Description: Capacity Area 1 - 4ft



-------------------------------------------------------------------------------
                          Program Options and Settings
-------------------------------------------------------------------------------

Computational Options:
 - Use unfactored loads in computations (conventional analysis)
Engineering Units Used for Data Input and Computations:
 - US Customary System Units (pounds, feet, inches)

Analysis Control Options:
 - Maximum number of iterations allowed               =          500
 - Deflection tolerance for convergence               =   1.0000E-05 in
 - Maximum allowable deflection                       =     100.0000 in
 - Number of pile increments                          =          100

Loading Type and Number of Cycles of Loading:
 - Cyclic loading specified
 - Number of cycles of loading                        =         1000 cycles
 - Use of p-y modification factors for p-y curves not selected
 - Analysis uses layering correction (Method of Georgiadis)
```

```
 - Layering correction is not computed if soil above is of same type
 - No distributed lateral loads are entered
 - Loading by lateral soil movements acting on pile not selected
 - Input of shear resistance at the pile tip not selected
 - Computation of pile-head foundation stiffness matrix not selected
 - Push-over analysis of pile not selected
 - Buckling analysis of pile not selected

Output Options:
 - Output files use decimal points to denote decimal symbols.
 - Values of pile-head deflection, bending moment, shear force, and
   soil reaction are printed for full length of pile.
 - Printing Increment (nodal spacing of output points) = 1
 - No p-y curves to be computed and reported for user-specified depths
 - Print using wide report formats



--------------------------------------------------------------------------------
                     Pile Structural Properties and Geometry
--------------------------------------------------------------------------------

Number of pile sections defined                        =           1
Total length of pile                                   =       4.250 ft
Depth of ground surface below top of pile              =      0.2500 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over
the length of the pile. A summary of values of pile diameter vs. depth follows.

            Depth Below          Pile
Point        Pile Head          Diameter
 No.           feet              inches
-----      -------------     -------------
  1            0.000            3.9400
  2            4.250            3.9400


Input Structural Properties for Pile Sections:
----------------------------------------------

Pile Section No. 1:

   Section 1 is an elastic pile
   Cross-sectional Shape                               = Strong H-Pile
   Length of section                                   =     4.250000 ft
   Flange Width                                        =     3.940000 in
   Section Depth                                       =     5.900000 in
   Flange Thickness                                    =     0.215000 in
   Web Thickness                                       =     0.170000 in
   Section Area                                        =     2.680000 sq. in
   Moment of Inertia                                   =    16.400000 in^4
   Elastic Modulus                                     =    29000000. psi



--------------------------------------------------------------------------------
                       Ground Slope and Pile Batter Angles
--------------------------------------------------------------------------------

Ground Slope Angle                                     =       0.000 degrees
                                                       =       0.000 radians

Pile Batter Angle                                      =       0.000 degrees
                                                       =       0.000 radians


--------------------------------------------------------------------------------
                       Soil and Rock Layering Information
--------------------------------------------------------------------------------

The soil profile is modelled using 2 layers

Layer 1 is stiff clay without free water

   Distance from top of pile to top of layer           =     0.250000 ft
   Distance from top of pile to bottom of layer        =     2.250000 ft
   Effective unit weight at top of layer               =   115.000000 pcf
   Effective unit weight at bottom of layer            =   115.000000 pcf
   Undrained cohesion at top of layer                  =   500.000000 psf
   Undrained cohesion at bottom of layer               =   500.000000 psf
   Epsilon-50 at top of layer                          =     0.020000
   Epsilon-50 at bottom of layer                       =     0.020000


Layer 2 is weak rock, p-y criteria by Reese, 1997

   Distance from top of pile to top of layer           =     2.250000 ft
```

```
   Distance from top of pile to bottom of layer       =     4.250000 ft
   Effective unit weight at top of layer              =   150.000000 pcf
   Effective unit weight at bottom of layer           =   150.000000 pcf
   Uniaxial compressive strength at top of layer      =   150.000000 psi
   Uniaxial compressive strength at bottom of layer   =   150.000000 psi
   Initial modulus of rock at top of layer            =      100000. psi
   Initial modulus of rock at bottom of layer         =      100000. psi
   RQD of rock at top of layer                        =       0.0000 %
   RQD of rock at bottom of layer                     =       0.0000 %
   k rm of rock at top of layer                       =    0.0005000
   k rm of rock at bottom of layer                    =    0.0005000
```

(Depth of the lowest soil layer extends 0.000 ft below the pile tip)

**** Warning - Possible Input Data Error ****

Values entered for effective unit weight of rock were outside the limits of
50 pcf to 150 pcf.

The maximum input value, in layer 1, for effective unit weight = 150.00 pcf

This data may be erroneous. Please check your data.

Summary of Input Soil Properties

Layer Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Undrained Cohesion psf	Uniaxial qu psi	RQD %	E50 or krm	Rock Mass Modulus psi
1	Stiff Clay	0.2500	115.0000	500.0000	--	--	0.02000	--
	w/o Free Water	2.2500	115.0000	500.0000	--	--	0.02000	--
2	Weak	2.2500	150.0000	--	150.0000	0.00	5.00E-04	100000.
	Rock	4.2500	150.0000	--	150.0000	0.00	5.00E-04	100000.

Cyclic Loading Type

Cyclic loading criteria were used for computation of p-y curves for all analyses.

Number of cycles of loading = 1000

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	4	y = 0.500000 in	M = 0.0000 in-lbs	0.0000000	N.A.

V = shear force applied normal to pile axis
M = bending moment applied to pile head
y = lateral deflection normal to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applied to pile head
Values of top y vs. pile lengths can be computed only for load types with
specified shear loading (Load Types 1, 2, and 3).
Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Moment-curvature properties were derived from elastic section properties

---

Layering Correction Equivalent Depths of Soil & Rock Layers

Top of   Equivalent

Layer No.	Layer Below Pile Head ft	Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.2500	0.00	N.A.	No	0.00	1703.
2	2.2500	2.0000	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 0.0 in-lbs
Axial load at pile head = 0.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness in-lb^2	Soil Res. p lb/inch	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.5000	0.00	7378.	-0.01618	0.00	4.76E+08	0.00	0.00	0.00
0.04250	0.4917	3763.	7378.	-0.01618	452.0185	4.76E+08	0.00	0.00	0.00
0.08500	0.4835	7526.	7378.	-0.01617	904.0371	4.76E+08	0.00	0.00	0.00
0.1275	0.4753	11289.	7378.	-0.01616	1356.	4.76E+08	0.00	0.00	0.00
0.1700	0.4670	15052.	7378.	-0.01615	1808.	4.76E+08	0.00	0.00	0.00
0.2125	0.4588	18815.	7378.	-0.01613	2260.	4.76E+08	0.00	0.00	0.00
0.2550	0.4506	22578.	7373.	-0.01611	2712.	4.76E+08	-19.5656	22.1470	0.00
0.2975	0.4423	26336.	7363.	-0.01608	3164.	4.76E+08	-19.9581	23.0105	0.00
0.3400	0.4342	30089.	7353.	-0.01605	3614.	4.76E+08	-20.3450	23.8993	0.00
0.3825	0.4260	33836.	7343.	-0.01602	4064.	4.76E+08	-20.7262	24.8145	0.00
0.4250	0.4178	37578.	7332.	-0.01598	4514.	4.76E+08	-21.1016	25.7574	0.00
0.4675	0.4097	41315.	7321.	-0.01594	4963.	4.76E+08	-21.4711	26.7292	0.00
0.5100	0.4016	45046.	7310.	-0.01589	5411.	4.76E+08	-21.8346	27.7312	0.00
0.5525	0.3935	48771.	7299.	-0.01584	5858.	4.76E+08	-22.1921	28.7648	0.00
0.5950	0.3854	52490.	7287.	-0.01579	6305.	4.76E+08	-22.5434	29.8317	0.00
0.6375	0.3774	56204.	7276.	-0.01573	6751.	4.76E+08	-22.8883	30.9332	0.00
0.6800	0.3694	59912.	7264.	-0.01567	7197.	4.76E+08	-23.2269	32.0712	0.00
0.7225	0.3614	63613.	7252.	-0.01560	7641.	4.76E+08	-23.5590	33.2475	0.00
0.7650	0.3534	67309.	7240.	-0.01553	8085.	4.76E+08	-23.8845	34.4638	0.00
0.8075	0.3455	70998.	7228.	-0.01546	8528.	4.76E+08	-24.2032	35.7224	0.00
0.8500	0.3377	74681.	7215.	-0.01538	8971.	4.76E+08	-24.5150	37.0252	0.00
0.8925	0.3299	78358.	7203.	-0.01530	9412.	4.76E+08	-24.8199	38.3746	0.00
0.9350	0.3221	82028.	7190.	-0.01521	9853.	4.76E+08	-25.1177	39.7730	0.00
0.9775	0.3143	85692.	7177.	-0.01512	10293.	4.76E+08	-25.4083	41.2230	0.00
1.0200	0.3067	89349.	7164.	-0.01503	10733.	4.76E+08	-25.6915	42.7274	0.00
1.0625	0.2990	92999.	7151.	-0.01493	11171.	4.76E+08	-25.9673	44.2892	0.00
1.1050	0.2914	96643.	7138.	-0.01483	11609.	4.76E+08	-26.2354	45.9116	0.00
1.1475	0.2839	100279.	7124.	-0.01472	12046.	4.76E+08	-26.4957	47.5978	0.00
1.1900	0.2764	103909.	7111.	-0.01461	12482.	4.76E+08	-26.7482	49.3517	0.00
1.2325	0.2690	107532.	7097.	-0.01450	12917.	4.76E+08	-26.9926	51.1770	0.00
1.2750	0.2616	111148.	7083.	-0.01438	13351.	4.76E+08	-27.2288	53.0780	0.00
1.3175	0.2543	114757.	7069.	-0.01426	13785.	4.76E+08	-27.4567	55.0592	0.00
1.3600	0.2471	118359.	7055.	-0.01413	14217.	4.76E+08	-27.6760	57.1254	0.00
1.4025	0.2399	121953.	7041.	-0.01401	14649.	4.76E+08	-27.8867	59.2820	0.00
1.4450	0.2328	125540.	7027.	-0.01387	15080.	4.76E+08	-28.0884	61.5345	0.00
1.4875	0.2258	129120.	7012.	-0.01374	15510.	4.76E+08	-28.2812	63.8890	0.00
1.5300	0.2188	132693.	6998.	-0.01360	15939.	4.76E+08	-28.4647	66.3522	0.00
1.5725	0.2119	136258.	6983.	-0.01345	16368.	4.76E+08	-28.6388	68.9313	0.00
1.6150	0.2051	139816.	6969.	-0.01330	16795.	4.76E+08	-28.8034	71.6340	0.00
1.6575	0.1983	143366.	6954.	-0.01315	17221.	4.76E+08	-28.9581	74.4687	0.00
1.7000	0.1917	146909.	6939.	-0.01300	17647.	4.76E+08	-29.1027	77.4447	0.00
1.7425	0.1851	150444.	6924.	-0.01284	18072.	4.76E+08	-29.2372	80.5721	0.00
1.7850	0.1786	153971.	6909.	-0.01267	18495.	4.76E+08	-29.3611	83.8618	0.00
1.8275	0.1721	157491.	6894.	-0.01251	18918.	4.76E+08	-29.4744	87.3257	0.00
1.8700	0.1658	161004.	6879.	-0.01234	19340.	4.76E+08	-29.5767	90.9771	0.00
1.9125	0.1596	164508.	6864.	-0.01216	19761.	4.76E+08	-29.6678	94.8303	0.00
1.9550	0.1534	168005.	6849.	-0.01198	20181.	4.76E+08	-29.7474	98.9014	0.00
1.9975	0.1473	171494.	6834.	-0.01180	20600.	4.76E+08	-29.8152	103.2077	0.00
2.0400	0.1414	174975.	6819.	-0.01162	21018.	4.76E+08	-29.8709	107.7687	0.00
2.0825	0.1355	178449.	6803.	-0.01143	21436.	4.76E+08	-29.9143	112.6059	0.00
2.1250	0.1297	181915.	6788.	-0.01123	21852.	4.76E+08	-29.9449	117.7430	0.00
2.1675	0.1240	185373.	6773.	-0.01104	22267.	4.76E+08	-29.9625	123.2065	0.00
2.2100	0.1184	188823.	6757.	-0.01083	22682.	4.76E+08	-29.9667	129.0260	0.00
2.2525	0.1130	192265.	6597.	-0.01063	23095.	4.76E+08	-597.3031	2696.	0.00
2.2950	0.1076	195552.	6266.	-0.01042	23490.	4.76E+08	-704.4036	3339.	0.00
2.3375	0.1023	198656.	5879.	-0.01021	23863.	4.76E+08	-811.5041	4044.	0.00
2.3800	0.09719	201549.	5438.	-0.01000	24210.	4.76E+08	-918.6046	4820.	0.00
2.4225	0.09215	204203.	4942.	-0.00978	24529.	4.76E+08	-1026.	5677.	0.00
2.4650	0.08722	206590.	4392.	-0.00956	24816.	4.76E+08	-1133.	6624.	0.00
2.5075	0.08240	208682.	3787.	-0.00934	25067.	4.76E+08	-1240.	7674.	0.00

2.5500	0.07769	210452.	3127.	-0.00911	25280.	4.76E+08	-1347.	8842.	0.00
2.5925	0.07310	211871.	2413.	-0.00889	25450.	4.76E+08	-1454.	10144.	0.00
2.6350	0.06863	212913.	1644.	-0.00866	25575.	4.76E+08	-1561.	11602.	0.00
2.6775	0.06427	213548.	820.1737	-0.00843	25652.	4.76E+08	-1668.	13238.	0.00
2.7200	0.06003	213749.	-57.9721	-0.00820	25676.	4.76E+08	-1775.	15083.	0.00
2.7625	0.05591	213489.	-990.7385	-0.00797	25645.	4.76E+08	-1883.	17172.	0.00
2.8050	0.05190	212739.	-1978.	-0.00774	25555.	4.76E+08	-1990.	19550.	0.00
2.8475	0.04801	211471.	-3020.	-0.00751	25402.	4.76E+08	-2097.	22272.	0.00
2.8900	0.04424	209658.	-4117.	-0.00729	25185.	4.76E+08	-2204.	25407.	0.00
2.9325	0.04058	207272.	-5268.	-0.00707	24898.	4.76E+08	-2311.	29044.	0.00
2.9750	0.03703	204285.	-6474.	-0.00684	24539.	4.76E+08	-2418.	33301.	0.00
3.0175	0.03360	200669.	-7734.	-0.00663	24105.	4.76E+08	-2525.	38331.	0.00
3.0600	0.03027	196396.	-9043.	-0.00641	23591.	4.76E+08	-2606.	43900.	0.00
3.1025	0.02705	191445.	-10379.	-0.00621	22997.	4.76E+08	-2637.	49704.	0.00
3.1450	0.02394	185809.	-11729.	-0.00600	22320.	4.76E+08	-2657.	56606.	0.00
3.1875	0.02093	179481.	-13087.	-0.00581	21560.	4.76E+08	-2666.	64966.	0.00
3.2300	0.01802	172460.	-14445.	-0.00562	20716.	4.76E+08	-2661.	75331.	0.00
3.2725	0.01520	164747.	-15777.	-0.00544	19790.	4.76E+08	-2561.	85937.	0.00
3.3150	0.01247	156368.	-17051.	-0.00527	18783.	4.76E+08	-2437.	99687.	0.00
3.3575	0.00982	147355.	-18258.	-0.00510	17701.	4.76E+08	-2296.	119188.	0.00
3.4000	0.00726	137744.	-19387.	-0.00495	16546.	4.76E+08	-2129.	149507.	0.00
3.4425	0.00477	127580.	-20418.	-0.00481	15325.	4.76E+08	-1917.	204744.	0.00
3.4850	0.00236	116918.	-21317.	-0.00468	14044.	4.76E+08	-1606.	347558.	0.00
3.5275	3.42E-06	105837.	-21770.	-0.00456	12713.	4.76E+08	-171.1512	2.55E+07	0.00
3.5700	-0.00229	94712.	-21406.	-0.00445	11377.	4.76E+08	1597.	355265.	0.00
3.6125	-0.00454	84003.	-20516.	-0.00435	10091.	4.76E+08	1893.	212874.	0.00
3.6550	-0.00673	73786.	-19501.	-0.00427	8863.	4.76E+08	2090.	158267.	0.00
3.6975	-0.00889	64112.	-18396.	-0.00420	7701.	4.76E+08	2240.	128482.	0.00
3.7400	-0.01101	55021.	-17223.	-0.00413	6609.	4.76E+08	2363.	109422.	0.00
3.7825	-0.01311	46545.	-15991.	-0.00408	5591.	4.76E+08	2468.	96038.	0.00
3.8250	-0.01517	38711.	-14708.	-0.00403	4650.	4.76E+08	2560.	86048.	0.00
3.8675	-0.01722	31543.	-13382.	-0.00399	3789.	4.76E+08	2642.	78260.	0.00
3.9100	-0.01925	25062.	-12015.	-0.00396	3010.	4.76E+08	2717.	71988.	0.00
3.9525	-0.02126	19288.	-10612.	-0.00394	2317.	4.76E+08	2786.	66809.	0.00
3.9950	-0.02327	14238.	-9175.	-0.00392	1710.	4.76E+08	2849.	62444.	0.00
4.0375	-0.02527	9929.	-7707.	-0.00391	1193.	4.76E+08	2908.	58705.	0.00
4.0800	-0.02726	6377.	-6209.	-0.00390	766.0202	4.76E+08	2964.	55458.	0.00
4.1225	-0.02924	3596.	-4684.	-0.00390	431.9188	4.76E+08	3016.	52606.	0.00
4.1650	-0.03123	1599.	-3133.	-0.00389	192.0639	4.76E+08	3066.	50077.	0.00
4.2075	-0.03321	399.7264	-1568.	-0.00389	48.0159	4.76E+08	3074.	47195.	0.00
4.2500	-0.03520	0.00	0.00	-0.00389	0.00	4.76E+08	3074.	22267.	0.00

* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

```
Pile-head deflection            =     0.50000000 inches
Computed slope at pile head     =    -0.01618151 radians
Maximum bending moment          =        213749. inch-lbs
Maximum shear force             =        -21770. lbs
Depth of maximum bending moment =     2.72000000 feet below pile head
Depth of maximum shear force    =     3.52750000 feet below pile head
Number of iterations            =             22
Number of zero deflection points =             1
```

Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

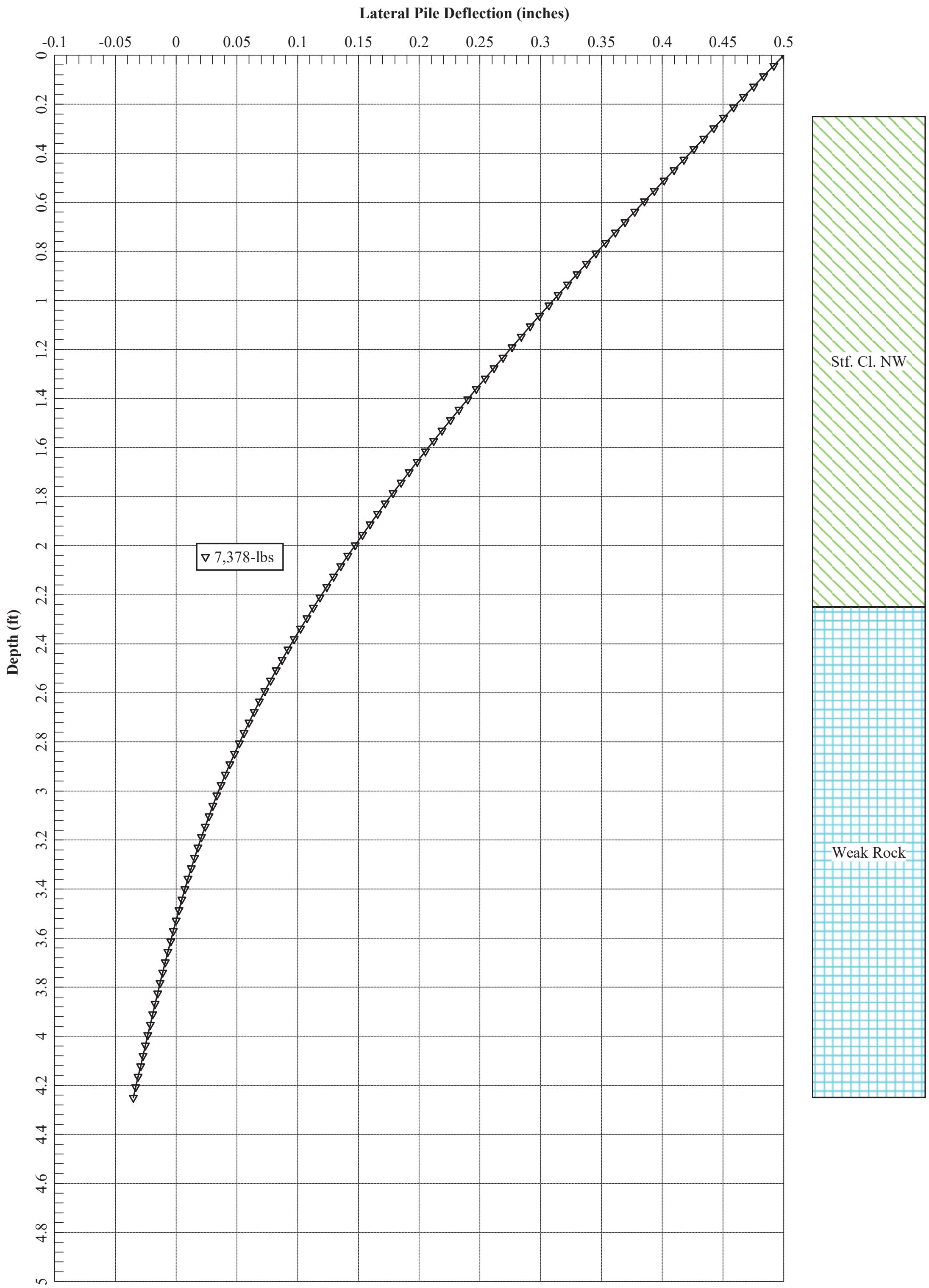
Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	y, in	0.5000	M, in-lb	0.00	0.00	0.5000	-0.01618	-21770.	213749.

Maximum pile-head deflection = 0.5000000000 inches
Maximum pile-head rotation   = -0.0161815127 radians = -0.927132 deg.

The analysis ended normally.

G2 Consulting Group, LLC
Mercer County Solar Power Plant
Capacity Area No. 1 4-ft



```
===============================================================================

                    LPile for Windows, Version 2016-09.011

                Analysis of Individual Piles and Drilled Shafts
               Subjected to Lateral Loading Using the p-y Method
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-------------------------------------------------------------------------------
                            Files Used for Analysis
-------------------------------------------------------------------------------

Path to file locations:
\\troy\geotechnical\2019 Geotechnical\003 Ann Arbor\193508 (j) Merccer Co Solar KY - Savion\Analysis\LPile\Cap Areas\

Name of input data file:
Capacity Area No. 2 - 5ft.lp9d

Name of output report file:
Capacity Area No. 2 - 5ft.lp9o

Name of plot output file:
Capacity Area No. 2 - 5ft.lp9p

Name of runtime message file:
Capacity Area No. 2 - 5ft.lp9r


-------------------------------------------------------------------------------
                           Date and Time of Analysis
-------------------------------------------------------------------------------

              Date:  December 27, 2019          Time:  16:07:21


-------------------------------------------------------------------------------
                                 Problem Title
-------------------------------------------------------------------------------

Project Name: Mercer County Solar Power Plant

Job Number: 193508

Client: Savion, LLC

Engineer: KAC

Description: Capacity Area 2 - 5ft



-------------------------------------------------------------------------------
                          Program Options and Settings
-------------------------------------------------------------------------------

Computational Options:
 - Use unfactored loads in computations (conventional analysis)
Engineering Units Used for Data Input and Computations:
 - US Customary System Units (pounds, feet, inches)

Analysis Control Options:
 - Maximum number of iterations allowed               =          500
 - Deflection tolerance for convergence               =   1.0000E-05 in
 - Maximum allowable deflection                       =     100.0000 in
 - Number of pile increments                          =          100

Loading Type and Number of Cycles of Loading:
 - Cyclic loading specified
 - Number of cycles of loading                        =         1000 cycles
 - Use of p-y modification factors for p-y curves not selected
 - Analysis uses layering correction (Method of Georgiadis)
```

```
 - Layering correction is not computed if soil above is of same type
 - No distributed lateral loads are entered
 - Loading by lateral soil movements acting on pile not selected
 - Input of shear resistance at the pile tip not selected
 - Computation of pile-head foundation stiffness matrix not selected
 - Push-over analysis of pile not selected
 - Buckling analysis of pile not selected

Output Options:
 - Output files use decimal points to denote decimal symbols.
 - Values of pile-head deflection, bending moment, shear force, and
   soil reaction are printed for full length of pile.
 - Printing Increment (nodal spacing of output points) = 1
 - No p-y curves to be computed and reported for user-specified depths
 - Print using wide report formats



--------------------------------------------------------------------------------
                    Pile Structural Properties and Geometry
--------------------------------------------------------------------------------

Number of pile sections defined                        =           1
Total length of pile                                   =       5.250 ft
Depth of ground surface below top of pile              =      0.2500 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over
the length of the pile. A summary of values of pile diameter vs. depth follows.

            Depth Below          Pile
Point        Pile Head          Diameter
 No.           feet              inches
-----      -------------     -------------
  1            0.000            3.9400
  2            5.250            3.9400


Input Structural Properties for Pile Sections:
----------------------------------------------

Pile Section No. 1:

   Section 1 is an elastic pile
   Cross-sectional Shape                               = Strong H-Pile
   Length of section                                   =     5.250000 ft
   Flange Width                                        =     3.940000 in
   Section Depth                                       =     5.900000 in
   Flange Thickness                                    =     0.215000 in
   Web Thickness                                       =     0.170000 in
   Section Area                                        =     2.680000 sq. in
   Moment of Inertia                                   =    16.400000 in^4
   Elastic Modulus                                     =    29000000. psi



--------------------------------------------------------------------------------
                      Ground Slope and Pile Batter Angles
--------------------------------------------------------------------------------

Ground Slope Angle                                     =       0.000 degrees
                                                       =       0.000 radians

Pile Batter Angle                                      =       0.000 degrees
                                                       =       0.000 radians


--------------------------------------------------------------------------------
                      Soil and Rock Layering Information
--------------------------------------------------------------------------------

The soil profile is modelled using 3 layers

Layer 1 is stiff clay without free water

   Distance from top of pile to top of layer           =     0.250000 ft
   Distance from top of pile to bottom of layer        =     2.250000 ft
   Effective unit weight at top of layer               =   115.000000 pcf
   Effective unit weight at bottom of layer            =   115.000000 pcf
   Undrained cohesion at top of layer                  =   500.000000 psf
   Undrained cohesion at bottom of layer               =   500.000000 psf
   Epsilon-50 at top of layer                          =     0.020000
   Epsilon-50 at bottom of layer                       =     0.020000


Layer 2 is stiff clay without free water

   Distance from top of pile to top of layer           =     2.250000 ft
```

```
   Distance from top of pile to bottom of layer       =     4.250000 ft
   Effective unit weight at top of layer              =   125.000000 pcf
   Effective unit weight at bottom of layer           =   125.000000 pcf
   Undrained cohesion at top of layer                 =        2500. psf
   Undrained cohesion at bottom of layer              =        2500. psf
   Epsilon-50 at top of layer                         =     0.006500
   Epsilon-50 at bottom of layer                      =     0.006500


Layer 3 is weak rock, p-y criteria by Reese, 1997

   Distance from top of pile to top of layer          =     4.250000 ft
   Distance from top of pile to bottom of layer       =     6.250000 ft
   Effective unit weight at top of layer              =   150.000000 pcf
   Effective unit weight at bottom of layer           =   150.000000 pcf
   Uniaxial compressive strength at top of layer      =   500.000000 psi
   Uniaxial compressive strength at bottom of layer   =   500.000000 psi
   Initial modulus of rock at top of layer            =      100000. psi
   Initial modulus of rock at bottom of layer         =      100000. psi
   RQD of rock at top of layer                        =       0.0000 %
   RQD of rock at bottom of layer                     =       0.0000 %
   k rm of rock at top of layer                       =    0.0005000
   k rm of rock at bottom of layer                    =    0.0005000


 (Depth of the lowest soil layer extends 1.000 ft below the pile tip)


**** Warning - Possible Input Data Error ****

Values entered for effective unit weight of rock were outside the limits of
50 pcf to 150 pcf.

The maximum input value, in layer   1, for effective unit weight = 150.00 pcf

This data may be erroneous. Please check your data.
```

Summary of Input Soil Properties

Layer Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Undrained Cohesion psf	Uniaxial qu psi	RQD %	E50 or krm	Rock Mass Modulus psi
1	Stiff Clay	0.2500	115.0000	500.0000	--	--	0.02000	--
	w/o Free Water	2.2500	115.0000	500.0000	--	--	0.02000	--
2	Stiff Clay	2.2500	125.0000	2500.	--	--	0.00650	--
	w/o Free Water	4.2500	125.0000	2500.	--	--	0.00650	--
3	Weak	4.2500	150.0000	--	500.0000	0.00	5.00E-04	100000.
	Rock	6.2500	150.0000	--	500.0000	0.00	5.00E-04	100000.

Cyclic Loading Type

Cyclic loading criteria were used for computation of p-y curves for all analyses.

Number of cycles of loading = 1000

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	4	y = 0.500000 in	M = 0.0000 in-lbs	0.0000000	N.A.

```
V = shear force applied normal to pile axis
M = bending moment applied to pile head
y = lateral deflection normal to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applied to pile head
Values of top y vs. pile lengths can be computed only for load types with
specified shear loading (Load Types 1, 2, and 3).
Thrust force is assumed to be acting axially for all pile batter angles.
```

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Moment-curvature properties were derived from elastic section properties

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.2500	0.00	N.A.	No	0.00	1574.
2	2.2500	2.0000	Yes	No	1574.	13333.
3	4.2500	4.0000	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 0.0 in-lbs
Axial load at pile head = 0.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness in-lb^2	Soil Res. p lb/inch	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.5000	0.00	4393.	-0.01316	0.00	4.76E+08	0.00	0.00	0.00
0.05250	0.4917	2768.	4393.	-0.01315	332.4771	4.76E+08	0.00	0.00	0.00
0.1050	0.4834	5536.	4393.	-0.01315	664.9542	4.76E+08	0.00	0.00	0.00
0.1575	0.4751	8303.	4393.	-0.01314	997.4313	4.76E+08	0.00	0.00	0.00
0.2100	0.4669	11071.	4393.	-0.01313	1330.	4.76E+08	0.00	0.00	0.00
0.2625	0.4586	13839.	4387.	-0.01311	1662.	4.76E+08	-19.7383	27.1152	0.00
0.3150	0.4503	16599.	4375.	-0.01309	1994.	4.76E+08	-20.2472	28.3241	0.00
0.3675	0.4421	19351.	4362.	-0.01307	2324.	4.76E+08	-20.7496	29.5679	0.00
0.4200	0.4339	22095.	4348.	-0.01304	2654.	4.76E+08	-21.2452	30.8480	0.00
0.4725	0.4257	24830.	4335.	-0.01301	2983.	4.76E+08	-21.7341	32.1661	0.00
0.5250	0.4175	27557.	4321.	-0.01297	3310.	4.76E+08	-22.2160	33.5239	0.00
0.5775	0.4093	30275.	4307.	-0.01294	3637.	4.76E+08	-22.6909	34.9232	0.00
0.6300	0.4012	32983.	4292.	-0.01289	3962.	4.76E+08	-23.1586	36.3659	0.00
0.6825	0.3931	35683.	4278.	-0.01285	4286.	4.76E+08	-23.6190	37.8541	0.00
0.7350	0.3850	38373.	4263.	-0.01280	4609.	4.76E+08	-24.0721	39.3898	0.00
0.7875	0.3770	41054.	4247.	-0.01275	4932.	4.76E+08	-24.5177	40.9753	0.00
0.8400	0.3689	43725.	4232.	-0.01269	5252.	4.76E+08	-24.9556	42.6131	0.00
0.8925	0.3610	46386.	4216.	-0.01263	5572.	4.76E+08	-25.3858	44.3055	0.00
0.9450	0.3530	49037.	4200.	-0.01257	5890.	4.76E+08	-25.8081	46.0553	0.00
0.9975	0.3451	51678.	4183.	-0.01250	6208.	4.76E+08	-26.2224	47.8654	0.00
1.0500	0.3373	54308.	4167.	-0.01243	6524.	4.76E+08	-26.6286	49.7386	0.00
1.1025	0.3295	56928.	4150.	-0.01236	6838.	4.76E+08	-27.0266	51.6783	0.00
1.1550	0.3217	59537.	4133.	-0.01228	7152.	4.76E+08	-27.4161	53.6878	0.00
1.2075	0.3140	62135.	4115.	-0.01220	7464.	4.76E+08	-27.7971	55.7707	0.00
1.2600	0.3063	64723.	4098.	-0.01211	7775.	4.76E+08	-28.1695	57.9308	0.00
1.3125	0.2987	67298.	4080.	-0.01203	8084.	4.76E+08	-28.5331	60.1723	0.00
1.3650	0.2912	69863.	4062.	-0.01194	8392.	4.76E+08	-28.8877	62.4995	0.00
1.4175	0.2837	72416.	4043.	-0.01184	8699.	4.76E+08	-29.2332	64.9170	0.00
1.4700	0.2763	74958.	4025.	-0.01174	9004.	4.76E+08	-29.5694	67.4298	0.00
1.5225	0.2689	77488.	4006.	-0.01164	9308.	4.76E+08	-29.8963	70.0431	0.00
1.5750	0.2616	80006.	3987.	-0.01154	9610.	4.76E+08	-30.2136	72.7628	0.00
1.6275	0.2544	82512.	3968.	-0.01143	9911.	4.76E+08	-30.5212	75.5947	0.00
1.6800	0.2472	85006.	3949.	-0.01132	10211.	4.76E+08	-30.8190	78.5455	0.00
1.7325	0.2401	87487.	3929.	-0.01121	10509.	4.76E+08	-31.1067	81.6221	0.00
1.7850	0.2331	89956.	3910.	-0.01109	10806.	4.76E+08	-31.3843	84.8319	0.00
1.8375	0.2261	92413.	3890.	-0.01097	11101.	4.76E+08	-31.6514	88.1830	0.00
1.8900	0.2193	94858.	3870.	-0.01084	11394.	4.76E+08	-31.9080	91.6840	0.00
1.9425	0.2125	97289.	3850.	-0.01072	11687.	4.76E+08	-32.1540	95.3443	0.00
1.9950	0.2058	99708.	3829.	-0.01059	11977.	4.76E+08	-32.3890	99.1738	0.00
2.0475	0.1991	102114.	3809.	-0.01045	12266.	4.76E+08	-32.6129	103.1834	0.00
2.1000	0.1926	104507.	3788.	-0.01032	12554.	4.76E+08	-32.8256	107.3846	0.00
2.1525	0.1861	106887.	3767.	-0.01018	12839.	4.76E+08	-33.0268	111.7901	0.00
2.2050	0.1798	109254.	3747.	-0.01003	13124.	4.76E+08	-33.2164	116.4136	0.00
2.2575	0.1735	111608.	3670.	-0.00989	13407.	4.76E+08	-208.6112	757.5659	0.00
2.3100	0.1673	113879.	3539.	-0.00974	13679.	4.76E+08	-209.5037	788.9193	0.00

2.3625	0.1612	116066.	3406.	-0.00958	13942.	4.76E+08	-210.3223	821.9048	0.00
2.4150	0.1552	118171.	3274.	-0.00943	14195.	4.76E+08	-211.0656	856.6385	0.00
2.4675	0.1493	120191.	3140.	-0.00927	14438.	4.76E+08	-211.7324	893.2469	0.00
2.5200	0.1435	122128.	3007.	-0.00911	14670.	4.76E+08	-212.3212	931.8685	0.00
2.5725	0.1379	123980.	2873.	-0.00895	14893.	4.76E+08	-212.8306	972.6547	0.00
2.6250	0.1323	125748.	2739.	-0.00878	15105.	4.76E+08	-213.2592	1016.	0.00
2.6775	0.1268	127431.	2604.	-0.00862	15307.	4.76E+08	-213.6053	1061.	0.00
2.7300	0.1214	129029.	2470.	-0.00845	15499.	4.76E+08	-213.8675	1110.	0.00
2.7825	0.1161	130543.	2335.	-0.00827	15681.	4.76E+08	-214.0439	1161.	0.00
2.8350	0.1110	131971.	2200.	-0.00810	15853.	4.76E+08	-214.1328	1215.	0.00
2.8875	0.1059	133315.	2065.	-0.00792	16014.	4.76E+08	-214.1323	1273.	0.00
2.9400	0.1010	134573.	1930.	-0.00775	16165.	4.76E+08	-214.0407	1335.	0.00
2.9925	0.09618	135747.	1795.	-0.00757	16306.	4.76E+08	-213.8557	1401.	0.00
3.0450	0.09147	136835.	1661.	-0.00739	16437.	4.76E+08	-213.5752	1471.	0.00
3.0975	0.08687	137839.	1526.	-0.00720	16558.	4.76E+08	-213.1971	1546.	0.00
3.1500	0.08239	138759.	1392.	-0.00702	16668.	4.76E+08	-212.7188	1627.	0.00
3.2025	0.07802	139593.	1258.	-0.00684	16768.	4.76E+08	-212.1379	1713.	0.00
3.2550	0.07378	140344.	1125.	-0.00665	16858.	4.76E+08	-211.4516	1806.	0.00
3.3075	0.06964	141011.	991.9599	-0.00647	16938.	4.76E+08	-210.6570	1906.	0.00
3.3600	0.06563	141594.	859.5314	-0.00628	17009.	4.76E+08	-209.7511	2014.	0.00
3.4125	0.06173	142094.	727.7096	-0.00609	17069.	4.76E+08	-208.7306	2130.	0.00
3.4650	0.05795	142511.	596.5681	-0.00590	17119.	4.76E+08	-207.5918	2257.	0.00
3.5175	0.05430	142845.	466.1824	-0.00571	17159.	4.76E+08	-206.3310	2394.	0.00
3.5700	0.05076	143098.	336.6308	-0.00552	17189.	4.76E+08	-204.9439	2544.	0.00
3.6225	0.04734	143270.	207.9942	-0.00533	17210.	4.76E+08	-203.4262	2707.	0.00
3.6750	0.04404	143360.	80.3566	-0.00514	17221.	4.76E+08	-201.7727	2887.	0.00
3.7275	0.04085	143371.	-46.1950	-0.00495	17222.	4.76E+08	-199.9782	3084.	0.00
3.7800	0.03779	143302.	-171.5697	-0.00476	17214.	4.76E+08	-198.0367	3301.	0.00
3.8325	0.03485	143155.	-295.6728	-0.00457	17196.	4.76E+08	-195.9415	3542.	0.00
3.8850	0.03203	142930.	-418.4053	-0.00439	17169.	4.76E+08	-193.6854	3810.	0.00
3.9375	0.02933	142627.	-539.6632	-0.00420	17133.	4.76E+08	-191.2601	4109.	0.00
3.9900	0.02674	142250.	-659.3369	-0.00401	17087.	4.76E+08	-188.6564	4445.	0.00
4.0425	0.02428	141797.	-777.3108	-0.00382	17033.	4.76E+08	-185.8637	4823.	0.00
4.0950	0.02193	141270.	-893.2097	-0.00363	16970.	4.76E+08	-182.0694	5231.	0.00
4.1475	0.01970	140671.	-1006.	-0.00345	16898.	4.76E+08	-177.2557	5668.	0.00
4.2000	0.01759	140002.	-1117.	-0.00326	16817.	4.76E+08	-172.3023	6172.	0.00
4.2525	0.01559	139264.	-1697.	-0.00307	16729.	4.76E+08	-1670.	67472.	0.00
4.3050	0.01372	137864.	-2845.	-0.00289	16560.	4.76E+08	-1976.	90747.	0.00
4.3575	0.01195	135679.	-4178.	-0.00271	16298.	4.76E+08	-2255.	118859.	0.00
4.4100	0.01030	132600.	-5678.	-0.00253	15928.	4.76E+08	-2506.	153267.	0.00
4.4625	0.00876	128526.	-7326.	-0.00236	15439.	4.76E+08	-2727.	196078.	0.00
4.5150	0.00733	123369.	-9103.	-0.00219	14819.	4.76E+08	-2914.	250490.	0.00
4.5675	0.00600	117056.	-10986.	-0.00203	14061.	4.76E+08	-3063.	321639.	0.00
4.6200	0.00477	109527.	-12948.	-0.00188	13157.	4.76E+08	-3167.	418454.	0.00
4.6725	0.00363	100742.	-14958.	-0.00174	12101.	4.76E+08	-3214.	558219.	0.00
4.7250	0.00257	90680.	-16974.	-0.00162	10893.	4.76E+08	-3184.	780197.	0.00
4.7775	0.00159	79355.	-18932.	-0.00150	9532.	4.76E+08	-3032.	1200720.	0.00
4.8300	6.76E-04	66826.	-20709.	-0.00141	8027.	4.76E+08	-2612.	2433684.	0.00
4.8825	-1.82E-04	53261.	-20892.	-0.00133	6398.	4.76E+08	2032.	7017891.	0.00
4.9350	-9.97E-04	40502.	-19223.	-0.00127	4865.	4.76E+08	3265.	2064208.	0.00
4.9875	-0.00178	29040.	-16939.	-0.00122	3488.	4.76E+08	3985.	1412931.	0.00
5.0400	-0.00253	19159.	-14238.	-0.00119	2301.	4.76E+08	4589.	1141157.	0.00
5.0925	-0.00327	11099.	-11173.	-0.00117	1333.	4.76E+08	5142.	989648.	0.00
5.1450	-0.00400	5081.	-7767.	-0.00116	610.2941	4.76E+08	5671.	892194.	0.00
5.1975	-0.00473	1313.	-4032.	-0.00115	157.6716	4.76E+08	6187.	823837.	0.00
5.2500	-0.00546	0.00	0.00	-0.00115	0.00	4.76E+08	6614.	381836.	0.00

* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.50000000 inches
Computed slope at pile head = -0.01315647 radians
Maximum bending moment = 143371. inch-lbs
Maximum shear force = -20892. lbs
Depth of maximum bending moment = 3.72750000 feet below pile head
Depth of maximum shear force = 4.88250000 feet below pile head
Number of iterations = 20
Number of zero deflection points = 1

Summary of Pile-head Responses for Conventional Analyses

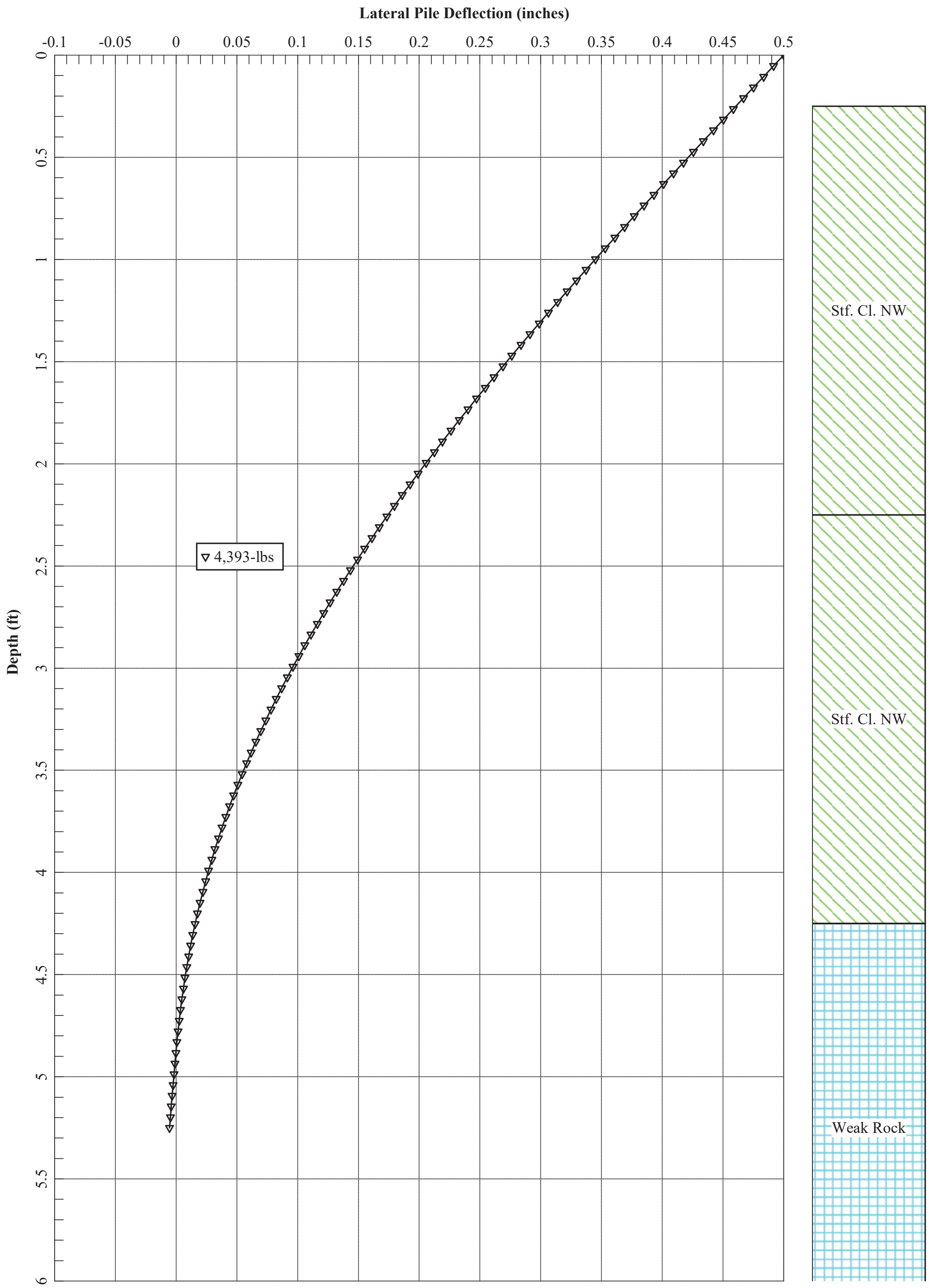
Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	y, in	0.5000	M, in-lb	0.00	0.00	0.5000	-0.01316	-20892.	143371.

```
Maximum pile-head deflection = 0.5000000000 inches
Maximum pile-head rotation   = -0.0131564659 radians = -0.753810 deg.

The analysis ended normally.
```


Lateral Pile Deflection (inches)
-0.1
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
Depth (ft)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
4,393-lbs
Stf. Cl. NW
Stf. Cl. NW
Weak Rock

```
==============================================================================

                  LPile for Windows, Version 2016-09.011

              Analysis of Individual Piles and Drilled Shafts
             Subjected to Lateral Loading Using the p-y Method
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------------------------------------------------------------------------------
                           Files Used for Analysis
------------------------------------------------------------------------------

Path to file locations:
\\troy\geotechnical\2019 Geotechnical\003 Ann Arbor\193508 (j) Merccer Co Solar KY - Savion\Analysis\LPile\Cap Areas\

Name of input data file:
Capacity Area No. 2 - 6ft.lp9d

Name of output report file:
Capacity Area No. 2 - 6ft.lp9o

Name of plot output file:
Capacity Area No. 2 - 6ft.lp9p

Name of runtime message file:
Capacity Area No. 2 - 6ft.lp9r


------------------------------------------------------------------------------
                          Date and Time of Analysis
------------------------------------------------------------------------------

               Date:  December 27, 2019          Time:  16:10:15


------------------------------------------------------------------------------
                                Problem Title
------------------------------------------------------------------------------

Project Name: Mercer County Solar Power Plant

Job Number: 193508

Client: Savion, LLC

Engineer: KAC

Description: Capacity Area 2 - 6ft



------------------------------------------------------------------------------
                         Program Options and Settings
------------------------------------------------------------------------------

Computational Options:
 - Use unfactored loads in computations (conventional analysis)
Engineering Units Used for Data Input and Computations:
 - US Customary System Units (pounds, feet, inches)

Analysis Control Options:
 - Maximum number of iterations allowed               =          500
 - Deflection tolerance for convergence               =   1.0000E-05 in
 - Maximum allowable deflection                       =     100.0000 in
 - Number of pile increments                          =          100

Loading Type and Number of Cycles of Loading:
 - Cyclic loading specified
 - Number of cycles of loading                        =         1000 cycles
 - Use of p-y modification factors for p-y curves not selected
 - Analysis uses layering correction (Method of Georgiadis)
```

```
 - Layering correction is not computed if soil above is of same type
 - No distributed lateral loads are entered
 - Loading by lateral soil movements acting on pile not selected
 - Input of shear resistance at the pile tip not selected
 - Computation of pile-head foundation stiffness matrix not selected
 - Push-over analysis of pile not selected
 - Buckling analysis of pile not selected

Output Options:
 - Output files use decimal points to denote decimal symbols.
 - Values of pile-head deflection, bending moment, shear force, and
   soil reaction are printed for full length of pile.
 - Printing Increment (nodal spacing of output points) = 1
 - No p-y curves to be computed and reported for user-specified depths
 - Print using wide report formats



--------------------------------------------------------------------------------
                     Pile Structural Properties and Geometry
--------------------------------------------------------------------------------

Number of pile sections defined                        =           1
Total length of pile                                   =       6.250 ft
Depth of ground surface below top of pile              =      0.2500 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over
the length of the pile. A summary of values of pile diameter vs. depth follows.

            Depth Below          Pile
Point       Pile Head          Diameter
 No.          feet              inches
-----     -------------     -------------
  1           0.000            3.9400
  2           6.250            3.9400


Input Structural Properties for Pile Sections:
----------------------------------------------

Pile Section No. 1:

   Section 1 is an elastic pile
   Cross-sectional Shape                              = Strong H-Pile
   Length of section                                  =     6.250000 ft
   Flange Width                                       =     3.940000 in
   Section Depth                                      =     5.900000 in
   Flange Thickness                                   =     0.215000 in
   Web Thickness                                      =     0.170000 in
   Section Area                                       =     2.680000 sq. in
   Moment of Inertia                                  =    16.400000 in^4
   Elastic Modulus                                    =    29000000. psi



--------------------------------------------------------------------------------
                       Ground Slope and Pile Batter Angles
--------------------------------------------------------------------------------

Ground Slope Angle                                     =       0.000 degrees
                                                       =       0.000 radians

Pile Batter Angle                                      =       0.000 degrees
                                                       =       0.000 radians


--------------------------------------------------------------------------------
                       Soil and Rock Layering Information
--------------------------------------------------------------------------------

The soil profile is modelled using 3 layers

Layer 1 is stiff clay without free water

   Distance from top of pile to top of layer          =     0.250000 ft
   Distance from top of pile to bottom of layer       =     2.250000 ft
   Effective unit weight at top of layer              =   115.000000 pcf
   Effective unit weight at bottom of layer           =   115.000000 pcf
   Undrained cohesion at top of layer                 =   500.000000 psf
   Undrained cohesion at bottom of layer              =   500.000000 psf
   Epsilon-50 at top of layer                         =     0.020000
   Epsilon-50 at bottom of layer                      =     0.020000


Layer 2 is stiff clay without free water

   Distance from top of pile to top of layer          =     2.250000 ft
```

```
   Distance from top of pile to bottom of layer        =     4.250000 ft
   Effective unit weight at top of layer               =   125.000000 pcf
   Effective unit weight at bottom of layer            =   125.000000 pcf
   Undrained cohesion at top of layer                  =        2500. psf
   Undrained cohesion at bottom of layer               =        2500. psf
   Epsilon-50 at top of layer                          =     0.006500
   Epsilon-50 at bottom of layer                       =     0.006500
```

Layer 3 is weak rock, p-y criteria by Reese, 1997

```
   Distance from top of pile to top of layer           =     4.250000 ft
   Distance from top of pile to bottom of layer        =     6.250000 ft
   Effective unit weight at top of layer               =   150.000000 pcf
   Effective unit weight at bottom of layer            =   150.000000 pcf
   Uniaxial compressive strength at top of layer       =   500.000000 psi
   Uniaxial compressive strength at bottom of layer    =   500.000000 psi
   Initial modulus of rock at top of layer             =      100000. psi
   Initial modulus of rock at bottom of layer          =      100000. psi
   RQD of rock at top of layer                         =       0.0000 %
   RQD of rock at bottom of layer                      =       0.0000 %
   k rm of rock at top of layer                        =    0.0005000
   k rm of rock at bottom of layer                     =    0.0005000
```

(Depth of the lowest soil layer extends 0.000 ft below the pile tip)

**** Warning - Possible Input Data Error ****

Values entered for effective unit weight of rock were outside the limits of 50 pcf to 150 pcf.

The maximum input value, in layer 1, for effective unit weight = 150.00 pcf

This data may be erroneous. Please check your data.

Summary of Input Soil Properties

Layer Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Undrained Cohesion psf	Uniaxial qu psi	RQD %	E50 or krm	Rock Mass Modulus psi
1	Stiff Clay	0.2500	115.0000	500.0000	--	--	0.02000	--
	w/o Free Water	2.2500	115.0000	500.0000	--	--	0.02000	--
2	Stiff Clay	2.2500	125.0000	2500.	--	--	0.00650	--
	w/o Free Water	4.2500	125.0000	2500.	--	--	0.00650	--
3	Weak	4.2500	150.0000	--	500.0000	0.00	5.00E-04	100000.
	Rock	6.2500	150.0000	--	500.0000	0.00	5.00E-04	100000.

Cyclic Loading Type

Cyclic loading criteria were used for computation of p-y curves for all analyses.

Number of cycles of loading = 1000

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	4	y = 0.500000 in	M = 0.0000 in-lbs	0.0000000	N.A.

V = shear force applied normal to pile axis
M = bending moment applied to pile head
y = lateral deflection normal to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applied to pile head
Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).
Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Moment-curvature properties were derived from elastic section properties

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Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.2500	0.00	N.A.	No	0.00	1574.
2	2.2500	2.0000	Yes	No	1574.	13333.
3	4.2500	4.0000	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 0.0 in-lbs
Axial load at pile head = 0.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness in-lb^2	Soil Res. p lb/inch	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.5000	0.00	4711.	-0.01355	0.00	4.76E+08	0.00	0.00	0.00
0.06250	0.4898	3534.	4711.	-0.01354	424.4566	4.76E+08	0.00	0.00	0.00
0.1250	0.4797	7067.	4711.	-0.01354	848.9132	4.76E+08	0.00	0.00	0.00
0.1875	0.4695	10601.	4711.	-0.01352	1273.	4.76E+08	0.00	0.00	0.00
0.2500	0.4594	14134.	4704.	-0.01350	1698.	4.76E+08	-19.6037	32.0042	0.00
0.3125	0.4493	17657.	4689.	-0.01348	2121.	4.76E+08	-20.2067	33.7317	0.00
0.3750	0.4392	21168.	4674.	-0.01345	2543.	4.76E+08	-20.8001	35.5206	0.00
0.4375	0.4291	24667.	4658.	-0.01341	2963.	4.76E+08	-21.3836	37.3742	0.00
0.5000	0.4191	28155.	4642.	-0.01337	3382.	4.76E+08	-21.9570	39.2961	0.00
0.5625	0.4091	31630.	4625.	-0.01332	3799.	4.76E+08	-22.5201	41.2901	0.00
0.6250	0.3991	35092.	4608.	-0.01327	4215.	4.76E+08	-23.0727	43.3605	0.00
0.6875	0.3892	38542.	4590.	-0.01321	4630.	4.76E+08	-23.6146	45.5114	0.00
0.7500	0.3793	41978.	4572.	-0.01315	5042.	4.76E+08	-24.1455	47.7476	0.00
0.8125	0.3694	45400.	4554.	-0.01308	5454.	4.76E+08	-24.6654	50.0743	0.00
0.8750	0.3596	48809.	4535.	-0.01300	5863.	4.76E+08	-25.1738	52.4966	0.00
0.9375	0.3499	52204.	4516.	-0.01292	6271.	4.76E+08	-25.6707	55.0205	0.00
1.0000	0.3403	55584.	4497.	-0.01284	6677.	4.76E+08	-26.1558	57.6521	0.00
1.0625	0.3307	58949.	4477.	-0.01275	7081.	4.76E+08	-26.6287	60.3982	0.00
1.1250	0.3211	62299.	4457.	-0.01265	7484.	4.76E+08	-27.0894	63.2659	0.00
1.1875	0.3117	65635.	4437.	-0.01255	7884.	4.76E+08	-27.5376	66.2632	0.00
1.2500	0.3023	68954.	4416.	-0.01245	8283.	4.76E+08	-27.9729	69.3983	0.00
1.3125	0.2930	72258.	4395.	-0.01234	8680.	4.76E+08	-28.3951	72.6804	0.00
1.3750	0.2838	75546.	4373.	-0.01222	9075.	4.76E+08	-28.8040	76.1194	0.00
1.4375	0.2747	78818.	4351.	-0.01210	9468.	4.76E+08	-29.1993	79.7260	0.00
1.5000	0.2657	82073.	4329.	-0.01197	9859.	4.76E+08	-29.5807	83.5116	0.00
1.5625	0.2567	85312.	4307.	-0.01184	10248.	4.76E+08	-29.9479	87.4891	0.00
1.6250	0.2479	88534.	4284.	-0.01170	10635.	4.76E+08	-30.3007	91.6721	0.00
1.6875	0.2392	91739.	4262.	-0.01156	11020.	4.76E+08	-30.6386	96.0755	0.00
1.7500	0.2306	94926.	4238.	-0.01141	11403.	4.76E+08	-30.9615	100.7158	0.00
1.8125	0.2221	98096.	4215.	-0.01126	11784.	4.76E+08	-31.2689	105.6108	0.00
1.8750	0.2137	101249.	4192.	-0.01110	12162.	4.76E+08	-31.5606	110.7801	0.00
1.9375	0.2054	104384.	4168.	-0.01094	12539.	4.76E+08	-31.8362	116.2453	0.00
2.0000	0.1973	107501.	4144.	-0.01077	12913.	4.76E+08	-32.0954	122.0299	0.00
2.0625	0.1892	110600.	4120.	-0.01060	13285.	4.76E+08	-32.3378	128.1599	0.00
2.1250	0.1814	113680.	4095.	-0.01042	13655.	4.76E+08	-32.5630	134.6640	0.00
2.1875	0.1736	116743.	4071.	-0.01024	14023.	4.76E+08	-32.7707	141.5739	0.00
2.2500	0.1660	119786.	4019.	-0.01006	14389.	4.76E+08	-104.4352	471.8684	0.00
2.3125	0.1585	122772.	3903.	-0.00987	14748.	4.76E+08	-206.8253	978.5428	0.00
2.3750	0.1512	125640.	3747.	-0.00967	15092.	4.76E+08	-207.6152	1030.	0.00
2.4375	0.1440	128392.	3591.	-0.00947	15423.	4.76E+08	-208.2894	1085.	0.00
2.5000	0.1370	131027.	3435.	-0.00926	15739.	4.76E+08	-208.8449	1143.	0.00
2.5625	0.1301	133545.	3278.	-0.00906	16042.	4.76E+08	-209.2791	1206.	0.00
2.6250	0.1234	135944.	3121.	-0.00884	16330.	4.76E+08	-209.5889	1274.	0.00
2.6875	0.1169	138226.	2964.	-0.00863	16604.	4.76E+08	-209.7710	1346.	0.00
2.7500	0.1105	140390.	2806.	-0.00841	16864.	4.76E+08	-209.8223	1425.	0.00

2.8125	0.1042	142436.	2649.	-0.00818	17110.	4.76E+08	-209.7393	1509.	0.00
2.8750	0.09819	144364.	2492.	-0.00796	17341.	4.76E+08	-209.5181	1600.	0.00
2.9375	0.09230	146174.	2335.	-0.00773	17559.	4.76E+08	-209.1549	1699.	0.00
3.0000	0.08659	147866.	2178.	-0.00750	17762.	4.76E+08	-208.6455	1807.	0.00
3.0625	0.08106	149441.	2022.	-0.00726	17951.	4.76E+08	-207.9855	1924.	0.00
3.1250	0.07570	150899.	1866.	-0.00703	18126.	4.76E+08	-207.1700	2053.	0.00
3.1875	0.07052	152240.	1711.	-0.00679	18287.	4.76E+08	-206.1941	2193.	0.00
3.2500	0.06552	153466.	1557.	-0.00655	18435.	4.76E+08	-205.0522	2347.	0.00
3.3125	0.06070	154576.	1404.	-0.00630	18568.	4.76E+08	-203.7384	2517.	0.00
3.3750	0.05606	155571.	1251.	-0.00606	18688.	4.76E+08	-202.2465	2706.	0.00
3.4375	0.05161	156453.	1100.	-0.00581	18793.	4.76E+08	-200.5694	2915.	0.00
3.5000	0.04734	157222.	950.6762	-0.00557	18886.	4.76E+08	-198.6996	3148.	0.00
3.5625	0.04326	157879.	802.4279	-0.00532	18965.	4.76E+08	-196.6291	3409.	0.00
3.6250	0.03937	158425.	655.8111	-0.00507	19030.	4.76E+08	-194.3489	3703.	0.00
3.6875	0.03566	158863.	510.9868	-0.00482	19083.	4.76E+08	-191.8492	4035.	0.00
3.7500	0.03214	159192.	368.1237	-0.00457	19122.	4.76E+08	-189.1190	4413.	0.00
3.8125	0.02881	159415.	227.3991	-0.00432	19149.	4.76E+08	-186.1466	4846.	0.00
3.8750	0.02567	159533.	88.9997	-0.00406	19163.	4.76E+08	-182.9186	5345.	0.00
3.9375	0.02271	159548.	-46.8774	-0.00381	19165.	4.76E+08	-179.4202	5925.	0.00
4.0000	0.01995	159463.	-180.0231	-0.00356	19155.	4.76E+08	-175.6352	6604.	0.00
4.0625	0.01737	159278.	-310.2157	-0.00331	19133.	4.76E+08	-171.5449	7407.	0.00
4.1250	0.01498	158997.	-436.6200	-0.00306	19099.	4.76E+08	-165.5333	8286.	0.00
4.1875	0.01278	158623.	-558.3550	-0.00281	19054.	4.76E+08	-159.0934	9334.	0.00
4.2500	0.01077	158160.	-920.1031	-0.00256	18998.	4.76E+08	-805.5682	56096.	0.00
4.3125	0.00895	157243.	-1905.	-0.00231	18888.	4.76E+08	-1821.	152724.	0.00
4.3750	0.00731	155302.	-3374.	-0.00206	18655.	4.76E+08	-2096.	215181.	0.00
4.4375	0.00585	152182.	-5033.	-0.00182	18280.	4.76E+08	-2328.	298411.	0.00
4.5000	0.00457	147752.	-6848.	-0.00158	17748.	4.76E+08	-2513.	412047.	0.00
4.5625	0.00347	141909.	-8784.	-0.00136	17046.	4.76E+08	-2649.	571954.	0.00
4.6250	0.00254	134576.	-10801.	-0.00114	16166.	4.76E+08	-2729.	805953.	0.00
4.6875	0.00177	125708.	-12855.	-9.33E-04	15100.	4.76E+08	-2748.	1167221.	0.00
4.7500	0.00114	115294.	-14896.	-7.43E-04	13849.	4.76E+08	-2694.	1771146.	0.00
4.8125	6.52E-04	103364.	-16859.	-5.70E-04	12416.	4.76E+08	-2543.	2925899.	0.00
4.8750	2.85E-04	90004.	-18650.	-4.18E-04	10812.	4.76E+08	-2233.	5875420.	0.00
4.9375	2.48E-05	75389.	-19840.	-2.88E-04	9056.	4.76E+08	-939.4601	2.84E+07	0.00
5.0000	-1.46E-04	60245.	-19386.	-1.81E-04	7237.	4.76E+08	2150.	1.10E+07	0.00
5.0625	-2.46E-04	46310.	-17601.	-9.66E-05	5563.	4.76E+08	2609.	7949999.	0.00
5.1250	-2.91E-04	33843.	-15541.	-3.34E-05	4065.	4.76E+08	2885.	7430756.	0.00
5.1875	-2.96E-04	22999.	-13311.	1.14E-05	2763.	4.76E+08	3062.	7750888.	0.00
5.2500	-2.74E-04	13877.	-10991.	4.05E-05	1667.	4.76E+08	3125.	8550308.	0.00
5.3125	-2.36E-04	6513.	-8690.	5.66E-05	782.3279	4.76E+08	3009.	9580923.	0.00
5.3750	-1.89E-04	841.1256	-6494.	6.24E-05	101.0377	4.76E+08	2849.	1.13E+07	0.00
5.4375	-1.42E-04	-3228.	-4431.	6.05E-05	387.7692	4.76E+08	2651.	1.40E+07	0.00
5.5000	-9.85E-05	-5806.	-2530.	5.34E-05	697.4382	4.76E+08	2420.	1.84E+07	0.00
5.5625	-6.19E-05	-7023.	-814.5488	4.32E-05	843.6109	4.76E+08	2155.	2.61E+07	0.00
5.6250	-3.37E-05	-7028.	624.6506	3.22E-05	844.2059	4.76E+08	1683.	3.75E+07	0.00
5.6875	-1.37E-05	-6086.	1513.	2.18E-05	731.0595	4.76E+08	684.9962	3.75E+07	0.00
5.7500	-9.31E-07	-4759.	1787.	1.33E-05	571.6288	4.76E+08	46.5426	3.75E+07	0.00
5.8125	6.21E-06	-3405.	1688.	6.84E-06	409.0533	4.76E+08	-310.4991	3.75E+07	0.00
5.8750	9.32E-06	-2227.	1397.	2.40E-06	267.4578	4.76E+08	-466.1645	3.75E+07	0.00
5.9375	9.80E-06	-1310.	1038.	-3.93E-07	157.3603	4.76E+08	-490.1610	3.75E+07	0.00
6.0000	8.73E-06	-669.1730	690.6837	-1.95E-06	80.3824	4.76E+08	-436.6893	3.75E+07	0.00
6.0625	6.87E-06	-273.9791	398.0581	-2.70E-06	32.9109	4.76E+08	-343.6455	3.75E+07	0.00
6.1250	4.69E-06	-72.0858	181.2912	-2.97E-06	8.6591	4.76E+08	-234.3997	3.75E+07	0.00
6.1875	2.42E-06	-2.0423	48.0572	-3.03E-06	0.2453	4.76E+08	-120.8910	3.75E+07	0.00
6.2500	1.45E-07	0.00	0.00	-3.03E-06	0.00	4.76E+08	-7.2616	1.88E+07	0.00

* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

```
Pile-head deflection            =     0.50000000 inches
Computed slope at pile head     =    -0.01354715 radians
Maximum bending moment          =        159548. inch-lbs
Maximum shear force             =        -19840. lbs
Depth of maximum bending moment =     3.93750000 feet below pile head
Depth of maximum shear force    =     4.93750000 feet below pile head
Number of iterations            =             15
Number of zero deflection points =             3
```

Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

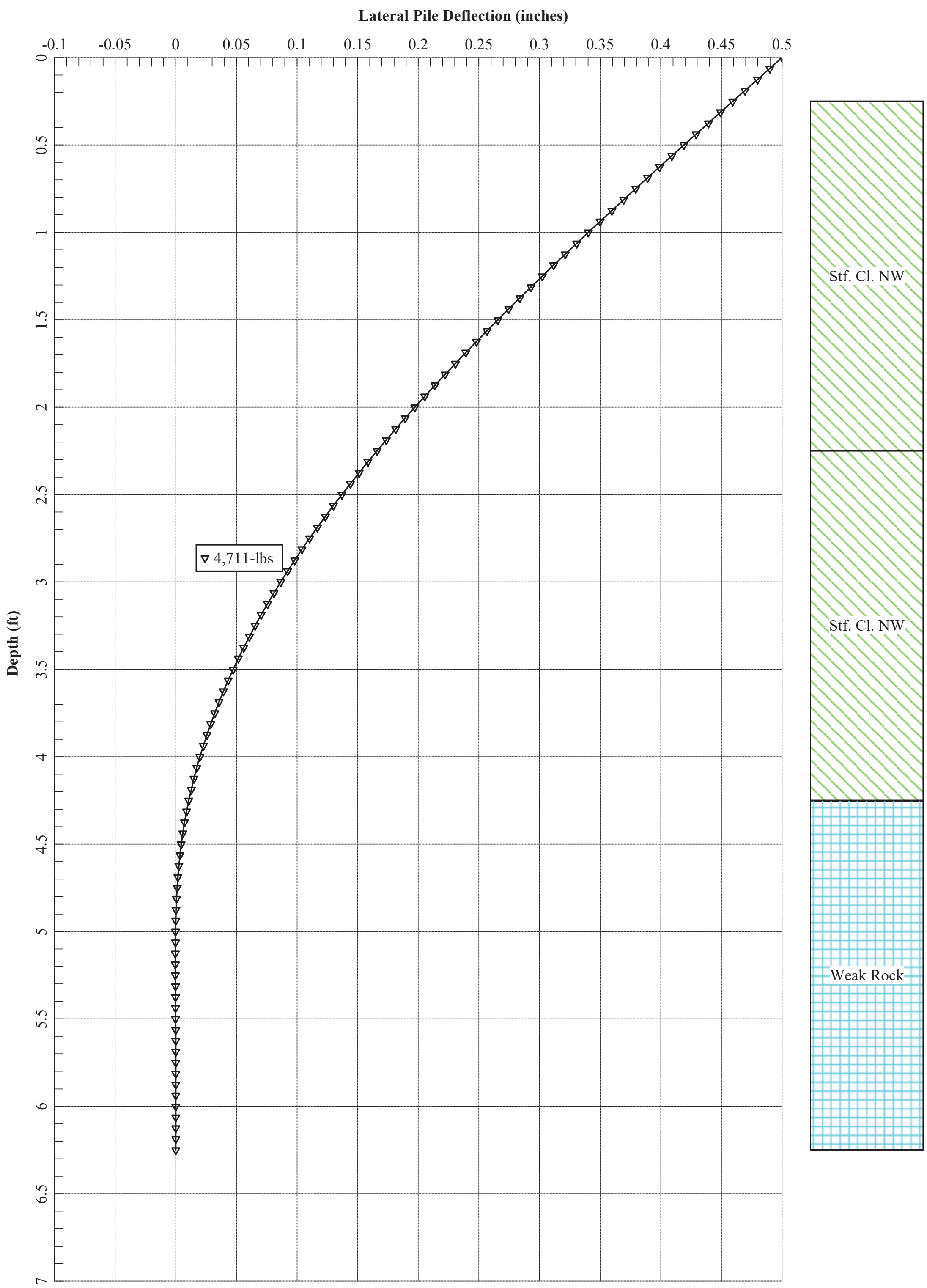
Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	y, in	0.5000	M, in-lb	0.00	0.00	0.5000	-0.01355	-19840.	159548.

```
Maximum pile-head deflection = 0.5000000000 inches
Maximum pile-head rotation   = -0.0135471544 radians = -0.776195 deg.

The analysis ended normally.
```

G2 Consulting Group, LLC
Mercer County Solar Power Plant
Capacity Area No. 2 6-ft



```
===============================================================================

                    LPile for Windows, Version 2016-09.011

                Analysis of Individual Piles and Drilled Shafts
               Subjected to Lateral Loading Using the p-y Method
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-------------------------------------------------------------------------------
                           Files Used for Analysis
-------------------------------------------------------------------------------

Path to file locations:
\\troy\geotechnical\2019 Geotechnical\003 Ann Arbor\193508 (j) Merccer Co Solar KY - Savion\Analysis\LPile\Cap Areas\

Name of input data file:
Capacity Area No. 4 - 5ft.lp9d

Name of output report file:
Capacity Area No. 4 - 5ft.lp9o

Name of plot output file:
Capacity Area No. 4 - 5ft.lp9p

Name of runtime message file:
Capacity Area No. 4 - 5ft.lp9r


-------------------------------------------------------------------------------
                          Date and Time of Analysis
-------------------------------------------------------------------------------

               Date:  December 27, 2019          Time:  16:15:58


-------------------------------------------------------------------------------
                                Problem Title
-------------------------------------------------------------------------------

Project Name: Mercer County Solar Power Plant

Job Number: 193508

Client: Savion, LLC

Engineer: KAC

Description: Capacity Area 3 & 4 - 5ft



-------------------------------------------------------------------------------
                          Program Options and Settings
-------------------------------------------------------------------------------

Computational Options:
 - Use unfactored loads in computations (conventional analysis)
Engineering Units Used for Data Input and Computations:
 - US Customary System Units (pounds, feet, inches)

Analysis Control Options:
 - Maximum number of iterations allowed               =          500
 - Deflection tolerance for convergence               =   1.0000E-05 in
 - Maximum allowable deflection                       =     100.0000 in
 - Number of pile increments                          =          100

Loading Type and Number of Cycles of Loading:
 - Cyclic loading specified
 - Number of cycles of loading                        =         1000 cycles
 - Use of p-y modification factors for p-y curves not selected
 - Analysis uses layering correction (Method of Georgiadis)
```

```
 - Layering correction is not computed if soil above is of same type
 - No distributed lateral loads are entered
 - Loading by lateral soil movements acting on pile not selected
 - Input of shear resistance at the pile tip not selected
 - Computation of pile-head foundation stiffness matrix not selected
 - Push-over analysis of pile not selected
 - Buckling analysis of pile not selected

Output Options:
 - Output files use decimal points to denote decimal symbols.
 - Values of pile-head deflection, bending moment, shear force, and
   soil reaction are printed for full length of pile.
 - Printing Increment (nodal spacing of output points) = 1
 - No p-y curves to be computed and reported for user-specified depths
 - Print using wide report formats



--------------------------------------------------------------------------------
                    Pile Structural Properties and Geometry
--------------------------------------------------------------------------------

Number of pile sections defined                         =           1
Total length of pile                                    =       5.250 ft
Depth of ground surface below top of pile               =      0.2500 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over
the length of the pile. A summary of values of pile diameter vs. depth follows.

            Depth Below          Pile
Point        Pile Head          Diameter
 No.           feet              inches
-----      -------------     -------------
  1            0.000            3.9400
  2            5.250            3.9400


Input Structural Properties for Pile Sections:
----------------------------------------------

Pile Section No. 1:

   Section 1 is an elastic pile
   Cross-sectional Shape                               = Strong H-Pile
   Length of section                                   =     5.250000 ft
   Flange Width                                        =     3.940000 in
   Section Depth                                       =     5.900000 in
   Flange Thickness                                    =     0.215000 in
   Web Thickness                                       =     0.170000 in
   Section Area                                        =     2.680000 sq. in
   Moment of Inertia                                   =    16.400000 in^4
   Elastic Modulus                                     =    29000000. psi



--------------------------------------------------------------------------------
                      Ground Slope and Pile Batter Angles
--------------------------------------------------------------------------------

Ground Slope Angle                                      =       0.000 degrees
                                                        =       0.000 radians

Pile Batter Angle                                       =       0.000 degrees
                                                        =       0.000 radians


--------------------------------------------------------------------------------
                      Soil and Rock Layering Information
--------------------------------------------------------------------------------

The soil profile is modelled using 2 layers

Layer 1 is stiff clay without free water

   Distance from top of pile to top of layer           =     0.250000 ft
   Distance from top of pile to bottom of layer        =     2.250000 ft
   Effective unit weight at top of layer               =   115.000000 pcf
   Effective unit weight at bottom of layer            =   115.000000 pcf
   Undrained cohesion at top of layer                  =   500.000000 psf
   Undrained cohesion at bottom of layer               =   500.000000 psf
   Epsilon-50 at top of layer                          =     0.020000
   Epsilon-50 at bottom of layer                       =     0.020000


Layer 2 is stiff clay without free water

   Distance from top of pile to top of layer           =     2.250000 ft
```

```
   Distance from top of pile to bottom of layer        =     8.250000 ft
   Effective unit weight at top of layer               =   125.000000 pcf
   Effective unit weight at bottom of layer            =   125.000000 pcf
   Undrained cohesion at top of layer                  =        2500. psf
   Undrained cohesion at bottom of layer               =        2500. psf
   Epsilon-50 at top of layer                          =     0.006500
   Epsilon-50 at bottom of layer                       =     0.006500
```

(Depth of the lowest soil layer extends 3.000 ft below the pile tip)

Summary of Input Soil Properties

Layer Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Undrained Cohesion psf	E50 or krm
1	Stiff Clay	0.2500	115.0000	500.0000	0.02000
	w/o Free Water	2.2500	115.0000	500.0000	0.02000
2	Stiff Clay	2.2500	125.0000	2500.	0.00650
	w/o Free Water	8.2500	125.0000	2500.	0.00650

Cyclic Loading Type

Cyclic loading criteria were used for computation of p-y curves for all analyses.

Number of cycles of loading = 1000

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	4	y = 0.500000 in	M = 0.0000 in-lbs	0.0000000	N.A.

V = shear force applied normal to pile axis
M = bending moment applied to pile head
y = lateral deflection normal to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applied to pile head
Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).
Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Moment-curvature properties were derived from elastic section properties

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.2500	0.00	N.A.	No	0.00	1574.
2	2.2500	2.0000	Yes	No	1574.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 0.0 in-lbs
Axial load at pile head = 0.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness in-lb^2	Soil Res. p lb/inch	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.5000	0.00	2033.	-0.01167	0.00	4.76E+08	0.00	0.00	0.00
0.05250	0.4926	1281.	2033.	-0.01167	153.8633	4.76E+08	0.00	0.00	0.00
0.1050	0.4853	2562.	2033.	-0.01167	307.7266	4.76E+08	0.00	0.00	0.00
0.1575	0.4779	3843.	2033.	-0.01166	461.5899	4.76E+08	0.00	0.00	0.00
0.2100	0.4706	5124.	2033.	-0.01166	615.4532	4.76E+08	0.00	0.00	0.00
0.2625	0.4633	6404.	2027.	-0.01165	769.3165	4.76E+08	-19.7882	26.9104	0.00
0.3150	0.4559	7678.	2014.	-0.01164	922.2364	4.76E+08	-20.3095	28.0639	0.00
0.3675	0.4486	8942.	2001.	-0.01163	1074.	4.76E+08	-20.8252	29.2466	0.00
0.4200	0.4413	10199.	1988.	-0.01162	1225.	4.76E+08	-21.3350	30.4597	0.00
0.4725	0.4340	11447.	1974.	-0.01160	1375.	4.76E+08	-21.8389	31.7046	0.00
0.5250	0.4267	12687.	1961.	-0.01159	1524.	4.76E+08	-22.3367	32.9824	0.00
0.5775	0.4194	13918.	1946.	-0.01157	1672.	4.76E+08	-22.8284	34.2947	0.00
0.6300	0.4121	15139.	1932.	-0.01155	1819.	4.76E+08	-23.3139	35.6429	0.00
0.6825	0.4048	16352.	1917.	-0.01153	1964.	4.76E+08	-23.7930	37.0286	0.00
0.7350	0.3976	17555.	1902.	-0.01151	2109.	4.76E+08	-24.2656	38.4534	0.00
0.7875	0.3903	18748.	1886.	-0.01148	2252.	4.76E+08	-24.7317	39.9191	0.00
0.8400	0.3831	19932.	1871.	-0.01146	2394.	4.76E+08	-25.1910	41.4274	0.00
0.8925	0.3759	21105.	1855.	-0.01143	2535.	4.76E+08	-25.6436	42.9804	0.00
0.9450	0.3687	22268.	1838.	-0.01140	2675.	4.76E+08	-26.0892	44.5802	0.00
0.9975	0.3615	23421.	1822.	-0.01137	2813.	4.76E+08	-26.5278	46.2289	0.00
1.0500	0.3544	24564.	1805.	-0.01134	2951.	4.76E+08	-26.9591	47.9289	0.00
1.1025	0.3472	25696.	1788.	-0.01130	3087.	4.76E+08	-27.3831	49.6827	0.00
1.1550	0.3401	26816.	1770.	-0.01127	3221.	4.76E+08	-27.7996	51.4929	0.00
1.2075	0.3330	27926.	1753.	-0.01123	3355.	4.76E+08	-28.2085	53.3624	0.00
1.2600	0.3260	29025.	1735.	-0.01120	3487.	4.76E+08	-28.6095	55.2942	0.00
1.3125	0.3189	30112.	1717.	-0.01116	3617.	4.76E+08	-29.0026	57.2916	0.00
1.3650	0.3119	31188.	1698.	-0.01112	3746.	4.76E+08	-29.3877	59.3579	0.00
1.4175	0.3049	32252.	1680.	-0.01107	3874.	4.76E+08	-29.7644	61.4970	0.00
1.4700	0.2980	33304.	1661.	-0.01103	4001.	4.76E+08	-30.1326	63.7127	0.00
1.5225	0.2910	34345.	1642.	-0.01099	4126.	4.76E+08	-30.4922	66.0094	0.00
1.5750	0.2841	35373.	1622.	-0.01094	4249.	4.76E+08	-30.8429	68.3917	0.00
1.6275	0.2772	36389.	1603.	-0.01089	4371.	4.76E+08	-31.1845	70.8646	0.00
1.6800	0.2704	37393.	1583.	-0.01084	4492.	4.76E+08	-31.5168	73.4333	0.00
1.7325	0.2636	38384.	1563.	-0.01079	4611.	4.76E+08	-31.8397	76.1038	0.00
1.7850	0.2568	39362.	1543.	-0.01074	4728.	4.76E+08	-32.1527	78.8823	0.00
1.8375	0.2500	40328.	1523.	-0.01069	4844.	4.76E+08	-32.4558	81.7755	0.00
1.8900	0.2433	41281.	1502.	-0.01063	4959.	4.76E+08	-32.7486	84.7910	0.00
1.9425	0.2366	42221.	1481.	-0.01058	5072.	4.76E+08	-33.0308	87.9368	0.00
1.9950	0.2300	43147.	1461.	-0.01052	5183.	4.76E+08	-33.3021	91.2216	0.00
2.0475	0.2234	44061.	1439.	-0.01046	5293.	4.76E+08	-33.5623	94.6552	0.00
2.1000	0.2168	44961.	1418.	-0.01041	5401.	4.76E+08	-33.8110	98.2481	0.00
2.1525	0.2103	45848.	1397.	-0.01035	5507.	4.76E+08	-34.0478	102.0120	0.00
2.2050	0.2038	46721.	1375.	-0.01028	5612.	4.76E+08	-34.2723	105.9596	0.00
2.2575	0.1973	47581.	1297.	-0.01022	5715.	4.76E+08	-215.4208	687.8205	0.00
2.3100	0.1909	48355.	1161.	-0.01016	5808.	4.76E+08	-216.5153	714.5654	0.00
2.3625	0.1845	49043.	1024.	-0.01009	5891.	4.76E+08	-217.5275	742.7283	0.00
2.4150	0.1782	49645.	886.5535	-0.01003	5963.	4.76E+08	-218.4543	772.4289	0.00
2.4675	0.1719	50160.	748.6634	-0.00996	6025.	4.76E+08	-219.2922	803.8011	0.00
2.5200	0.1656	50588.	610.2745	-0.00990	6077.	4.76E+08	-220.0376	836.9959	0.00
2.5725	0.1594	50929.	471.4464	-0.00983	6118.	4.76E+08	-220.6864	872.1838	0.00
2.6250	0.1532	51182.	332.2414	-0.00976	6148.	4.76E+08	-221.2342	909.5581	0.00
2.6775	0.1471	51348.	192.7247	-0.00969	6168.	4.76E+08	-221.6760	949.3393	0.00
2.7300	0.1410	51425.	52.9648	-0.00962	6177.	4.76E+08	-222.0064	991.7798	0.00
2.7825	0.1350	51414.	-86.9664	-0.00956	6176.	4.76E+08	-222.2196	1037.	0.00
2.8350	0.1290	51316.	-226.9928	-0.00949	6164.	4.76E+08	-222.3087	1086.	0.00
2.8875	0.1230	51128.	-367.0340	-0.00942	6142.	4.76E+08	-222.2664	1138.	0.00
2.9400	0.1171	50853.	-507.0044	-0.00935	6109.	4.76E+08	-222.0842	1195.	0.00
2.9925	0.1112	50490.	-646.8131	-0.00929	6065.	4.76E+08	-221.7527	1256.	0.00
3.0450	0.1054	50038.	-786.3624	-0.00922	6011.	4.76E+08	-221.2611	1322.	0.00
3.0975	0.09962	49499.	-925.5478	-0.00915	5946.	4.76E+08	-220.5971	1395.	0.00
3.1500	0.09388	48872.	-1064.	-0.00909	5871.	4.76E+08	-219.7466	1475.	0.00
3.2025	0.08817	48158.	-1202.	-0.00902	5785.	4.76E+08	-218.6931	1563.	0.00
3.2550	0.08251	47357.	-1340.	-0.00896	5689.	4.76E+08	-217.4174	1660.	0.00
3.3075	0.07688	46470.	-1476.	-0.00890	5582.	4.76E+08	-215.8969	1769.	0.00
3.3600	0.07129	45497.	-1612.	-0.00884	5465.	4.76E+08	-214.1044	1892.	0.00
3.4125	0.06574	44439.	-1746.	-0.00878	5338.	4.76E+08	-212.0072	2032.	0.00
3.4650	0.06023	43297.	-1879.	-0.00872	5201.	4.76E+08	-209.5653	2192.	0.00
3.5175	0.05476	42072.	-2010.	-0.00866	5054.	4.76E+08	-206.7285	2379.	0.00
3.5700	0.04932	40765.	-2139.	-0.00861	4897.	4.76E+08	-203.4332	2599.	0.00
3.6225	0.04391	39377.	-2266.	-0.00856	4730.	4.76E+08	-199.5966	2864.	0.00
3.6750	0.03854	37910.	-2390.	-0.00850	4554.	4.76E+08	-195.1074	3190.	0.00
3.7275	0.03319	36365.	-2512.	-0.00846	4368.	4.76E+08	-189.8110	3603.	0.00
3.7800	0.02788	34745.	-2629.	-0.00841	4174.	4.76E+08	-183.4819	4146.	0.00
3.8325	0.02260	33052.	-2742.	-0.00836	3970.	4.76E+08	-175.7698	4900.	0.00

3.8850	0.01734	31290.	-2850.	-0.00832	3759.	4.76E+08	-166.0796	6033.	0.00
3.9375	0.01211	29461.	-2951.	-0.00828	3539.	4.76E+08	-153.2509	7970.	0.00
3.9900	0.00691	27572.	-3041.	-0.00824	3312.	4.76E+08	-134.3919	12253.	0.00
4.0425	0.00173	25629.	-3114.	-0.00821	3079.	4.76E+08	-95.7234	34889.	0.00
4.0950	-0.00343	23649.	-3108.	-0.00818	2841.	4.76E+08	114.6603	21050.	0.00
4.1475	-0.00857	21713.	-3026.	-0.00814	2608.	4.76E+08	144.0240	10585.	0.00
4.2000	-0.01369	19836.	-2930.	-0.00812	2383.	4.76E+08	161.8846	7447.	0.00
4.2525	-0.01880	18022.	-2824.	-0.00809	2165.	4.76E+08	175.2136	5872.	0.00
4.3050	-0.02389	16278.	-2710.	-0.00807	1955.	4.76E+08	186.0207	4905.	0.00
4.3575	-0.02897	14607.	-2590.	-0.00805	1755.	4.76E+08	195.1944	4245.	0.00
4.4100	-0.03403	13015.	-2464.	-0.00803	1563.	4.76E+08	203.2130	3762.	0.00
4.4625	-0.03909	11502.	-2334.	-0.00801	1382.	4.76E+08	210.3666	3391.	0.00
4.5150	-0.04413	10074.	-2199.	-0.00800	1210.	4.76E+08	216.8450	3096.	0.00
4.5675	-0.04917	8731.	-2061.	-0.00799	1049.	4.76E+08	222.7804	2855.	0.00
4.6200	-0.05420	7477.	-1919.	-0.00798	898.1248	4.76E+08	228.2684	2654.	0.00
4.6725	-0.05922	6313.	-1773.	-0.00797	758.3492	4.76E+08	233.3808	2483.	0.00
4.7250	-0.06424	5242.	-1625.	-0.00796	629.7004	4.76E+08	238.1728	2336.	0.00
4.7775	-0.06925	4266.	-1473.	-0.00795	512.4068	4.76E+08	242.6880	2208.	0.00
4.8300	-0.07426	3386.	-1319.	-0.00795	406.6837	4.76E+08	246.9615	2095.	0.00
4.8825	-0.07926	2603.	-1162.	-0.00795	312.7348	4.76E+08	251.0217	1995.	0.00
4.9350	-0.08427	1921.	-1003.	-0.00794	230.7538	4.76E+08	254.8923	1906.	0.00
4.9875	-0.08927	1340.	-841.2657	-0.00794	160.9250	4.76E+08	258.5930	1825.	0.00
5.0400	-0.09427	861.0009	-677.2346	-0.00794	103.4251	4.76E+08	262.1406	1752.	0.00
5.0925	-0.09927	486.3649	-511.0124	-0.00794	58.4231	4.76E+08	265.5492	1685.	0.00
5.1450	-0.1043	217.1253	-342.6826	-0.00794	26.0815	4.76E+08	268.8311	1624.	0.00
5.1975	-0.1093	54.5849	-172.3217	-0.00794	6.5568	4.76E+08	271.9970	1568.	0.00
5.2500	-0.1143	0.00	0.00	-0.00794	0.00	4.76E+08	275.0560	758.1957	0.00

* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

```
Pile-head deflection            =     0.50000000 inches
Computed slope at pile head     =    -0.01167001 radians
Maximum bending moment          =         51425. inch-lbs
Maximum shear force             =         -3114. lbs
Depth of maximum bending moment =     2.73000000 feet below pile head
Depth of maximum shear force    =     4.04250000 feet below pile head
Number of iterations            =             26
Number of zero deflection points =             1
```

Summary of Pile-head Responses for Conventional Analyses

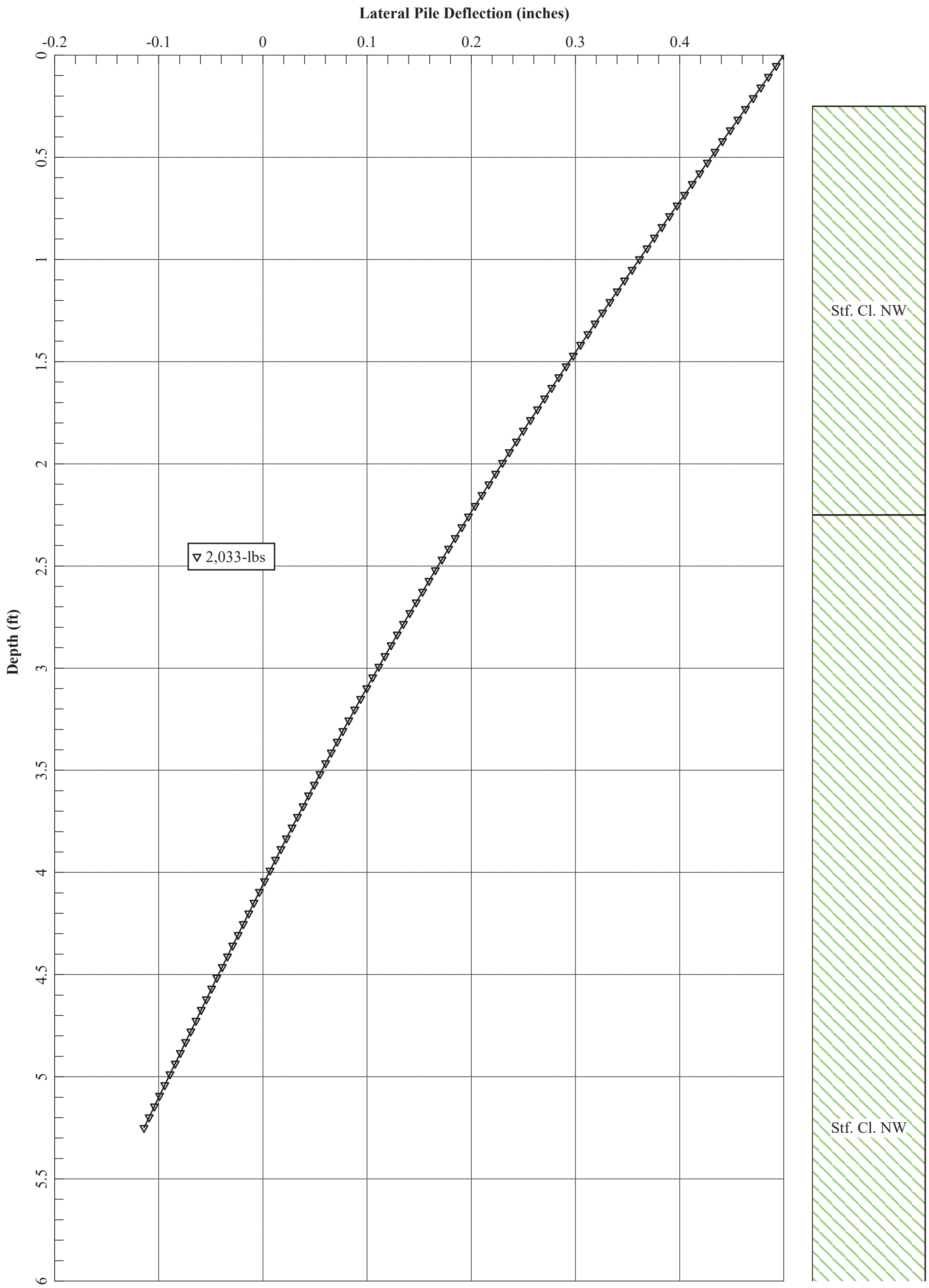
Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	y, in	0.5000	M, in-lb	0.00	0.00	0.5000	-0.01167	-3114.	51425.

Maximum pile-head deflection = 0.5000000000 inches
Maximum pile-head rotation = -0.0116700086 radians = -0.668642 deg.

The analysis ended normally.


Lateral Pile Deflection (inches)
-0.2
-0.1
0
0.1
0.2
0.3
0.4
Depth (ft)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
▿ 2,033-lbs
Stf. Cl. NW
Stf. Cl. NW

```
===============================================================================

                    LPile for Windows, Version 2016-09.011

                Analysis of Individual Piles and Drilled Shafts
               Subjected to Lateral Loading Using the p-y Method
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===============================================================================

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-------------------------------------------------------------------------------
                            Files Used for Analysis
-------------------------------------------------------------------------------

Path to file locations:
\\troy\geotechnical\2019 Geotechnical\003 Ann Arbor\193508 (j) Merccer Co Solar KY - Savion\Analysis\LPile\Cap Areas\

Name of input data file:
Capacity Area No. 4 - 6ft.lp9d

Name of output report file:
Capacity Area No. 4 - 6ft.lp9o

Name of plot output file:
Capacity Area No. 4 - 6ft.lp9p

Name of runtime message file:
Capacity Area No. 4 - 6ft.lp9r


-------------------------------------------------------------------------------
                           Date and Time of Analysis
-------------------------------------------------------------------------------

              Date:  December 27, 2019          Time:  16:17:48


-------------------------------------------------------------------------------
                                 Problem Title
-------------------------------------------------------------------------------

Project Name: Mercer County Solar Power Plant

Job Number: 193508

Client: Savion, LLC

Engineer: KAC

Description: Capacity Area 3 & 4 - 6ft



-------------------------------------------------------------------------------
                          Program Options and Settings
-------------------------------------------------------------------------------

Computational Options:
 - Use unfactored loads in computations (conventional analysis)
Engineering Units Used for Data Input and Computations:
 - US Customary System Units (pounds, feet, inches)

Analysis Control Options:
 - Maximum number of iterations allowed               =          500
 - Deflection tolerance for convergence               =   1.0000E-05 in
 - Maximum allowable deflection                       =     100.0000 in
 - Number of pile increments                          =          100

Loading Type and Number of Cycles of Loading:
 - Cyclic loading specified
 - Number of cycles of loading                        =         1000 cycles
 - Use of p-y modification factors for p-y curves not selected
 - Analysis uses layering correction (Method of Georgiadis)
```

```
 - Layering correction is not computed if soil above is of same type
 - No distributed lateral loads are entered
 - Loading by lateral soil movements acting on pile not selected
 - Input of shear resistance at the pile tip not selected
 - Computation of pile-head foundation stiffness matrix not selected
 - Push-over analysis of pile not selected
 - Buckling analysis of pile not selected

Output Options:
 - Output files use decimal points to denote decimal symbols.
 - Values of pile-head deflection, bending moment, shear force, and
   soil reaction are printed for full length of pile.
 - Printing Increment (nodal spacing of output points) = 1
 - No p-y curves to be computed and reported for user-specified depths
 - Print using wide report formats



--------------------------------------------------------------------------------
                    Pile Structural Properties and Geometry
--------------------------------------------------------------------------------

Number of pile sections defined                        =           1
Total length of pile                                   =       6.250 ft
Depth of ground surface below top of pile              =      0.2500 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over
the length of the pile. A summary of values of pile diameter vs. depth follows.

            Depth Below          Pile
Point        Pile Head         Diameter
 No.           feet             inches
-----      -------------     -------------
  1            0.000            3.9400
  2            6.250            3.9400


Input Structural Properties for Pile Sections:
----------------------------------------------

Pile Section No. 1:

   Section 1 is an elastic pile
   Cross-sectional Shape                              = Strong H-Pile
   Length of section                                  =     6.250000 ft
   Flange Width                                       =     3.940000 in
   Section Depth                                      =     5.900000 in
   Flange Thickness                                   =     0.215000 in
   Web Thickness                                      =     0.170000 in
   Section Area                                       =     2.680000 sq. in
   Moment of Inertia                                  =    16.400000 in^4
   Elastic Modulus                                    =    29000000. psi



--------------------------------------------------------------------------------
                      Ground Slope and Pile Batter Angles
--------------------------------------------------------------------------------

Ground Slope Angle                                     =       0.000 degrees
                                                       =       0.000 radians

Pile Batter Angle                                      =       0.000 degrees
                                                       =       0.000 radians


--------------------------------------------------------------------------------
                      Soil and Rock Layering Information
--------------------------------------------------------------------------------

The soil profile is modelled using 2 layers

Layer 1 is stiff clay without free water

   Distance from top of pile to top of layer          =     0.250000 ft
   Distance from top of pile to bottom of layer       =     2.250000 ft
   Effective unit weight at top of layer              =   115.000000 pcf
   Effective unit weight at bottom of layer           =   115.000000 pcf
   Undrained cohesion at top of layer                 =   500.000000 psf
   Undrained cohesion at bottom of layer              =   500.000000 psf
   Epsilon-50 at top of layer                         =     0.020000
   Epsilon-50 at bottom of layer                      =     0.020000


Layer 2 is stiff clay without free water

   Distance from top of pile to top of layer          =     2.250000 ft
```

```
   Distance from top of pile to bottom of layer       =     8.250000 ft
   Effective unit weight at top of layer              =   125.000000 pcf
   Effective unit weight at bottom of layer           =   125.000000 pcf
   Undrained cohesion at top of layer                 =        2500. psf
   Undrained cohesion at bottom of layer              =        2500. psf
   Epsilon-50 at top of layer                         =     0.006500
   Epsilon-50 at bottom of layer                      =     0.006500


 (Depth of the lowest soil layer extends 2.000 ft below the pile tip)


--------------------------------------------------------------------------------
                        Summary of Input Soil Properties
--------------------------------------------------------------------------------

Layer        Soil Type          Layer      Effective    Undrained       E50
Layer          Name             Depth       Unit Wt.    Cohesion        or
 Num.     (p-y Curve Type)        ft          pcf          psf          krm
-----   -------------------    ----------   ----------   ----------   ----------
  1         Stiff Clay           0.2500     115.0000     500.0000     0.02000
          w/o Free Water         2.2500     115.0000     500.0000     0.02000
  2         Stiff Clay           2.2500     125.0000        2500.     0.00650
          w/o Free Water         8.2500     125.0000        2500.     0.00650


--------------------------------------------------------------------------------
                               Cyclic Loading Type
--------------------------------------------------------------------------------

Cyclic loading criteria were used for computation of p-y curves for all analyses.

Number of cycles of loading = 1000


--------------------------------------------------------------------------------
                Pile-head Loading and Pile-head Fixity Conditions
--------------------------------------------------------------------------------

Number of loads specified = 1

Load    Load        Condition               Condition           Axial Thrust      Compute Top y
 No.    Type            1                       2                 Force, lbs      vs. Pile Length
-----   ----    --------------------   -----------------------   ----------------   ---------------
   1      4     y =      0.500000 in    M =       0.0000 in-lbs         0.0000000          N.A.

V = shear force applied normal to pile axis
M = bending moment applied to pile head
y = lateral deflection normal to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applied to pile head
Values of top y vs. pile lengths can be computed only for load types with
specified shear loading (Load Types 1, 2, and 3).
Thrust force is assumed to be acting axially for all pile batter angles.



--------------------------------------------------------------------------------
     Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness
--------------------------------------------------------------------------------

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:
-------------------
Moment-curvature properties were derived from elastic section properties



--------------------------------------------------------------------------------
           Layering Correction Equivalent Depths of Soil & Rock Layers
--------------------------------------------------------------------------------

         Top of    Equivalent
          Layer     Top Depth  Same Layer  Layer is        F0          F1
Layer     Below       Below      Type As    Rock or     Integral    Integral
 No.    Pile Head   Grnd Surf     Layer     is Below    for Layer   for Layer
            ft          ft        Above    Rock Layer      lbs         lbs
-----   ----------  ----------  ----------  ----------  ----------  ----------
  1        0.2500        0.00       N.A.        No           0.00       1574.
  2        2.2500      2.0000       Yes         No          1574.       N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals
       for Layer n. Layering correction equivalent depths are computed only
       for soil types with both shallow-depth and deep-depth expressions for
       peak lateral load transfer. These soil types are soft and stiff clays,
       non-liquefied sands, and cemented c-phi soil.
```

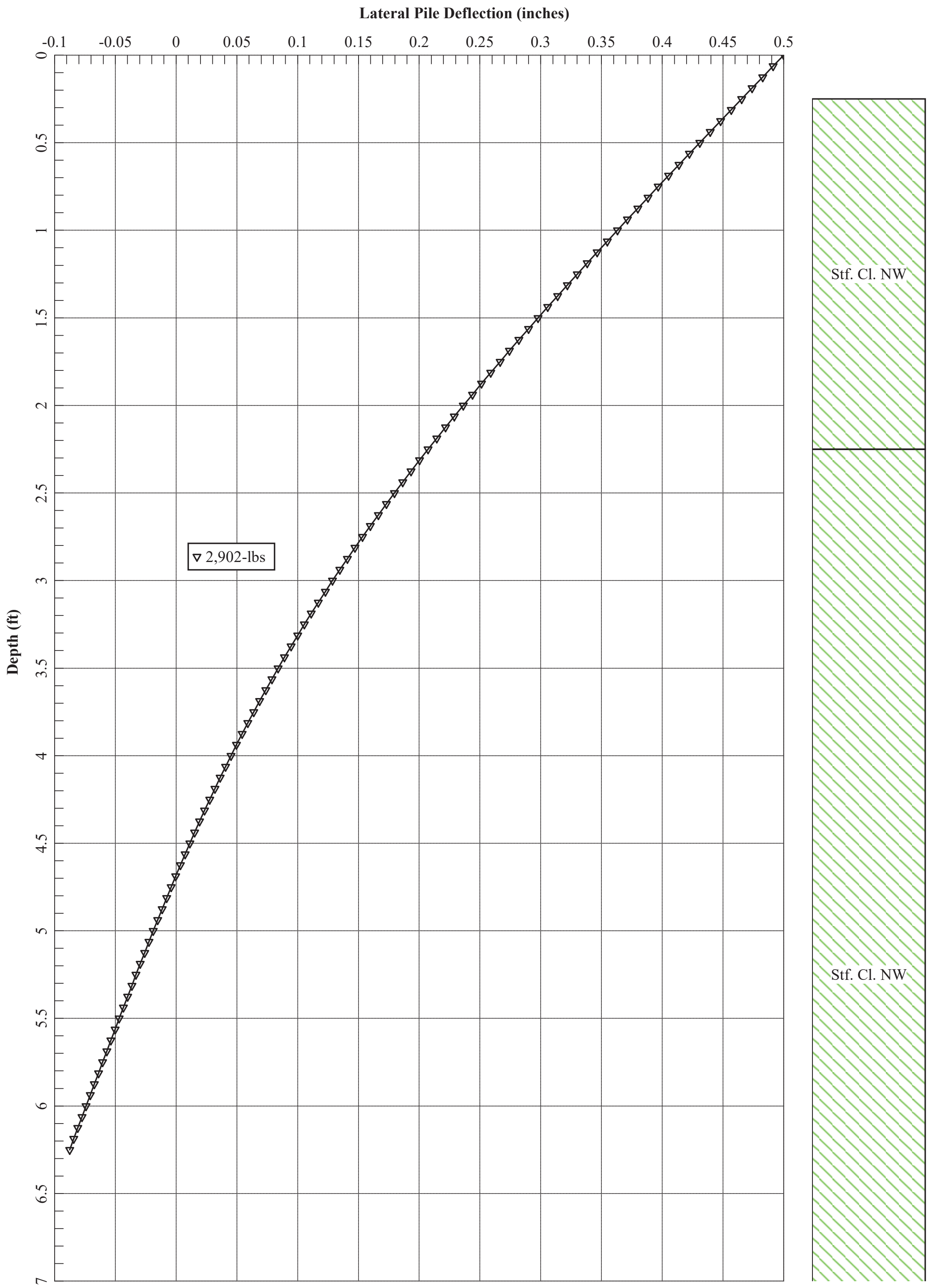
Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 0.0 in-lbs
Axial load at pile head = 0.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness in-lb^2	Soil Res. p lb/inch	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.5000	0.00	2902.	-0.01155	0.00	4.76E+08	0.00	0.00	0.00
0.06250	0.4913	2176.	2902.	-0.01155	261.4301	4.76E+08	0.00	0.00	0.00
0.1250	0.4827	4353.	2902.	-0.01155	522.8602	4.76E+08	0.00	0.00	0.00
0.1875	0.4740	6529.	2902.	-0.01154	784.2903	4.76E+08	0.00	0.00	0.00
0.2500	0.4654	8705.	2894.	-0.01153	1046.	4.76E+08	-19.6670	31.6960	0.00
0.3125	0.4567	10871.	2879.	-0.01151	1306.	4.76E+08	-20.2899	33.3184	0.00
0.3750	0.4481	13025.	2864.	-0.01149	1565.	4.76E+08	-20.9048	34.9891	0.00
0.4375	0.4395	15167.	2848.	-0.01147	1822.	4.76E+08	-21.5116	36.7102	0.00
0.5000	0.4309	17297.	2832.	-0.01144	2078.	4.76E+08	-22.1102	38.4842	0.00
0.5625	0.4223	19414.	2815.	-0.01141	2332.	4.76E+08	-22.7004	40.3134	0.00
0.6250	0.4138	21519.	2798.	-0.01138	2585.	4.76E+08	-23.2820	42.2007	0.00
0.6875	0.4052	23611.	2780.	-0.01135	2836.	4.76E+08	-23.8549	44.1487	0.00
0.7500	0.3968	25689.	2762.	-0.01131	3086.	4.76E+08	-24.4190	46.1604	0.00
0.8125	0.3883	27754.	2743.	-0.01127	3334.	4.76E+08	-24.9741	48.2390	0.00
0.8750	0.3799	29804.	2724.	-0.01122	3580.	4.76E+08	-25.5200	50.3879	0.00
0.9375	0.3715	31841.	2705.	-0.01117	3825.	4.76E+08	-26.0566	52.6105	0.00
1.0000	0.3631	33862.	2685.	-0.01112	4068.	4.76E+08	-26.5837	54.9106	0.00
1.0625	0.3548	35869.	2665.	-0.01107	4309.	4.76E+08	-27.1011	57.2923	0.00
1.1250	0.3465	37860.	2645.	-0.01101	4548.	4.76E+08	-27.6088	59.7598	0.00
1.1875	0.3383	39836.	2624.	-0.01095	4785.	4.76E+08	-28.1064	62.3177	0.00
1.2500	0.3301	41796.	2603.	-0.01088	5021.	4.76E+08	-28.5939	64.9708	0.00
1.3125	0.3219	43740.	2581.	-0.01081	5254.	4.76E+08	-29.0710	67.7243	0.00
1.3750	0.3139	45667.	2559.	-0.01074	5486.	4.76E+08	-29.5376	70.5837	0.00
1.4375	0.3058	47578.	2537.	-0.01067	5715.	4.76E+08	-29.9934	73.5551	0.00
1.5000	0.2979	49472.	2514.	-0.01059	5943.	4.76E+08	-30.4383	76.6447	0.00
1.5625	0.2899	51349.	2491.	-0.01051	6168.	4.76E+08	-30.8721	79.8593	0.00
1.6250	0.2821	53209.	2468.	-0.01043	6392.	4.76E+08	-31.2945	83.2063	0.00
1.6875	0.2743	55051.	2444.	-0.01035	6613.	4.76E+08	-31.7054	86.6935	0.00
1.7500	0.2666	56875.	2420.	-0.01026	6832.	4.76E+08	-32.1045	90.3295	0.00
1.8125	0.2589	58681.	2396.	-0.01017	7049.	4.76E+08	-32.4915	94.1233	0.00
1.8750	0.2513	60469.	2371.	-0.01007	7264.	4.76E+08	-32.8664	98.0848	0.00
1.9375	0.2438	62238.	2347.	-0.00998	7476.	4.76E+08	-33.2287	102.2246	0.00
2.0000	0.2363	63989.	2322.	-0.00988	7686.	4.76E+08	-33.5783	106.5543	0.00
2.0625	0.2290	65720.	2296.	-0.00977	7894.	4.76E+08	-33.9149	111.0863	0.00
2.1250	0.2217	67433.	2271.	-0.00967	8100.	4.76E+08	-34.2383	115.8341	0.00
2.1875	0.2145	69127.	2245.	-0.00956	8304.	4.76E+08	-34.5480	120.8126	0.00
2.2500	0.2073	70800.	2191.	-0.00945	8505.	4.76E+08	-110.4033	399.3516	0.00
2.3125	0.2003	72412.	2067.	-0.00934	8698.	4.76E+08	-219.2727	821.0585	0.00
2.3750	0.1933	73901.	1902.	-0.00922	8877.	4.76E+08	-220.7681	856.4222	0.00
2.4375	0.1865	75265.	1736.	-0.00911	9041.	4.76E+08	-222.1742	893.6489	0.00
2.5000	0.1797	76505.	1569.	-0.00899	9190.	4.76E+08	-223.4888	932.8804	0.00
2.5625	0.1730	77618.	1401.	-0.00886	9324.	4.76E+08	-224.7094	974.2735	0.00
2.6250	0.1664	78605.	1232.	-0.00874	9442.	4.76E+08	-225.8335	1018.	0.00
2.6875	0.1599	79466.	1062.	-0.00862	9546.	4.76E+08	-226.8583	1064.	0.00
2.7500	0.1535	80198.	891.4054	-0.00849	9634.	4.76E+08	-227.7809	1113.	0.00
2.8125	0.1471	80803.	720.2633	-0.00836	9706.	4.76E+08	-228.5980	1165.	0.00
2.8750	0.1409	81279.	548.5493	-0.00824	9763.	4.76E+08	-229.3061	1220.	0.00
2.9375	0.1348	81626.	376.3465	-0.00811	9805.	4.76E+08	-229.9012	1279.	0.00
3.0000	0.1287	81843.	203.7414	-0.00798	9831.	4.76E+08	-230.3791	1342.	0.00
3.0625	0.1228	81931.	30.8236	-0.00785	9842.	4.76E+08	-230.7350	1409.	0.00
3.1250	0.1170	81889.	-142.3133	-0.00772	9837.	4.76E+08	-230.9635	1481.	0.00
3.1875	0.1112	81718.	-315.5717	-0.00759	9816.	4.76E+08	-231.0589	1558.	0.00
3.2500	0.1056	81416.	-488.8493	-0.00746	9780.	4.76E+08	-231.0146	1641.	0.00
3.3125	0.1000	80985.	-662.0384	-0.00733	9728.	4.76E+08	-230.8229	1731.	0.00
3.3750	0.09459	80423.	-835.0254	-0.00721	9661.	4.76E+08	-230.4757	1828.	0.00
3.4375	0.08923	79732.	-1008.	-0.00708	9578.	4.76E+08	-229.9632	1933.	0.00
3.5000	0.08396	78912.	-1180.	-0.00696	9479.	4.76E+08	-229.2745	2048.	0.00
3.5625	0.07879	77962.	-1352.	-0.00683	9365.	4.76E+08	-228.3969	2174.	0.00
3.6250	0.07372	76884.	-1522.	-0.00671	9235.	4.76E+08	-227.3157	2313.	0.00
3.6875	0.06873	75678.	-1692.	-0.00659	9091.	4.76E+08	-226.0138	2466.	0.00
3.7500	0.06383	74346.	-1861.	-0.00647	8931.	4.76E+08	-224.4707	2637.	0.00
3.8125	0.05902	72886.	-2029.	-0.00636	8755.	4.76E+08	-222.6623	2829.	0.00
3.8750	0.05430	71302.	-2195.	-0.00624	8565.	4.76E+08	-220.5594	3047.	0.00
3.9375	0.04966	69594.	-2360.	-0.00613	8360.	4.76E+08	-218.1264	3294.	0.00
4.0000	0.04510	67762.	-2522.	-0.00602	8140.	4.76E+08	-215.3190	3581.	0.00
4.0625	0.04063	65810.	-2683.	-0.00592	7905.	4.76E+08	-212.0816	3915.	0.00
4.1250	0.03623	63739.	-2839.	-0.00581	7656.	4.76E+08	-206.3529	4272.	0.00
4.1875	0.03190	61551.	-2992.	-0.00572	7394.	4.76E+08	-199.8956	4699.	0.00
4.2500	0.02765	59251.	-3139.	-0.00562	7117.	4.76E+08	-192.8712	5231.	0.00
4.3125	0.02347	56842.	-3281.	-0.00553	6828.	4.76E+08	-185.1211	5915.	0.00
4.3750	0.01936	54330.	-3416.	-0.00544	6526.	4.76E+08	-176.4071	6835.	0.00
4.4375	0.01531	51718.	-3545.	-0.00536	6212.	4.76E+08	-166.3436	8149.	0.00
4.5000	0.01132	49012.	-3665.	-0.00528	5887.	4.76E+08	-154.2372	10218.	0.00
4.5625	0.00739	46220.	-3775.	-0.00520	5552.	4.76E+08	-138.6078	14066.	0.00

```
    4.6250   0.00352     43350.     -3870.   -0.00513      5207.   4.76E+08  -115.0212     24539.       0.00
    4.6875 -3.09E-04     40415.     -3889.   -0.00507      4855.   4.76E+08    63.7662    154989.       0.00
    4.7500  -0.00408     37516.     -3821.   -0.00501      4506.   4.76E+08   119.7455     21986.       0.00
    4.8125  -0.00782     34684.     -3723.   -0.00495      4166.   4.76E+08   140.7538     13505.       0.00
    4.8750  -0.01151     31931.     -3612.   -0.00490      3836.   4.76E+08   155.0094     10103.       0.00
    4.9375  -0.01516     29266.     -3492.   -0.00485      3516.   4.76E+08   166.0523      8215.       0.00
    5.0000  -0.01878     26694.     -3364.   -0.00480      3207.   4.76E+08   175.1685      6996.       0.00
    5.0625  -0.02237     24221.     -3229.   -0.00476      2909.   4.76E+08   182.9849      6136.       0.00
    5.1250  -0.02592     21850.     -3089.   -0.00473      2625.   4.76E+08   189.8589      5493.       0.00
    5.1875  -0.02946     19587.     -2945.   -0.00469      2353.   4.76E+08   196.0153      4991.       0.00
    5.2500  -0.03297     17433.     -2796.   -0.00467      2094.   4.76E+08   201.6055      4587.       0.00
    5.3125  -0.03645     15393.     -2642.   -0.00464      1849.   4.76E+08   206.7367      4253.       0.00
    5.3750  -0.03993     13470.     -2486.   -0.00462      1618.   4.76E+08   211.4879      3973.       0.00
    5.4375  -0.04338     11665.     -2325.   -0.00460      1401.   4.76E+08   215.9190      3733.       0.00
    5.5000  -0.04682      9981.     -2162.   -0.00458      1199.   4.76E+08   220.0768      3525.       0.00
    5.5625  -0.05025      8422.     -1995.   -0.00457      1012.   4.76E+08   223.9984      3343.       0.00
    5.6250  -0.05367      6988.     -1826.   -0.00455   839.4640   4.76E+08   227.7136      3182.       0.00
    5.6875  -0.05708      5683.     -1654.   -0.00454   682.6539   4.76E+08   231.2470      3039.       0.00
    5.7500  -0.06048      4508.     -1479.   -0.00454   541.4689   4.76E+08   234.6189      2909.       0.00
    5.8125  -0.06388      3464.     -1302.   -0.00453   416.1368   4.76E+08   237.8465      2792.       0.00
    5.8750  -0.06728      2555.     -1122.   -0.00452   306.8756   4.76E+08   240.9441      2686.       0.00
    5.9375  -0.07067      1781.  -940.6012   -0.00452   213.8946   4.76E+08   243.9241      2589.       0.00
    6.0000  -0.07406      1144.  -756.5809   -0.00452   137.3953   4.76E+08   246.7969      2499.       0.00
    6.0625  -0.07745  645.7744  -570.4427   -0.00452    77.5717   4.76E+08   249.5716      2417.       0.00
    6.1250  -0.08083  288.1344  -382.2572   -0.00452    34.6113   4.76E+08   252.2562      2341.       0.00
    6.1875  -0.08422   72.3885  -192.0896   -0.00452     8.6954   4.76E+08   254.8575      2270.       0.00
    6.2500  -0.08761      0.00       0.00   -0.00452       0.00   4.76E+08   257.3814      1102.       0.00

  * The above values of total stress are combined axial and bending stresses.


  Output Summary for Load Case No. 1:

  Pile-head deflection            =     0.50000000 inches
  Computed slope at pile head     =    -0.01155346 radians
  Maximum bending moment          =         81931. inch-lbs
  Maximum shear force             =         -3889. lbs
  Depth of maximum bending moment  =     3.06250000 feet below pile head
  Depth of maximum shear force     =     4.68750000 feet below pile head
  Number of iterations            =             24
  Number of zero deflection points =             1


  ------------------------------------------------------------------------------
              Summary of Pile-head Responses for Conventional Analyses
  ------------------------------------------------------------------------------

  Definitions of Pile-head Loading Conditions:

  Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
  Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
  Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
  Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
  Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians


  Load Load                Load                  Axial    Pile-head  Pile-head  Max Shear Max Moment
  Case Type   Pile-head    Type     Pile-head   Loading  Deflection  Rotation    in Pile    in Pile
   No.  1      Load 1       2        Load 2       lbs      inches     radians      lbs       in-lbs
  ---- ----- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
     1  y, in     0.5000  M, in-lb        0.00       0.00     0.5000   -0.01155     -3889.     81931.


  Maximum pile-head deflection = 0.5000000000 inches
  Maximum pile-head rotation   = -0.0115534594 radians = -0.661964 deg.

  The analysis ended normally.
```

G2 Consulting Group, LLC
Mercer County Solar Power Plant
Capacity Area Nos. 3 & 4 - 6-ft



```
===============================================================================

                    LPile for Windows, Version 2016-09.011

                Analysis of Individual Piles and Drilled Shafts
               Subjected to Lateral Loading Using the p-y Method
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-------------------------------------------------------------------------------
                           Files Used for Analysis
-------------------------------------------------------------------------------

Path to file locations:
\\troy\geotechnical\2019 Geotechnical\003 Ann Arbor\193508 (j) Merccer Co Solar KY - Savion\Analysis\LPile\Cap Areas\

Name of input data file:
Capacity Area No. 3 - 7ft.lp9d

Name of output report file:
Capacity Area No. 3 - 7ft.lp9o

Name of plot output file:
Capacity Area No. 3 - 7ft.lp9p

Name of runtime message file:
Capacity Area No. 3 - 7ft.lp9r


-------------------------------------------------------------------------------
                          Date and Time of Analysis
-------------------------------------------------------------------------------

               Date:  December 27, 2019          Time:  16:11:55


-------------------------------------------------------------------------------
                                Problem Title
-------------------------------------------------------------------------------

Project Name: Mercer County Solar Power Plant

Job Number: 193508

Client: Savion, LLC

Engineer: KAC

Description: Capacity Area 3 - 7ft



-------------------------------------------------------------------------------
                         Program Options and Settings
-------------------------------------------------------------------------------

Computational Options:
 - Use unfactored loads in computations (conventional analysis)
Engineering Units Used for Data Input and Computations:
 - US Customary System Units (pounds, feet, inches)

Analysis Control Options:
 - Maximum number of iterations allowed               =         500
 - Deflection tolerance for convergence               =   1.0000E-05 in
 - Maximum allowable deflection                       =     100.0000 in
 - Number of pile increments                          =         100

Loading Type and Number of Cycles of Loading:
 - Cyclic loading specified
 - Number of cycles of loading                        =        1000 cycles
 - Use of p-y modification factors for p-y curves not selected
 - Analysis uses layering correction (Method of Georgiadis)
```

```
 - Layering correction is not computed if soil above is of same type
 - No distributed lateral loads are entered
 - Loading by lateral soil movements acting on pile not selected
 - Input of shear resistance at the pile tip not selected
 - Computation of pile-head foundation stiffness matrix not selected
 - Push-over analysis of pile not selected
 - Buckling analysis of pile not selected

Output Options:
 - Output files use decimal points to denote decimal symbols.
 - Values of pile-head deflection, bending moment, shear force, and
   soil reaction are printed for full length of pile.
 - Printing Increment (nodal spacing of output points) = 1
 - No p-y curves to be computed and reported for user-specified depths
 - Print using wide report formats



--------------------------------------------------------------------------------
                     Pile Structural Properties and Geometry
--------------------------------------------------------------------------------

Number of pile sections defined                       =           1
Total length of pile                                  =       7.250 ft
Depth of ground surface below top of pile             =      0.2500 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over
the length of the pile. A summary of values of pile diameter vs. depth follows.

            Depth Below          Pile
Point        Pile Head         Diameter
 No.           feet             inches
-----      -------------     -------------
  1            0.000           3.9400
  2            7.250           3.9400


Input Structural Properties for Pile Sections:
----------------------------------------------

Pile Section No. 1:

   Section 1 is an elastic pile
   Cross-sectional Shape                             = Strong H-Pile
   Length of section                                 =     7.250000 ft
   Flange Width                                      =     3.940000 in
   Section Depth                                     =     5.900000 in
   Flange Thickness                                  =     0.215000 in
   Web Thickness                                     =     0.170000 in
   Section Area                                      =     2.680000 sq. in
   Moment of Inertia                                 =    16.400000 in^4
   Elastic Modulus                                   =    29000000. psi



--------------------------------------------------------------------------------
                       Ground Slope and Pile Batter Angles
--------------------------------------------------------------------------------

Ground Slope Angle                                    =       0.000 degrees
                                                      =       0.000 radians

Pile Batter Angle                                     =       0.000 degrees
                                                      =       0.000 radians


--------------------------------------------------------------------------------
                       Soil and Rock Layering Information
--------------------------------------------------------------------------------

The soil profile is modelled using 3 layers

Layer 1 is stiff clay without free water

   Distance from top of pile to top of layer          =     0.250000 ft
   Distance from top of pile to bottom of layer       =     2.250000 ft
   Effective unit weight at top of layer              =   115.000000 pcf
   Effective unit weight at bottom of layer           =   115.000000 pcf
   Undrained cohesion at top of layer                 =   500.000000 psf
   Undrained cohesion at bottom of layer              =   500.000000 psf
   Epsilon-50 at top of layer                         =     0.020000
   Epsilon-50 at bottom of layer                      =     0.020000


Layer 2 is stiff clay without free water

   Distance from top of pile to top of layer          =     2.250000 ft
```

```
   Distance from top of pile to bottom of layer       =     6.250000 ft
   Effective unit weight at top of layer              =   125.000000 pcf
   Effective unit weight at bottom of layer           =   125.000000 pcf
   Undrained cohesion at top of layer                 =        2500. psf
   Undrained cohesion at bottom of layer              =        2500. psf
   Epsilon-50 at top of layer                         =     0.006500
   Epsilon-50 at bottom of layer                      =     0.006500
```

Layer 3 is weak rock, p-y criteria by Reese, 1997

```
   Distance from top of pile to top of layer          =     6.250000 ft
   Distance from top of pile to bottom of layer       =     8.250000 ft
   Effective unit weight at top of layer              =   150.000000 pcf
   Effective unit weight at bottom of layer           =   150.000000 pcf
   Uniaxial compressive strength at top of layer      =   500.000000 psi
   Uniaxial compressive strength at bottom of layer   =   500.000000 psi
   Initial modulus of rock at top of layer            =      100000. psi
   Initial modulus of rock at bottom of layer         =      100000. psi
   RQD of rock at top of layer                        =       0.0000 %
   RQD of rock at bottom of layer                     =       0.0000 %
   k rm of rock at top of layer                       =    0.0005000
   k rm of rock at bottom of layer                    =    0.0005000
```

(Depth of the lowest soil layer extends 1.000 ft below the pile tip)

**** Warning - Possible Input Data Error ****

Values entered for effective unit weight of rock were outside the limits of
50 pcf to 150 pcf.

The maximum input value, in layer 1, for effective unit weight = 150.00 pcf

This data may be erroneous. Please check your data.

Summary of Input Soil Properties

Layer Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Undrained Cohesion psf	Uniaxial qu psi	RQD %	E50 or krm	Rock Mass Modulus psi
1	Stiff Clay	0.2500	115.0000	500.0000	--	--	0.02000	--
	w/o Free Water	2.2500	115.0000	500.0000	--	--	0.02000	--
2	Stiff Clay	2.2500	125.0000	2500.	--	--	0.00650	--
	w/o Free Water	6.2500	125.0000	2500.	--	--	0.00650	--
3	Weak	6.2500	150.0000	--	500.0000	0.00	5.00E-04	100000.
	Rock	8.2500	150.0000	--	500.0000	0.00	5.00E-04	100000.

Cyclic Loading Type

Cyclic loading criteria were used for computation of p-y curves for all analyses.

Number of cycles of loading = 1000

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	4	y = 0.500000 in	M = 0.0000 in-lbs	0.0000000	N.A.

V = shear force applied normal to pile axis
M = bending moment applied to pile head
y = lateral deflection normal to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applied to pile head
Values of top y vs. pile lengths can be computed only for load types with
specified shear loading (Load Types 1, 2, and 3).
Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Moment-curvature properties were derived from elastic section properties

---

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.2500	0.00	N.A.	No	0.00	1574.
2	2.2500	2.0000	Yes	No	1574.	28804.
3	6.2500	6.0000	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 0.0 in-lbs
Axial load at pile head = 0.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness in-lb^2	Soil Res. p lb/inch	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.5000	0.00	3868.	-0.01231	0.00	4.76E+08	0.00	0.00	0.00
0.07250	0.4893	3366.	3868.	-0.01231	404.2766	4.76E+08	0.00	0.00	0.00
0.1450	0.4786	6731.	3868.	-0.01230	808.5532	4.76E+08	0.00	0.00	0.00
0.2175	0.4679	10097.	3868.	-0.01228	1213.	4.76E+08	0.00	0.00	0.00
0.2900	0.4572	13462.	3860.	-0.01226	1617.	4.76E+08	-20.0380	38.1286	0.00
0.3625	0.4466	16813.	3842.	-0.01223	2020.	4.76E+08	-20.7447	40.4154	0.00
0.4350	0.4359	20147.	3824.	-0.01220	2420.	4.76E+08	-21.4398	42.7880	0.00
0.5075	0.4253	23466.	3805.	-0.01216	2819.	4.76E+08	-22.1229	45.2512	0.00
0.5800	0.4148	26767.	3785.	-0.01211	3215.	4.76E+08	-22.7938	47.8105	0.00
0.6525	0.4043	30052.	3765.	-0.01206	3610.	4.76E+08	-23.4522	50.4713	0.00
0.7250	0.3938	33319.	3744.	-0.01200	4002.	4.76E+08	-24.0979	53.2397	0.00
0.7975	0.3834	36567.	3723.	-0.01194	4393.	4.76E+08	-24.7307	56.1221	0.00
0.8700	0.3730	39797.	3701.	-0.01187	4780.	4.76E+08	-25.3502	59.1255	0.00
0.9425	0.3627	43007.	3679.	-0.01179	5166.	4.76E+08	-25.9563	62.2573	0.00
1.0150	0.3525	46198.	3656.	-0.01171	5549.	4.76E+08	-26.5486	65.5253	0.00
1.0875	0.3423	49369.	3633.	-0.01162	5930.	4.76E+08	-27.1269	68.9383	0.00
1.1600	0.3323	52519.	3609.	-0.01153	6309.	4.76E+08	-27.6909	72.5053	0.00
1.2325	0.3223	55649.	3585.	-0.01143	6685.	4.76E+08	-28.2404	76.2363	0.00
1.3050	0.3124	58757.	3560.	-0.01133	7058.	4.76E+08	-28.7750	80.1419	0.00
1.3775	0.3026	61843.	3535.	-0.01122	7429.	4.76E+08	-29.2946	84.2338	0.00
1.4500	0.2929	64907.	3509.	-0.01110	7797.	4.76E+08	-29.7987	88.5244	0.00
1.5225	0.2832	67948.	3483.	-0.01098	8162.	4.76E+08	-30.2872	93.0271	0.00
1.5950	0.2738	70967.	3456.	-0.01085	8525.	4.76E+08	-30.7597	97.7565	0.00
1.6675	0.2644	73962.	3429.	-0.01072	8884.	4.76E+08	-31.2159	102.7284	0.00
1.7400	0.2551	76934.	3402.	-0.01058	9241.	4.76E+08	-31.6555	107.9600	0.00
1.8125	0.2460	79881.	3374.	-0.01044	9596.	4.76E+08	-32.0783	113.4699	0.00
1.8850	0.2369	82805.	3346.	-0.01029	9947.	4.76E+08	-32.4839	119.2782	0.00
1.9575	0.2280	85703.	3318.	-0.01014	10295.	4.76E+08	-32.8720	125.4070	0.00
2.0300	0.2193	88577.	3289.	-0.00998	10640.	4.76E+08	-33.2423	131.8802	0.00
2.1025	0.2107	91426.	3260.	-0.00981	10982.	4.76E+08	-33.5946	138.7238	0.00
2.1750	0.2022	94249.	3230.	-0.00964	11321.	4.76E+08	-33.9285	145.9663	0.00
2.2475	0.1939	97047.	3201.	-0.00947	11657.	4.76E+08	-34.2437	153.6386	0.00
2.3200	0.1858	99819.	3092.	-0.00929	11990.	4.76E+08	-215.5950	1010.	0.00
2.3925	0.1777	102427.	2904.	-0.00910	12304.	4.76E+08	-217.1274	1063.	0.00
2.4650	0.1699	104872.	2714.	-0.00891	12597.	4.76E+08	-218.5420	1119.	0.00
2.5375	0.1622	107150.	2524.	-0.00872	12871.	4.76E+08	-219.8372	1179.	0.00
2.6100	0.1547	109263.	2332.	-0.00852	13125.	4.76E+08	-221.0112	1243.	0.00
2.6825	0.1474	111208.	2139.	-0.00832	13358.	4.76E+08	-222.0622	1311.	0.00
2.7550	0.1403	112985.	1946.	-0.00811	13572.	4.76E+08	-222.9882	1383.	0.00
2.8275	0.1333	114593.	1751.	-0.00791	13765.	4.76E+08	-223.7876	1461.	0.00
2.9000	0.1265	116032.	1556.	-0.00769	13938.	4.76E+08	-224.4584	1544.	0.00
2.9725	0.1199	117301.	1361.	-0.00748	14090.	4.76E+08	-224.9987	1632.	0.00
3.0450	0.1135	118399.	1165.	-0.00727	14222.	4.76E+08	-225.4066	1728.	0.00
3.1175	0.1073	119328.	968.5509	-0.00705	14334.	4.76E+08	-225.6801	1830.	0.00
3.1900	0.1012	120085.	772.1496	-0.00683	14425.	4.76E+08	-225.8172	1941.	0.00

3.2625	0.09538	120671.	575.6892	-0.00661	14495.	4.76E+08	-225.8158	2060.	0.00
3.3350	0.08973	121086.	379.2912	-0.00639	14545.	4.76E+08	-225.6739	2188.	0.00
3.4075	0.08427	121331.	183.0787	-0.00617	14575.	4.76E+08	-225.3893	2327.	0.00
3.4800	0.07900	121405.	-12.8231	-0.00594	14583.	4.76E+08	-224.9598	2477.	0.00
3.5525	0.07392	121309.	-208.2873	-0.00572	14572.	4.76E+08	-224.3832	2641.	0.00
3.6250	0.06904	121043.	-403.1848	-0.00550	14540.	4.76E+08	-223.6571	2818.	0.00
3.6975	0.06435	120607.	-597.3846	-0.00528	14488.	4.76E+08	-222.7792	3012.	0.00
3.7700	0.05985	120003.	-790.7534	-0.00506	14415.	4.76E+08	-221.7469	3223.	0.00
3.8425	0.05555	119231.	-983.1560	-0.00484	14322.	4.76E+08	-220.5578	3454.	0.00
3.9150	0.05143	118292.	-1174.	-0.00462	14210.	4.76E+08	-219.2092	3708.	0.00
3.9875	0.04750	117188.	-1365.	-0.00441	14077.	4.76E+08	-217.6983	3987.	0.00
4.0600	0.04376	115918.	-1553.	-0.00420	13924.	4.76E+08	-216.0223	4295.	0.00
4.1325	0.04020	114485.	-1739.	-0.00398	13752.	4.76E+08	-211.8580	4585.	0.00
4.2050	0.03683	112892.	-1922.	-0.00378	13561.	4.76E+08	-207.2667	4896.	0.00
4.2775	0.03363	111142.	-2100.	-0.00357	13351.	4.76E+08	-202.6192	5241.	0.00
4.3500	0.03061	109238.	-2274.	-0.00337	13122.	4.76E+08	-197.9141	5625.	0.00
4.4225	0.02777	107185.	-2444.	-0.00317	12875.	4.76E+08	-193.1500	6052.	0.00
4.4950	0.02509	104985.	-2610.	-0.00298	12611.	4.76E+08	-188.3251	6529.	0.00
4.5675	0.02259	102643.	-2772.	-0.00279	12330.	4.76E+08	-183.4379	7066.	0.00
4.6400	0.02024	100162.	-2929.	-0.00260	12032.	4.76E+08	-178.4861	7671.	0.00
4.7125	0.01806	97546.	-3082.	-0.00242	11717.	4.76E+08	-173.4676	8357.	0.00
4.7850	0.01603	94798.	-3231.	-0.00225	11387.	4.76E+08	-168.3798	9139.	0.00
4.8575	0.01415	91923.	-3375.	-0.00207	11042.	4.76E+08	-163.2200	10035.	0.00
4.9300	0.01242	88925.	-3515.	-0.00191	10682.	4.76E+08	-157.9849	11068.	0.00
5.0025	0.01083	85807.	-3650.	-0.00175	10307.	4.76E+08	-152.6708	12267.	0.00
5.0750	0.00937	82574.	-3781.	-0.00160	9919.	4.76E+08	-147.2736	13669.	0.00
5.1475	0.00805	79229.	-3906.	-0.00145	9517.	4.76E+08	-141.7884	15321.	0.00
5.2200	0.00685	75776.	-4027.	-0.00131	9102.	4.76E+08	-136.2095	17288.	0.00
5.2925	0.00578	72221.	-4143.	-0.00117	8675.	4.76E+08	-130.5304	19651.	0.00
5.3650	0.00482	68567.	-4254.	-0.00104	8236.	4.76E+08	-124.7430	22526.	0.00
5.4375	0.00397	64818.	-4360.	-9.20E-04	7786.	4.76E+08	-118.8375	26069.	0.00
5.5100	0.00322	60979.	-4461.	-8.05E-04	7325.	4.76E+08	-112.8021	30503.	0.00
5.5825	0.00257	57056.	-4557.	-6.97E-04	6854.	4.76E+08	-106.6213	36155.	0.00
5.6550	0.00200	53051.	-4647.	-5.96E-04	6373.	4.76E+08	-100.2754	43515.	0.00
5.7275	0.00153	48970.	-4731.	-5.03E-04	5882.	4.76E+08	-93.7372	53358.	0.00
5.8000	0.00113	44819.	-4810.	-4.17E-04	5384.	4.76E+08	-86.9685	66965.	0.00
5.8725	8.03E-04	40602.	-4882.	-3.39E-04	4877.	4.76E+08	-79.9120	86609.	0.00
5.9450	5.40E-04	36324.	-4949.	-2.69E-04	4363.	4.76E+08	-72.4743	116726.	0.00
6.0175	3.35E-04	31991.	-5008.	-2.06E-04	3843.	4.76E+08	-64.4869	167258.	0.00
6.0900	1.82E-04	27610.	-5060.	-1.52E-04	3317.	4.76E+08	-55.5911	266319.	0.00
6.1625	7.17E-05	23186.	-5107.	-1.05E-04	2785.	4.76E+08	-52.4685	636537.	0.00
6.2350	-1.28E-06	18723.	-5130.	-6.68E-05	2249.	4.76E+08	0.9351	636537.	0.00
6.3075	-4.45E-05	14260.	-4929.	-3.66E-05	1713.	4.76E+08	459.6252	8991587.	0.00
6.3800	-6.50E-05	10146.	-4451.	-1.43E-05	1219.	4.76E+08	639.5388	8563752.	0.00
6.4525	-6.93E-05	6515.	-3833.	9.55E-07	782.5833	4.76E+08	782.6767	9822335.	0.00
6.5250	-6.33E-05	3477.	-3103.	1.01E-05	417.6295	4.76E+08	893.7607	1.23E+07	0.00
6.5975	-5.18E-05	1115.	-2292.	1.43E-05	133.9366	4.76E+08	971.7495	1.63E+07	0.00
6.6700	-3.84E-05	-511.1847	-1428.	1.48E-05	61.4045	4.76E+08	1015.	2.30E+07	0.00
6.7425	-2.59E-05	-1369.	-647.6827	1.31E-05	164.4542	4.76E+08	777.8876	2.61E+07	0.00
6.8150	-1.56E-05	-1638.	-85.7526	1.04E-05	196.7781	4.76E+08	513.9058	2.87E+07	0.00
6.8875	-7.88E-06	-1518.	260.7530	7.49E-06	182.3775	4.76E+08	282.6590	3.12E+07	0.00
6.9600	-2.57E-06	-1184.	427.1075	5.02E-06	142.2775	4.76E+08	99.7651	3.38E+07	0.00
7.0325	8.53E-07	-775.1027	455.0067	3.22E-06	93.1069	4.76E+08	-35.6291	3.63E+07	0.00
7.1050	3.04E-06	-392.7307	380.3447	2.16E-06	47.1756	4.76E+08	-136.0076	3.89E+07	0.00
7.1775	4.60E-06	-113.3029	225.7073	1.69E-06	13.6102	4.76E+08	-219.4807	4.15E+07	0.00
7.2500	5.99E-06	0.00	0.00	1.59E-06	0.00	4.76E+08	-299.3867	2.18E+07	0.00

* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

```
Pile-head deflection            =     0.50000000 inches
Computed slope at pile head     =    -0.01230959 radians
Maximum bending moment          =        121405. inch-lbs
Maximum shear force             =         -5130. lbs
Depth of maximum bending moment =     3.48000000 feet below pile head
Depth of maximum shear force    =     6.23500000 feet below pile head
Number of iterations            =             16
Number of zero deflection points =             2
```

Summary of Pile-head Responses for Conventional Analyses

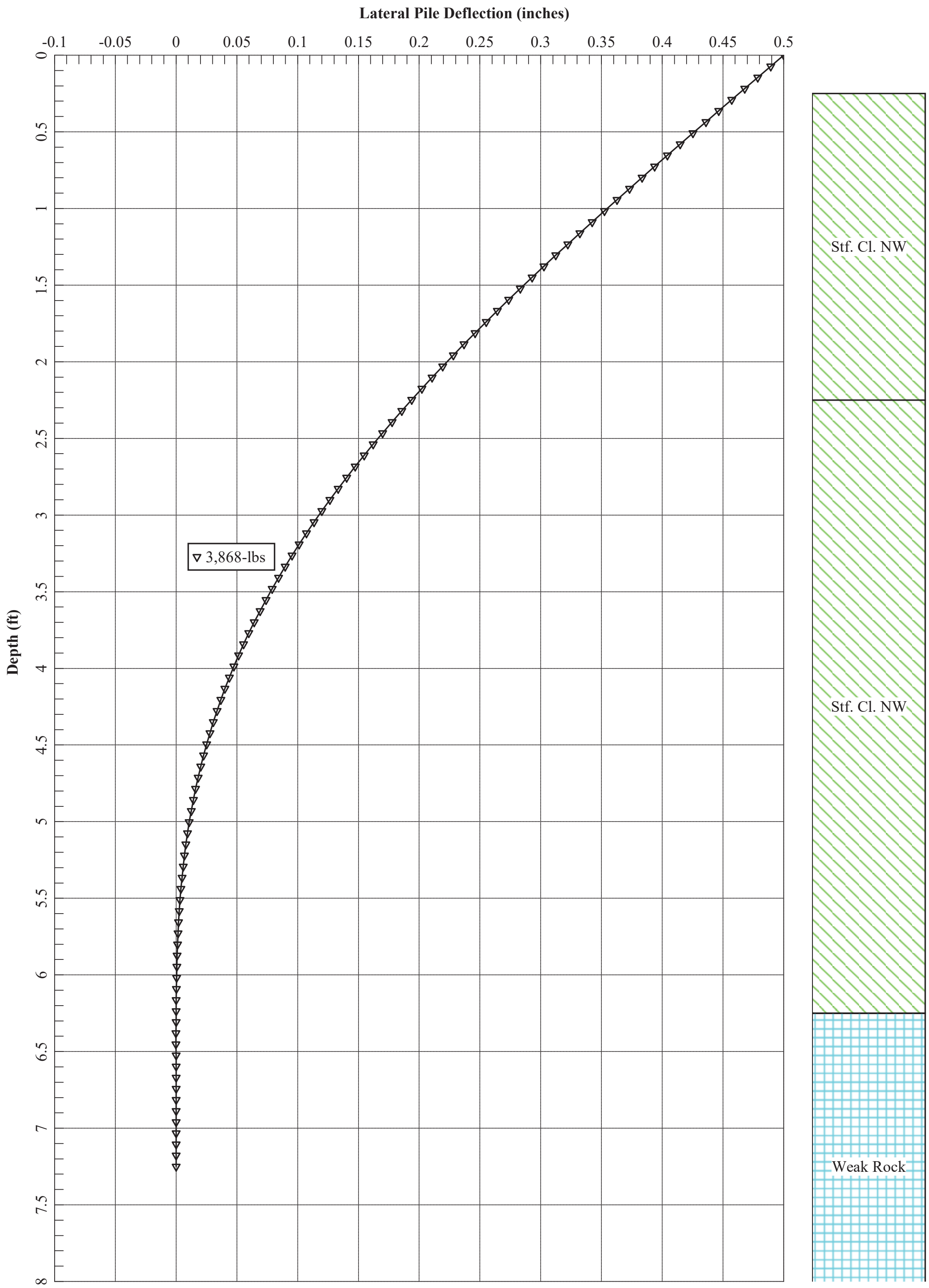
Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	y, in	0.5000	M, in-lb	0.00	0.00	0.5000	-0.01231	-5130.	121405.

```
Maximum pile-head deflection = 0.5000000000 inches
Maximum pile-head rotation   = -0.0123095919 radians = -0.705288 deg.

The analysis ended normally.
```


Lateral Pile Deflection (inches)
-0.1
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
Depth (ft)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
8
3,868-lbs
Stf. Cl. NW
Stf. Cl. NW
Weak Rock

```
===============================================================================

                    LPile for Windows, Version 2016-09.011

                Analysis of Individual Piles and Drilled Shafts
               Subjected to Lateral Loading Using the p-y Method
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-------------------------------------------------------------------------------
                            Files Used for Analysis
-------------------------------------------------------------------------------

Path to file locations:
\\troy\geotechnical\2019 Geotechnical\003 Ann Arbor\193508 (j) Merccer Co Solar KY - Savion\Analysis\LPile\Cap Areas\

Name of input data file:
Capacity Area No. 3 - 8ft.lp9d

Name of output report file:
Capacity Area No. 3 - 8ft.lp9o

Name of plot output file:
Capacity Area No. 3 - 8ft.lp9p

Name of runtime message file:
Capacity Area No. 3 - 8ft.lp9r


-------------------------------------------------------------------------------
                           Date and Time of Analysis
-------------------------------------------------------------------------------

              Date:  December 27, 2019          Time:  16:14:01


-------------------------------------------------------------------------------
                                 Problem Title
-------------------------------------------------------------------------------

Project Name: Mercer County Solar Power Plant

Job Number: 193508

Client: Savion, LLC

Engineer: KAC

Description: Capacity Area 3 - 8ft



-------------------------------------------------------------------------------
                         Program Options and Settings
-------------------------------------------------------------------------------

Computational Options:
 - Use unfactored loads in computations (conventional analysis)
Engineering Units Used for Data Input and Computations:
 - US Customary System Units (pounds, feet, inches)

Analysis Control Options:
 - Maximum number of iterations allowed               =         500
 - Deflection tolerance for convergence               =   1.0000E-05 in
 - Maximum allowable deflection                       =     100.0000 in
 - Number of pile increments                          =         100

Loading Type and Number of Cycles of Loading:
 - Cyclic loading specified
 - Number of cycles of loading                        =        1000 cycles
 - Use of p-y modification factors for p-y curves not selected
 - Analysis uses layering correction (Method of Georgiadis)
```

```
 - Layering correction is not computed if soil above is of same type
 - No distributed lateral loads are entered
 - Loading by lateral soil movements acting on pile not selected
 - Input of shear resistance at the pile tip not selected
 - Computation of pile-head foundation stiffness matrix not selected
 - Push-over analysis of pile not selected
 - Buckling analysis of pile not selected

Output Options:
 - Output files use decimal points to denote decimal symbols.
 - Values of pile-head deflection, bending moment, shear force, and
   soil reaction are printed for full length of pile.
 - Printing Increment (nodal spacing of output points) = 1
 - No p-y curves to be computed and reported for user-specified depths
 - Print using wide report formats



--------------------------------------------------------------------------------
                    Pile Structural Properties and Geometry
--------------------------------------------------------------------------------

Number of pile sections defined                        =            1
Total length of pile                                   =        8.250 ft
Depth of ground surface below top of pile              =       0.2500 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over
the length of the pile. A summary of values of pile diameter vs. depth follows.

            Depth Below          Pile
Point        Pile Head         Diameter
 No.           feet             inches
-----      -------------    -------------
  1            0.000            3.9400
  2            8.250            3.9400


Input Structural Properties for Pile Sections:
---------------------------------------------

Pile Section No. 1:

   Section 1 is an elastic pile
   Cross-sectional Shape                              = Strong H-Pile
   Length of section                                  =     8.250000 ft
   Flange Width                                       =     3.940000 in
   Section Depth                                      =     5.900000 in
   Flange Thickness                                   =     0.215000 in
   Web Thickness                                      =     0.170000 in
   Section Area                                       =     2.680000 sq. in
   Moment of Inertia                                  =    16.400000 in^4
   Elastic Modulus                                    =    29000000. psi



--------------------------------------------------------------------------------
                      Ground Slope and Pile Batter Angles
--------------------------------------------------------------------------------

Ground Slope Angle                                     =        0.000 degrees
                                                       =        0.000 radians

Pile Batter Angle                                      =        0.000 degrees
                                                       =        0.000 radians


--------------------------------------------------------------------------------
                      Soil and Rock Layering Information
--------------------------------------------------------------------------------

The soil profile is modelled using 3 layers

Layer 1 is stiff clay without free water

   Distance from top of pile to top of layer          =     0.250000 ft
   Distance from top of pile to bottom of layer       =     2.250000 ft
   Effective unit weight at top of layer              =   115.000000 pcf
   Effective unit weight at bottom of layer           =   115.000000 pcf
   Undrained cohesion at top of layer                 =   500.000000 psf
   Undrained cohesion at bottom of layer              =   500.000000 psf
   Epsilon-50 at top of layer                         =     0.020000
   Epsilon-50 at bottom of layer                      =     0.020000


Layer 2 is stiff clay without free water

   Distance from top of pile to top of layer          =     2.250000 ft
```

```
   Distance from top of pile to bottom of layer       =    6.250000 ft
   Effective unit weight at top of layer              =  125.000000 pcf
   Effective unit weight at bottom of layer           =  125.000000 pcf
   Undrained cohesion at top of layer                 =       2500. psf
   Undrained cohesion at bottom of layer              =       2500. psf
   Epsilon-50 at top of layer                         =    0.006500
   Epsilon-50 at bottom of layer                      =    0.006500


Layer 3 is weak rock, p-y criteria by Reese, 1997

   Distance from top of pile to top of layer          =    6.250000 ft
   Distance from top of pile to bottom of layer       =    8.250000 ft
   Effective unit weight at top of layer              =  150.000000 pcf
   Effective unit weight at bottom of layer           =  150.000000 pcf
   Uniaxial compressive strength at top of layer      =  500.000000 psi
   Uniaxial compressive strength at bottom of layer   =  500.000000 psi
   Initial modulus of rock at top of layer            =     100000. psi
   Initial modulus of rock at bottom of layer         =     100000. psi
   RQD of rock at top of layer                        =      0.0000 %
   RQD of rock at bottom of layer                     =      0.0000 %
   k rm of rock at top of layer                       =   0.0005000
   k rm of rock at bottom of layer                    =   0.0005000


 (Depth of the lowest soil layer extends 0.000 ft below the pile tip)


**** Warning - Possible Input Data Error ****

Values entered for effective unit weight of rock were outside the limits of
50 pcf to 150 pcf.

The maximum input value, in layer   1, for effective unit weight = 150.00 pcf

This data may be erroneous. Please check your data.



--------------------------------------------------------------------------------
                        Summary of Input Soil Properties
--------------------------------------------------------------------------------

Layer        Soil Type         Layer     Effective    Undrained    Uniaxial                      E50        Rock Mass
Layer          Name            Depth      Unit Wt.    Cohesion        qu         RQD %            or         Modulus
Num.     (p-y Curve Type)        ft          pcf         psf          psi                          krm          psi
-----   ------------------   ----------  ----------  ----------  ----------  ----------  ----------  ----------
  1          Stiff Clay           0.2500    115.0000    500.0000        --          --        0.02000        --
           w/o Free Water         2.2500    115.0000    500.0000        --          --        0.02000        --
  2          Stiff Clay           2.2500    125.0000       2500.        --          --        0.00650        --
           w/o Free Water         6.2500    125.0000       2500.        --          --        0.00650        --
  3             Weak              6.2500    150.0000       --      500.0000        0.00     5.00E-04     100000.
                Rock              8.2500    150.0000       --      500.0000        0.00     5.00E-04     100000.


--------------------------------------------------------------------------------
                               Cyclic Loading Type
--------------------------------------------------------------------------------

Cyclic loading criteria were used for computation of p-y curves for all analyses.

Number of cycles of loading = 1000


--------------------------------------------------------------------------------
                Pile-head Loading and Pile-head Fixity Conditions
--------------------------------------------------------------------------------

Number of loads specified = 1

Load    Load         Condition                Condition            Axial Thrust      Compute Top y
 No.    Type             1                        2                  Force, lbs      vs. Pile Length
-----   ----    --------------------   -----------------------   ----------------   ---------------
  1      4      y =     0.500000 in    M =        0.0000 in-lbs        0.0000000           N.A.

V = shear force applied normal to pile axis
M = bending moment applied to pile head
y = lateral deflection normal to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applied to pile head
Values of top y vs. pile lengths can be computed only for load types with
specified shear loading (Load Types 1, 2, and 3).
Thrust force is assumed to be acting axially for all pile batter angles.



--------------------------------------------------------------------------------
     Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness
--------------------------------------------------------------------------------

Axial thrust force values were determined from pile-head loading conditions
```

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Moment-curvature properties were derived from elastic section properties

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.2500	0.00	N.A.	No	0.00	1574.
2	2.2500	2.0000	Yes	No	1574.	28804.
3	6.2500	6.0000	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 0.0 in-lbs
Axial load at pile head = 0.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness in-lb^2	Soil Res. p lb/inch	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.5000	0.00	3875.	-0.01232	0.00	4.76E+08	0.00	0.00	0.00
0.08250	0.4878	3836.	3875.	-0.01232	460.8244	4.76E+08	0.00	0.00	0.00
0.1650	0.4756	7673.	3875.	-0.01231	921.6488	4.76E+08	0.00	0.00	0.00
0.2475	0.4634	11509.	3875.	-0.01229	1382.	4.76E+08	0.00	0.00	0.00
0.3300	0.4513	15345.	3865.	-0.01226	1843.	4.76E+08	-20.4288	44.8152	0.00
0.4125	0.4392	19162.	3844.	-0.01222	2302.	4.76E+08	-21.2246	47.8460	0.00
0.4950	0.4271	22957.	3823.	-0.01218	2758.	4.76E+08	-22.0050	51.0082	0.00
0.5775	0.4151	26731.	3801.	-0.01213	3211.	4.76E+08	-22.7697	54.3108	0.00
0.6600	0.4031	30482.	3778.	-0.01207	3662.	4.76E+08	-23.5182	57.7630	0.00
0.7425	0.3912	34211.	3754.	-0.01200	4109.	4.76E+08	-24.2502	61.3750	0.00
0.8250	0.3793	37916.	3730.	-0.01192	4555.	4.76E+08	-24.9653	65.1578	0.00
0.9075	0.3676	41596.	3705.	-0.01184	4997.	4.76E+08	-25.6631	69.1232	0.00
0.9900	0.3559	45251.	3679.	-0.01175	5436.	4.76E+08	-26.3433	73.2840	0.00
1.0725	0.3443	48881.	3653.	-0.01165	5872.	4.76E+08	-27.0054	77.6544	0.00
1.1550	0.3328	52483.	3626.	-0.01155	6304.	4.76E+08	-27.6491	82.2494	0.00
1.2375	0.3214	56059.	3598.	-0.01143	6734.	4.76E+08	-28.2740	87.0855	0.00
1.3200	0.3102	59607.	3570.	-0.01131	7160.	4.76E+08	-28.8796	92.1807	0.00
1.4025	0.2990	63127.	3541.	-0.01119	7583.	4.76E+08	-29.4655	97.5546	0.00
1.4850	0.2880	66618.	3511.	-0.01105	8002.	4.76E+08	-30.0314	103.2287	0.00
1.5675	0.2771	70079.	3481.	-0.01091	8418.	4.76E+08	-30.5767	109.2264	0.00
1.6500	0.2664	73511.	3451.	-0.01076	8830.	4.76E+08	-31.1010	115.5733	0.00
1.7325	0.2558	76912.	3420.	-0.01060	9239.	4.76E+08	-31.6040	122.2975	0.00
1.8150	0.2454	80282.	3388.	-0.01044	9644.	4.76E+08	-32.0852	129.4298	0.00
1.8975	0.2352	83620.	3356.	-0.01027	10045.	4.76E+08	-32.5440	137.0043	0.00
1.9800	0.2251	86927.	3324.	-0.01009	10442.	4.76E+08	-32.9802	145.0582	0.00
2.0625	0.2152	90201.	3291.	-0.00991	10835.	4.76E+08	-33.3932	153.6325	0.00
2.1450	0.2055	93443.	3258.	-0.00972	11225.	4.76E+08	-33.7826	162.7727	0.00
2.2275	0.1959	96652.	3224.	-0.00952	11610.	4.76E+08	-34.1479	172.5287	0.00
2.3100	0.1866	99827.	3101.	-0.00931	11991.	4.76E+08	-215.3028	1142.	0.00
2.3925	0.1775	102791.	2887.	-0.00910	12347.	4.76E+08	-217.0510	1211.	0.00
2.4750	0.1686	105542.	2671.	-0.00889	12678.	4.76E+08	-218.6466	1284.	0.00
2.5575	0.1599	108079.	2454.	-0.00866	12983.	4.76E+08	-220.0872	1363.	0.00
2.6400	0.1514	110400.	2235.	-0.00844	13261.	4.76E+08	-221.3700	1447.	0.00
2.7225	0.1432	112505.	2015.	-0.00820	13514.	4.76E+08	-222.4925	1538.	0.00
2.8050	0.1352	114391.	1795.	-0.00797	13741.	4.76E+08	-223.4518	1636.	0.00
2.8875	0.1274	116058.	1573.	-0.00773	13941.	4.76E+08	-224.2453	1742.	0.00
2.9700	0.1199	117506.	1351.	-0.00749	14115.	4.76E+08	-224.8701	1857.	0.00
3.0525	0.1126	118733.	1128.	-0.00724	14262.	4.76E+08	-225.3235	1981.	0.00
3.1350	0.1056	119739.	904.7288	-0.00699	14383.	4.76E+08	-225.6024	2116.	0.00
3.2175	0.09877	120524.	681.3322	-0.00674	14478.	4.76E+08	-225.7039	2262.	0.00
3.3000	0.09222	121088.	457.9244	-0.00649	14545.	4.76E+08	-225.6250	2422.	0.00
3.3825	0.08592	121431.	234.6855	-0.00624	14586.	4.76E+08	-225.3626	2597.	0.00
3.4650	0.07987	121553.	11.7989	-0.00598	14601.	4.76E+08	-224.9134	2788.	0.00
3.5475	0.07407	121454.	-210.5490	-0.00573	14589.	4.76E+08	-224.2742	2998.	0.00
3.6300	0.06852	121136.	-432.1682	-0.00548	14551.	4.76E+08	-223.4415	3228.	0.00

3.7125	0.06322	120598.	-652.8656	-0.00523	14487.	4.76E+08	-222.4118	3483.	0.00
3.7950	0.05817	119843.	-872.4442	-0.00498	14396.	4.76E+08	-221.1815	3764.	0.00
3.8775	0.05337	118871.	-1091.	-0.00473	14279.	4.76E+08	-219.7467	4076.	0.00
3.9600	0.04881	117683.	-1307.	-0.00448	14136.	4.76E+08	-218.1035	4424.	0.00
4.0425	0.04449	116282.	-1522.	-0.00424	13968.	4.76E+08	-216.2478	4811.	0.00
4.1250	0.04042	114669.	-1734.	-0.00400	13774.	4.76E+08	-212.1300	5196.	0.00
4.2075	0.03658	112848.	-1942.	-0.00376	13556.	4.76E+08	-206.9031	5600.	0.00
4.2900	0.03297	110824.	-2144.	-0.00353	13312.	4.76E+08	-201.6032	6054.	0.00
4.3725	0.02959	108603.	-2341.	-0.00330	13046.	4.76E+08	-196.2283	6565.	0.00
4.4550	0.02644	106189.	-2533.	-0.00308	12756.	4.76E+08	-190.7763	7144.	0.00
4.5375	0.02350	103588.	-2719.	-0.00286	12443.	4.76E+08	-185.2446	7804.	0.00
4.6200	0.02078	100806.	-2899.	-0.00265	12109.	4.76E+08	-179.6305	8560.	0.00
4.7025	0.01826	97847.	-3074.	-0.00244	11754.	4.76E+08	-173.9306	9430.	0.00
4.7850	0.01595	94718.	-3244.	-0.00224	11378.	4.76E+08	-168.1414	10439.	0.00
4.8675	0.01383	91425.	-3407.	-0.00204	10982.	4.76E+08	-162.2587	11617.	0.00
4.9500	0.01190	87972.	-3565.	-0.00186	10567.	4.76E+08	-156.2777	13004.	0.00
5.0325	0.01015	84366.	-3717.	-0.00168	10134.	4.76E+08	-150.1929	14651.	0.00
5.1150	0.00857	80613.	-3862.	-0.00151	9683.	4.76E+08	-143.9977	16627.	0.00
5.1975	0.00717	76719.	-4002.	-0.00134	9216.	4.76E+08	-137.6843	19024.	0.00
5.2800	0.00591	72690.	-4135.	-0.00119	8732.	4.76E+08	-131.2435	21969.	0.00
5.3625	0.00481	68532.	-4261.	-0.00104	8232.	4.76E+08	-124.6640	25641.	0.00
5.4450	0.00385	64252.	-4382.	-9.03E-04	7718.	4.76E+08	-117.9315	30298.	0.00
5.5275	0.00303	59857.	-4495.	-7.73E-04	7190.	4.76E+08	-111.0281	36324.	0.00
5.6100	0.00232	55352.	-4601.	-6.54E-04	6649.	4.76E+08	-103.9298	44310.	0.00
5.6925	0.00173	50746.	-4701.	-5.43E-04	6096.	4.76E+08	-96.6039	55215.	0.00
5.7750	0.00125	46045.	-4792.	-4.42E-04	5531.	4.76E+08	-89.0033	70677.	0.00
5.8575	8.56E-04	41257.	-4877.	-3.51E-04	4956.	4.76E+08	-81.0549	93720.	0.00
5.9400	5.51E-04	36389.	-4953.	-2.71E-04	4371.	4.76E+08	-72.6349	130567.	0.00
6.0225	3.20E-04	31451.	-5020.	-2.00E-04	3778.	4.76E+08	-63.5031	196303.	0.00
6.1050	1.55E-04	26450.	-5078.	-1.40E-04	3177.	4.76E+08	-53.0798	339925.	0.00
6.1875	4.34E-05	21397.	-5120.	-9.00E-05	2570.	4.76E+08	-31.7733	724335.	0.00
6.2700	-2.36E-05	16312.	-5009.	-5.08E-05	1959.	4.76E+08	255.6356	1.07E+07	0.00
6.3525	-5.71E-05	11479.	-4596.	-2.18E-05	1379.	4.76E+08	577.8773	1.00E+07	0.00
6.4350	-6.69E-05	7212.	-3939.	-2.39E-06	866.2649	4.76E+08	750.6695	1.11E+07	0.00
6.5175	-6.18E-05	3680.	-3131.	8.94E-06	442.0532	4.76E+08	881.7361	1.41E+07	0.00
6.6000	-4.92E-05	1013.	-2214.	1.38E-05	121.6497	4.76E+08	970.0754	1.95E+07	0.00
6.6825	-3.45E-05	-703.8300	-1264.	1.41E-05	84.5454	4.76E+08	949.6971	2.73E+07	0.00
6.7650	-2.12E-05	-1490.	-469.7012	1.19E-05	178.9312	4.76E+08	654.5163	3.06E+07	0.00
6.8475	-1.10E-05	-1634.	40.1641	8.62E-06	196.2599	4.76E+08	375.5147	3.39E+07	0.00
6.9300	-4.11E-06	-1410.	302.6336	5.45E-06	169.3786	4.76E+08	154.7269	3.72E+07	0.00
7.0125	-1.73E-07	-1035.	382.7389	2.90E-06	124.2810	4.76E+08	7.1020	4.06E+07	0.00
7.0950	1.63E-06	-652.2319	350.3968	1.15E-06	78.3474	4.76E+08	-72.4397	4.39E+07	0.00
7.1775	2.10E-06	-340.8381	265.0244	1.14E-07	40.9421	4.76E+08	-100.0298	4.72E+07	0.00
7.2600	1.86E-06	-127.4835	169.4710	-3.74E-07	15.3136	4.76E+08	-93.0076	4.95E+07	0.00
7.3425	1.36E-06	-5.2856	89.7973	-5.12E-07	0.6349	4.76E+08	-67.9494	4.95E+07	0.00
7.4250	8.47E-07	50.3151	35.2008	-4.65E-07	6.0440	4.76E+08	-42.3466	4.95E+07	0.00
7.5075	4.39E-07	64.4120	3.3848	-3.45E-07	7.7373	4.76E+08	-21.9282	4.95E+07	0.00
7.5900	1.63E-07	57.0170	-11.5023	-2.19E-07	6.8490	4.76E+08	-8.1467	4.95E+07	0.00
7.6725	4.80E-09	41.6375	-15.6537	-1.16E-07	5.0016	4.76E+08	-0.2401	4.95E+07	0.00
7.7550	-6.75E-08	26.0226	-14.1013	-4.60E-08	3.1259	4.76E+08	3.3762	4.95E+07	0.00
7.8375	-8.62E-08	13.7169	-10.2960	-4.61E-09	1.6477	4.76E+08	4.3112	4.95E+07	0.00
7.9200	-7.67E-08	5.6366	-6.2647	1.55E-08	0.6771	4.76E+08	3.8329	4.95E+07	0.00
8.0025	-5.55E-08	1.3129	-2.9944	2.28E-08	0.1577	4.76E+08	2.7737	4.95E+07	0.00
8.0850	-3.16E-08	-0.2923	-0.8396	2.38E-08	0.03511	4.76E+08	1.5793	4.95E+07	0.00
8.1675	-8.30E-09	-0.3495	0.1476	2.32E-08	0.04199	4.76E+08	0.4150	4.95E+07	0.00
8.2500	1.43E-08	0.00	0.00	2.28E-08	0.00	4.76E+08	-0.7133	2.48E+07	0.00

* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

```
Pile-head deflection             =     0.50000000 inches
Computed slope at pile head      =    -0.01232141 radians
Maximum bending moment           =        121553. inch-lbs
Maximum shear force              =          -5120. lbs
Depth of maximum bending moment  =     3.46500000 feet below pile head
Depth of maximum shear force     =     6.18750000 feet below pile head
Number of iterations             =             16
Number of zero deflection points =              4
```

Summary of Pile-head Responses for Conventional Analyses

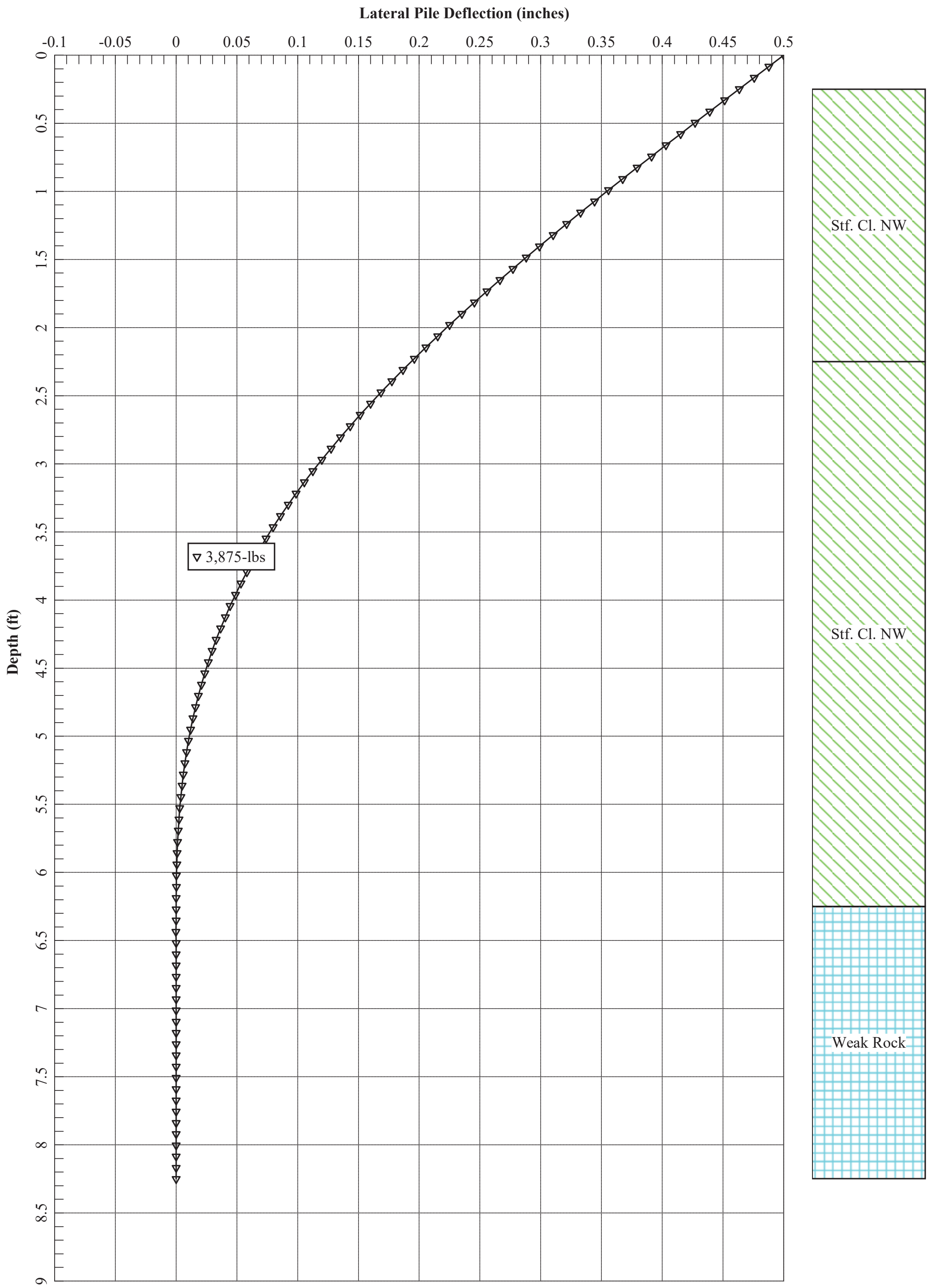
Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	y, in	0.5000	M, in-lb	0.00	0.00	0.5000	-0.01232	-5120.	121553.

```
Maximum pile-head deflection = 0.5000000000 inches
Maximum pile-head rotation   = -0.0123214085 radians = -0.705965 deg.

The analysis ended normally.
```


Lateral Pile Deflection (inches)
-0.1
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
Depth (ft)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
8
8.5
9
3,875-lbs
Stf. Cl. NW
Stf. Cl. NW
Weak Rock

```
===============================================================================

                    LPile for Windows, Version 2016-09.011

                Analysis of Individual Piles and Drilled Shafts
               Subjected to Lateral Loading Using the p-y Method
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-------------------------------------------------------------------------------
                            Files Used for Analysis
-------------------------------------------------------------------------------

Path to file locations:
\\troy\geotechnical\2019 Geotechnical\003 Ann Arbor\193508 (j) Merccer Co Solar KY - Savion\Analysis\LPile\Cap Areas\

Name of input data file:
Capacity Area No. 4 - 7ft.lp9d

Name of output report file:
Capacity Area No. 4 - 7ft.lp9o

Name of plot output file:
Capacity Area No. 4 - 7ft.lp9p

Name of runtime message file:
Capacity Area No. 4 - 7ft.lp9r


-------------------------------------------------------------------------------
                           Date and Time of Analysis
-------------------------------------------------------------------------------

               Date:  December 27, 2019          Time:  16:20:02


-------------------------------------------------------------------------------
                                 Problem Title
-------------------------------------------------------------------------------

Project Name: Mercer County Solar Power Plant

Job Number: 193508

Client: Savion, LLC

Engineer: KAC

Description: Capacity Area 4 - 7ft



-------------------------------------------------------------------------------
                          Program Options and Settings
-------------------------------------------------------------------------------

Computational Options:
 - Use unfactored loads in computations (conventional analysis)
Engineering Units Used for Data Input and Computations:
 - US Customary System Units (pounds, feet, inches)

Analysis Control Options:
 - Maximum number of iterations allowed               =          500
 - Deflection tolerance for convergence               =   1.0000E-05 in
 - Maximum allowable deflection                       =     100.0000 in
 - Number of pile increments                          =          100

Loading Type and Number of Cycles of Loading:
 - Cyclic loading specified
 - Number of cycles of loading                        =         1000 cycles
 - Use of p-y modification factors for p-y curves not selected
 - Analysis uses layering correction (Method of Georgiadis)
```

```
 - Layering correction is not computed if soil above is of same type
 - No distributed lateral loads are entered
 - Loading by lateral soil movements acting on pile not selected
 - Input of shear resistance at the pile tip not selected
 - Computation of pile-head foundation stiffness matrix not selected
 - Push-over analysis of pile not selected
 - Buckling analysis of pile not selected

Output Options:
 - Output files use decimal points to denote decimal symbols.
 - Values of pile-head deflection, bending moment, shear force, and
   soil reaction are printed for full length of pile.
 - Printing Increment (nodal spacing of output points) = 1
 - No p-y curves to be computed and reported for user-specified depths
 - Print using wide report formats



--------------------------------------------------------------------------------
                     Pile Structural Properties and Geometry
--------------------------------------------------------------------------------

Number of pile sections defined                         =           1
Total length of pile                                    =       7.250 ft
Depth of ground surface below top of pile               =      0.2500 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over
the length of the pile. A summary of values of pile diameter vs. depth follows.

            Depth Below          Pile
Point        Pile Head         Diameter
 No.           feet             inches
-----      -------------    -------------
  1            0.000           3.9400
  2            7.250           3.9400


Input Structural Properties for Pile Sections:
----------------------------------------------

Pile Section No. 1:

   Section 1 is an elastic pile
   Cross-sectional Shape                              = Strong H-Pile
   Length of section                                  =     7.250000 ft
   Flange Width                                       =     3.940000 in
   Section Depth                                      =     5.900000 in
   Flange Thickness                                   =     0.215000 in
   Web Thickness                                      =     0.170000 in
   Section Area                                       =     2.680000 sq. in
   Moment of Inertia                                  =    16.400000 in^4
   Elastic Modulus                                    =    29000000. psi



--------------------------------------------------------------------------------
                       Ground Slope and Pile Batter Angles
--------------------------------------------------------------------------------

Ground Slope Angle                                      =       0.000 degrees
                                                        =       0.000 radians

Pile Batter Angle                                       =       0.000 degrees
                                                        =       0.000 radians


--------------------------------------------------------------------------------
                       Soil and Rock Layering Information
--------------------------------------------------------------------------------

The soil profile is modelled using 2 layers

Layer 1 is stiff clay without free water

   Distance from top of pile to top of layer          =     0.250000 ft
   Distance from top of pile to bottom of layer       =     2.250000 ft
   Effective unit weight at top of layer              =   115.000000 pcf
   Effective unit weight at bottom of layer           =   115.000000 pcf
   Undrained cohesion at top of layer                 =   500.000000 psf
   Undrained cohesion at bottom of layer              =   500.000000 psf
   Epsilon-50 at top of layer                         =     0.020000
   Epsilon-50 at bottom of layer                      =     0.020000


Layer 2 is stiff clay without free water

   Distance from top of pile to top of layer          =     2.250000 ft
```

```
   Distance from top of pile to bottom of layer       =     8.250000 ft
   Effective unit weight at top of layer              =   125.000000 pcf
   Effective unit weight at bottom of layer           =   125.000000 pcf
   Undrained cohesion at top of layer                 =        2500. psf
   Undrained cohesion at bottom of layer              =        2500. psf
   Epsilon-50 at top of layer                         =     0.006500
   Epsilon-50 at bottom of layer                      =     0.006500
```

(Depth of the lowest soil layer extends 1.000 ft below the pile tip)

Summary of Input Soil Properties

Layer Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Undrained Cohesion psf	E50 or krm
1	Stiff Clay	0.2500	115.0000	500.0000	0.02000
	w/o Free Water	2.2500	115.0000	500.0000	0.02000
2	Stiff Clay	2.2500	125.0000	2500.	0.00650
	w/o Free Water	8.2500	125.0000	2500.	0.00650

Cyclic Loading Type

Cyclic loading criteria were used for computation of p-y curves for all analyses.

Number of cycles of loading = 1000

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	4	y = 0.500000 in	M = 0.0000 in-lbs	0.0000000	N.A.

V = shear force applied normal to pile axis
M = bending moment applied to pile head
y = lateral deflection normal to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applied to pile head
Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).
Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Moment-curvature properties were derived from elastic section properties

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.2500	0.00	N.A.	No	0.00	1574.
2	2.2500	2.0000	Yes	No	1574.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 0.0 in-lbs
Axial load at pile head = 0.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness in-lb^2	Soil Res. p lb/inch	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.5000	0.00	3575.	-0.01201	0.00	4.76E+08	0.00	0.00	0.00
0.07250	0.4896	3110.	3575.	-0.01201	373.5689	4.76E+08	0.00	0.00	0.00
0.1450	0.4791	6220.	3575.	-0.01200	747.1377	4.76E+08	0.00	0.00	0.00
0.2175	0.4687	9330.	3575.	-0.01199	1121.	4.76E+08	0.00	0.00	0.00
0.2900	0.4583	12440.	3566.	-0.01197	1494.	4.76E+08	-20.0492	38.0639	0.00
0.3625	0.4479	15534.	3548.	-0.01194	1866.	4.76E+08	-20.7596	40.3279	0.00
0.4350	0.4375	18613.	3530.	-0.01191	2236.	4.76E+08	-21.4587	42.6745	0.00
0.5075	0.4271	21676.	3511.	-0.01187	2604.	4.76E+08	-22.1461	45.1083	0.00
0.5800	0.4168	24722.	3491.	-0.01183	2970.	4.76E+08	-22.8217	47.6343	0.00
0.6525	0.4065	27751.	3471.	-0.01178	3334.	4.76E+08	-23.4852	50.2577	0.00
0.7250	0.3963	30762.	3450.	-0.01173	3695.	4.76E+08	-24.1364	52.9842	0.00
0.7975	0.3861	33755.	3429.	-0.01167	4055.	4.76E+08	-24.7750	55.8198	0.00
0.8700	0.3760	36729.	3407.	-0.01160	4412.	4.76E+08	-25.4008	58.7708	0.00
0.9425	0.3659	39683.	3385.	-0.01153	4767.	4.76E+08	-26.0136	61.8443	0.00
1.0150	0.3559	42618.	3362.	-0.01146	5119.	4.76E+08	-26.6130	65.0476	0.00
1.0875	0.3460	45533.	3339.	-0.01138	5470.	4.76E+08	-27.1989	68.3887	0.00
1.1600	0.3361	48428.	3315.	-0.01129	5817.	4.76E+08	-27.7710	71.8760	0.00
1.2325	0.3264	51301.	3290.	-0.01120	6162.	4.76E+08	-28.3290	75.5188	0.00
1.3050	0.3167	54153.	3265.	-0.01111	6505.	4.76E+08	-28.8727	79.3269	0.00
1.3775	0.3070	56983.	3240.	-0.01100	6845.	4.76E+08	-29.4017	83.3109	0.00
1.4500	0.2975	59790.	3214.	-0.01090	7182.	4.76E+08	-29.9159	87.4824	0.00
1.5225	0.2881	62575.	3188.	-0.01078	7517.	4.76E+08	-30.4148	91.8537	0.00
1.5950	0.2787	65338.	3161.	-0.01067	7848.	4.76E+08	-30.8983	96.4383	0.00
1.6675	0.2695	68076.	3134.	-0.01055	8177.	4.76E+08	-31.3661	101.2505	0.00
1.7400	0.2604	70791.	3107.	-0.01042	8504.	4.76E+08	-31.8178	106.3062	0.00
1.8125	0.2514	73482.	3079.	-0.01029	8827.	4.76E+08	-32.2532	111.6222	0.00
1.8850	0.2425	76148.	3051.	-0.01015	9147.	4.76E+08	-32.6720	117.2172	0.00
1.9575	0.2337	78790.	3022.	-0.01001	9464.	4.76E+08	-33.0738	123.1111	0.00
2.0300	0.2251	81407.	2993.	-0.00986	9779.	4.76E+08	-33.4584	129.3258	0.00
2.1025	0.2166	83998.	2964.	-0.00971	10090.	4.76E+08	-33.8254	135.8851	0.00
2.1750	0.2082	86564.	2934.	-0.00955	10398.	4.76E+08	-34.1746	142.8148	0.00
2.2475	0.1999	89104.	2904.	-0.00939	10703.	4.76E+08	-34.5056	150.1433	0.00
2.3200	0.1918	91618.	2795.	-0.00923	11005.	4.76E+08	-217.3320	985.6058	0.00
2.3925	0.1839	93967.	2605.	-0.00906	11287.	4.76E+08	-218.9675	1036.	0.00
2.4650	0.1761	96150.	2414.	-0.00888	11550.	4.76E+08	-220.4880	1089.	0.00
2.5375	0.1684	98167.	2221.	-0.00871	11792.	4.76E+08	-221.8915	1146.	0.00
2.6100	0.1609	100016.	2028.	-0.00853	12014.	4.76E+08	-223.1759	1207.	0.00
2.6825	0.1536	101696.	1833.	-0.00834	12216.	4.76E+08	-224.3391	1271.	0.00
2.7550	0.1464	103206.	1638.	-0.00815	12397.	4.76E+08	-225.3787	1339.	0.00
2.8275	0.1394	104545.	1441.	-0.00796	12558.	4.76E+08	-226.2926	1412.	0.00
2.9000	0.1326	105713.	1244.	-0.00777	12698.	4.76E+08	-227.0780	1490.	0.00
2.9725	0.1259	106709.	1046.	-0.00758	12818.	4.76E+08	-227.7325	1574.	0.00
3.0450	0.1194	107533.	847.6754	-0.00738	12917.	4.76E+08	-228.2532	1664.	0.00
3.1175	0.1130	108184.	648.9282	-0.00718	12995.	4.76E+08	-228.6370	1760.	0.00
3.1900	0.1069	108662.	449.9080	-0.00699	13053.	4.76E+08	-228.8807	1863.	0.00
3.2625	0.1009	108967.	250.7383	-0.00679	13089.	4.76E+08	-228.9806	1975.	0.00
3.3350	0.09506	109099.	51.5459	-0.00659	13105.	4.76E+08	-228.9330	2095.	0.00
3.4075	0.08942	109057.	-147.5391	-0.00639	13100.	4.76E+08	-228.7336	2225.	0.00
3.4800	0.08395	108842.	-346.3824	-0.00619	13074.	4.76E+08	-228.3775	2367.	0.00
3.5525	0.07865	108454.	-544.8456	-0.00599	13028.	4.76E+08	-227.8596	2520.	0.00
3.6250	0.07353	107894.	-742.7852	-0.00579	12960.	4.76E+08	-227.1740	2688.	0.00
3.6975	0.06857	107162.	-940.0524	-0.00559	12872.	4.76E+08	-226.3138	2871.	0.00
3.7700	0.06379	106258.	-1136.	-0.00540	12764.	4.76E+08	-225.2716	3072.	0.00
3.8425	0.05918	105184.	-1332.	-0.00521	12635.	4.76E+08	-224.0385	3294.	0.00
3.9150	0.05473	103941.	-1526.	-0.00502	12486.	4.76E+08	-222.6044	3538.	0.00
3.9875	0.05045	102528.	-1719.	-0.00483	12316.	4.76E+08	-220.9575	3810.	0.00
4.0600	0.04634	100949.	-1911.	-0.00464	12126.	4.76E+08	-219.0838	4114.	0.00
4.1325	0.04238	99204.	-2099.	-0.00446	11917.	4.76E+08	-214.6163	4406.	0.00
4.2050	0.03858	97296.	-2284.	-0.00428	11687.	4.76E+08	-209.6343	4727.	0.00
4.2775	0.03494	95230.	-2464.	-0.00410	11439.	4.76E+08	-204.4964	5092.	0.00
4.3500	0.03144	93009.	-2640.	-0.00393	11172.	4.76E+08	-199.1797	5511.	0.00
4.4225	0.02810	90637.	-2810.	-0.00376	10888.	4.76E+08	-193.6552	5996.	0.00
4.4950	0.02490	88119.	-2976.	-0.00360	10585.	4.76E+08	-187.8856	6565.	0.00
4.5675	0.02184	85458.	-3137.	-0.00344	10265.	4.76E+08	-181.8223	7243.	0.00
4.6400	0.01892	82660.	-3293.	-0.00329	9929.	4.76E+08	-175.3999	8067.	0.00
4.7125	0.01612	79729.	-3442.	-0.00314	9577.	4.76E+08	-168.5277	9093.	0.00
4.7850	0.01346	76671.	-3586.	-0.00299	9210.	4.76E+08	-161.0757	10412.	0.00
4.8575	0.01092	73490.	-3722.	-0.00286	8828.	4.76E+08	-152.8465	12183.	0.00
4.9300	0.00849	70194.	-3851.	-0.00272	8432.	4.76E+08	-143.5190	14709.	0.00
5.0025	0.00617	66789.	-3971.	-0.00260	8023.	4.76E+08	-132.5125	18673.	0.00
5.0750	0.00397	63284.	-4080.	-0.00248	7602.	4.76E+08	-118.5827	26015.	0.00
5.1475	0.00186	59690.	-4175.	-0.00237	7170.	4.76E+08	-97.9845	45881.	0.00
5.2200	-1.55E-04	56021.	-4194.	-0.00226	6729.	4.76E+08	54.3130	305411.	0.00
5.2925	-0.00208	52393.	-4126.	-0.00216	6294.	4.76E+08	101.2210	42373.	0.00

5.3650	-0.00392	48841.	-4030.	-0.00207	5867.	4.76E+08	118.4926	26309.	0.00
5.4375	-0.00568	45380.	-3922.	-0.00198	5451.	4.76E+08	129.9767	19905.	0.00
5.5100	-0.00737	42017.	-3805.	-0.00190	5047.	4.76E+08	138.6972	16370.	0.00
5.5825	-0.00899	38759.	-3682.	-0.00183	4656.	4.76E+08	145.7578	14099.	0.00
5.6550	-0.01056	35611.	-3552.	-0.00176	4278.	4.76E+08	151.6992	12503.	0.00
5.7275	-0.01206	32578.	-3418.	-0.00170	3913.	4.76E+08	156.8309	11313.	0.00
5.8000	-0.01351	29663.	-3280.	-0.00164	3563.	4.76E+08	161.3490	10387.	0.00
5.8725	-0.01492	26871.	-3138.	-0.00159	3228.	4.76E+08	165.3860	9644.	0.00
5.9450	-0.01628	24204.	-2992.	-0.00154	2907.	4.76E+08	169.0366	9031.	0.00
6.0175	-0.01761	21665.	-2844.	-0.00150	2602.	4.76E+08	172.3709	8517.	0.00
6.0900	-0.01890	19256.	-2692.	-0.00147	2313.	4.76E+08	175.4423	8077.	0.00
6.1625	-0.02016	16980.	-2538.	-0.00143	2040.	4.76E+08	178.2927	7695.	0.00
6.2350	-0.02139	14839.	-2382.	-0.00140	1783.	4.76E+08	180.9555	7360.	0.00
6.3075	-0.02260	12836.	-2224.	-0.00138	1542.	4.76E+08	183.4579	7063.	0.00
6.3800	-0.02379	10970.	-2063.	-0.00136	1318.	4.76E+08	185.8220	6796.	0.00
6.4525	-0.02496	9246.	-1900.	-0.00134	1111.	4.76E+08	188.0663	6556.	0.00
6.5250	-0.02611	7664.	-1736.	-0.00132	920.6134	4.76E+08	190.2063	6337.	0.00
6.5975	-0.02726	6226.	-1569.	-0.00131	747.8651	4.76E+08	192.2549	6136.	0.00
6.6700	-0.02839	4933.	-1401.	-0.00130	592.5967	4.76E+08	194.2231	5951.	0.00
6.7425	-0.02952	3788.	-1231.	-0.00129	454.9871	4.76E+08	196.1202	5780.	0.00
6.8150	-0.03064	2791.	-1060.	-0.00129	335.2088	4.76E+08	197.9540	5621.	0.00
6.8875	-0.03176	1943.	-887.0337	-0.00128	233.4286	4.76E+08	199.7313	5472.	0.00
6.9600	-0.03287	1247.	-712.5165	-0.00128	149.8080	4.76E+08	201.4577	5332.	0.00
7.0325	-0.03398	703.4845	-536.5175	-0.00128	84.5039	4.76E+08	203.1377	5201.	0.00
7.1050	-0.03509	313.5917	-359.0753	-0.00128	37.6693	4.76E+08	204.7755	5077.	0.00
7.1775	-0.03620	78.6935	-180.2251	-0.00127	9.4528	4.76E+08	206.3742	4960.	0.00
7.2500	-0.03731	0.00	0.00	-0.00127	0.00	4.76E+08	207.9364	2425.	0.00

* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

```
Pile-head deflection            =     0.50000000 inches
Computed slope at pile head     =    -0.01201107 radians
Maximum bending moment          =       109099. inch-lbs
Maximum shear force             =         -4194. lbs
Depth of maximum bending moment  =     3.33500000 feet below pile head
Depth of maximum shear force    =     5.22000000 feet below pile head
Number of iterations            =            23
Number of zero deflection points =             1
```

Summary of Pile-head Responses for Conventional Analyses

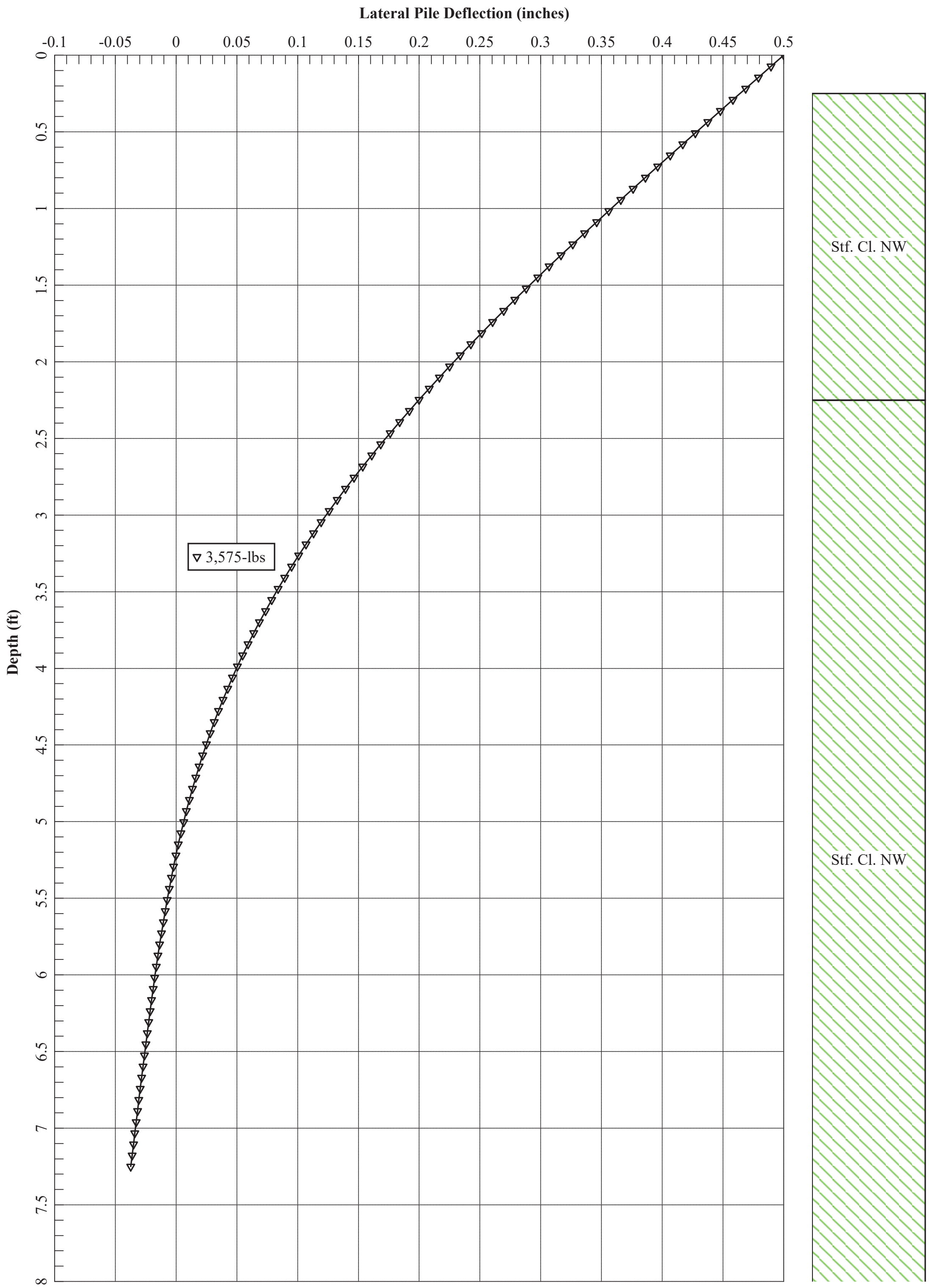
Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	y, in	0.5000	M, in-lb	0.00	0.00	0.5000	-0.01201	-4194.	109099.

Maximum pile-head deflection = 0.5000000000 inches
Maximum pile-head rotation   = -0.0120110693 radians = -0.688184 deg.

The analysis ended normally.


Lateral Pile Deflection (inches)
-0.1
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
Depth (ft)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
8
▽ 3,575-lbs
Stf. Cl. NW
Stf. Cl. NW

```
===============================================================================

                    LPile for Windows, Version 2016-09.011

                Analysis of Individual Piles and Drilled Shafts
               Subjected to Lateral Loading Using the p-y Method
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-------------------------------------------------------------------------------
                            Files Used for Analysis
-------------------------------------------------------------------------------

Path to file locations:
\\troy\geotechnical\2019 Geotechnical\003 Ann Arbor\193508 (j) Merccer Co Solar KY - Savion\Analysis\LPile\Cap Areas\

Name of input data file:
Capacity Area No. 4 - 8ft.lp9d

Name of output report file:
Capacity Area No. 4 - 8ft.lp9o

Name of plot output file:
Capacity Area No. 4 - 8ft.lp9p

Name of runtime message file:
Capacity Area No. 4 - 8ft.lp9r


-------------------------------------------------------------------------------
                           Date and Time of Analysis
-------------------------------------------------------------------------------

               Date:  December 27, 2019          Time:  16:21:36


-------------------------------------------------------------------------------
                                 Problem Title
-------------------------------------------------------------------------------

Project Name: Mercer County Solar Power Plant

Job Number: 193508

Client: Savion, LLC

Engineer: KAC

Description: Capacity Area 4 - 8ft



-------------------------------------------------------------------------------
                          Program Options and Settings
-------------------------------------------------------------------------------

Computational Options:
 - Use unfactored loads in computations (conventional analysis)
Engineering Units Used for Data Input and Computations:
 - US Customary System Units (pounds, feet, inches)

Analysis Control Options:
 - Maximum number of iterations allowed               =          500
 - Deflection tolerance for convergence               =   1.0000E-05 in
 - Maximum allowable deflection                       =     100.0000 in
 - Number of pile increments                          =          100

Loading Type and Number of Cycles of Loading:
 - Cyclic loading specified
 - Number of cycles of loading                        =         1000 cycles
 - Use of p-y modification factors for p-y curves not selected
 - Analysis uses layering correction (Method of Georgiadis)
```

```
 - Layering correction is not computed if soil above is of same type
 - No distributed lateral loads are entered
 - Loading by lateral soil movements acting on pile not selected
 - Input of shear resistance at the pile tip not selected
 - Computation of pile-head foundation stiffness matrix not selected
 - Push-over analysis of pile not selected
 - Buckling analysis of pile not selected

Output Options:
 - Output files use decimal points to denote decimal symbols.
 - Values of pile-head deflection, bending moment, shear force, and
   soil reaction are printed for full length of pile.
 - Printing Increment (nodal spacing of output points) = 1
 - No p-y curves to be computed and reported for user-specified depths
 - Print using wide report formats



--------------------------------------------------------------------------------
                     Pile Structural Properties and Geometry
--------------------------------------------------------------------------------

Number of pile sections defined                        =           1
Total length of pile                                   =       8.250 ft
Depth of ground surface below top of pile              =      0.2500 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over
the length of the pile. A summary of values of pile diameter vs. depth follows.

            Depth Below          Pile
Point        Pile Head         Diameter
 No.           feet             inches
-----      -------------     -------------
  1            0.000            3.9400
  2            8.250            3.9400


Input Structural Properties for Pile Sections:
----------------------------------------------

Pile Section No. 1:

   Section 1 is an elastic pile
   Cross-sectional Shape                              = Strong H-Pile
   Length of section                                  =     8.250000 ft
   Flange Width                                       =     3.940000 in
   Section Depth                                      =     5.900000 in
   Flange Thickness                                   =     0.215000 in
   Web Thickness                                      =     0.170000 in
   Section Area                                       =     2.680000 sq. in
   Moment of Inertia                                  =    16.400000 in^4
   Elastic Modulus                                    =    29000000. psi



--------------------------------------------------------------------------------
                       Ground Slope and Pile Batter Angles
--------------------------------------------------------------------------------

Ground Slope Angle                                     =       0.000 degrees
                                                       =       0.000 radians

Pile Batter Angle                                      =       0.000 degrees
                                                       =       0.000 radians


--------------------------------------------------------------------------------
                       Soil and Rock Layering Information
--------------------------------------------------------------------------------

The soil profile is modelled using 2 layers

Layer 1 is stiff clay without free water

   Distance from top of pile to top of layer          =     0.250000 ft
   Distance from top of pile to bottom of layer       =     2.250000 ft
   Effective unit weight at top of layer              =   115.000000 pcf
   Effective unit weight at bottom of layer           =   115.000000 pcf
   Undrained cohesion at top of layer                 =   500.000000 psf
   Undrained cohesion at bottom of layer              =   500.000000 psf
   Epsilon-50 at top of layer                         =     0.020000
   Epsilon-50 at bottom of layer                      =     0.020000


Layer 2 is stiff clay without free water

   Distance from top of pile to top of layer          =     2.250000 ft
```

```
   Distance from top of pile to bottom of layer        =     8.250000 ft
   Effective unit weight at top of layer               =   125.000000 pcf
   Effective unit weight at bottom of layer            =   125.000000 pcf
   Undrained cohesion at top of layer                  =        2500. psf
   Undrained cohesion at bottom of layer               =        2500. psf
   Epsilon-50 at top of layer                          =     0.006500
   Epsilon-50 at bottom of layer                       =     0.006500
```

(Depth of the lowest soil layer extends 0.000 ft below the pile tip)

Summary of Input Soil Properties

Layer Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Undrained Cohesion psf	E50 or krm
1	Stiff Clay	0.2500	115.0000	500.0000	0.02000
	w/o Free Water	2.2500	115.0000	500.0000	0.02000
2	Stiff Clay	2.2500	125.0000	2500.	0.00650
	w/o Free Water	8.2500	125.0000	2500.	0.00650

Cyclic Loading Type

Cyclic loading criteria were used for computation of p-y curves for all analyses.

Number of cycles of loading = 1000

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	4	y = 0.500000 in	M = 0.0000 in-lbs	0.0000000	N.A.

V = shear force applied normal to pile axis
M = bending moment applied to pile head
y = lateral deflection normal to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applied to pile head
Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).
Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Moment-curvature properties were derived from elastic section properties

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.2500	0.00	N.A.	No	0.00	1574.
2	2.2500	2.0000	Yes	No	1574.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

```
-----------------------------------------------------------------------------
                Computed Values of Pile Loading and Deflection
                  for Lateral Loading for Load Case Number 1
-----------------------------------------------------------------------------

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head                              =     0.500000 inches
Moment at pile head                                    =          0.0 in-lbs
Axial load at pile head                                =          0.0 lbs
```

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness in-lb^2	Soil Res. p lb/inch	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.5000	0.00	3839.	-0.01235	0.00	4.76E+08	0.00	0.00	0.00
0.08250	0.4878	3800.	3839.	-0.01234	456.4829	4.76E+08	0.00	0.00	0.00
0.1650	0.4756	7600.	3839.	-0.01233	912.9659	4.76E+08	0.00	0.00	0.00
0.2475	0.4634	11400.	3839.	-0.01231	1369.	4.76E+08	0.00	0.00	0.00
0.3300	0.4512	15201.	3828.	-0.01228	1826.	4.76E+08	-20.4277	44.8224	0.00
0.4125	0.4390	18981.	3808.	-0.01225	2280.	4.76E+08	-21.2231	47.8558	0.00
0.4950	0.4269	22740.	3786.	-0.01220	2732.	4.76E+08	-22.0031	51.0213	0.00
0.5775	0.4149	26478.	3764.	-0.01215	3181.	4.76E+08	-22.7673	54.3276	0.00
0.6600	0.4029	30193.	3741.	-0.01209	3627.	4.76E+08	-23.5152	57.7842	0.00
0.7425	0.3909	33886.	3718.	-0.01203	4070.	4.76E+08	-24.2466	61.4013	0.00
0.8250	0.3791	37554.	3693.	-0.01195	4511.	4.76E+08	-24.9610	65.1901	0.00
0.9075	0.3673	41199.	3668.	-0.01187	4949.	4.76E+08	-25.6581	69.1625	0.00
0.9900	0.3556	44818.	3643.	-0.01178	5384.	4.76E+08	-26.3374	73.3316	0.00
1.0725	0.3439	48411.	3616.	-0.01168	5815.	4.76E+08	-26.9986	77.7115	0.00
1.1550	0.3324	51978.	3589.	-0.01158	6244.	4.76E+08	-27.6413	82.3176	0.00
1.2375	0.3210	55517.	3561.	-0.01147	6669.	4.76E+08	-28.2650	87.1667	0.00
1.3200	0.3097	59029.	3533.	-0.01135	7091.	4.76E+08	-28.8693	92.2771	0.00
1.4025	0.2986	62513.	3504.	-0.01122	7509.	4.76E+08	-29.4537	97.6689	0.00
1.4850	0.2875	65968.	3475.	-0.01109	7924.	4.76E+08	-30.0180	103.3637	0.00
1.5675	0.2766	69393.	3445.	-0.01095	8336.	4.76E+08	-30.5615	109.3857	0.00
1.6500	0.2658	72789.	3414.	-0.01080	8744.	4.76E+08	-31.0838	115.7611	0.00
1.7325	0.2552	76154.	3383.	-0.01064	9148.	4.76E+08	-31.5846	122.5187	0.00
1.8150	0.2448	79488.	3352.	-0.01048	9548.	4.76E+08	-32.0632	129.6902	0.00
1.8975	0.2345	82790.	3320.	-0.01031	9945.	4.76E+08	-32.5193	137.3107	0.00
1.9800	0.2243	86061.	3287.	-0.01014	10338.	4.76E+08	-32.9523	145.4188	0.00
2.0625	0.2144	89299.	3255.	-0.00995	10727.	4.76E+08	-33.3619	154.0570	0.00
2.1450	0.2046	92505.	3221.	-0.00977	11112.	4.76E+08	-33.7474	163.2725	0.00
2.2275	0.1951	95678.	3188.	-0.00957	11493.	4.76E+08	-34.1084	173.1177	0.00
2.3100	0.1857	98817.	3064.	-0.00937	11870.	4.76E+08	-215.0261	1146.	0.00
2.3925	0.1765	101745.	2851.	-0.00916	12222.	4.76E+08	-216.7410	1216.	0.00
2.4750	0.1675	104461.	2635.	-0.00894	12548.	4.76E+08	-218.2994	1290.	0.00
2.5575	0.1588	106963.	2419.	-0.00872	12849.	4.76E+08	-219.6983	1370.	0.00
2.6400	0.1503	109250.	2200.	-0.00850	13123.	4.76E+08	-220.9345	1456.	0.00
2.7225	0.1420	111320.	1981.	-0.00827	13372.	4.76E+08	-222.0047	1548.	0.00
2.8050	0.1339	113173.	1761.	-0.00804	13595.	4.76E+08	-222.9054	1648.	0.00
2.8875	0.1261	114807.	1540.	-0.00780	13791.	4.76E+08	-223.6330	1756.	0.00
2.9700	0.1185	116222.	1318.	-0.00756	13961.	4.76E+08	-224.1838	1874.	0.00
3.0525	0.1111	117417.	1096.	-0.00731	14104.	4.76E+08	-224.5539	2001.	0.00
3.1350	0.1040	118393.	873.7776	-0.00707	14222.	4.76E+08	-224.7390	2140.	0.00
3.2175	0.09710	119148.	651.2882	-0.00682	14312.	4.76E+08	-224.7346	2291.	0.00
3.3000	0.09047	119682.	428.8992	-0.00657	14376.	4.76E+08	-224.5361	2457.	0.00
3.3825	0.08408	119997.	206.8055	-0.00632	14414.	4.76E+08	-224.1381	2639.	0.00
3.4650	0.07795	120092.	-14.7928	-0.00607	14426.	4.76E+08	-223.5352	2839.	0.00
3.5475	0.07206	119967.	-235.6897	-0.00582	14411.	4.76E+08	-222.7212	3060.	0.00
3.6300	0.06641	119625.	-455.6730	-0.00557	14370.	4.76E+08	-221.6895	3305.	0.00
3.7125	0.06102	119065.	-674.5234	-0.00533	14302.	4.76E+08	-220.4325	3577.	0.00
3.7950	0.05587	118289.	-892.0138	-0.00508	14209.	4.76E+08	-218.9420	3880.	0.00
3.8775	0.05096	117299.	-1108.	-0.00483	14090.	4.76E+08	-217.2084	4220.	0.00
3.9600	0.04629	116096.	-1322.	-0.00459	13946.	4.76E+08	-215.2210	4602.	0.00
4.0425	0.04187	114682.	-1534.	-0.00435	13776.	4.76E+08	-212.9673	5036.	0.00
4.1250	0.03768	113059.	-1743.	-0.00411	13581.	4.76E+08	-208.4234	5476.	0.00
4.2075	0.03372	111231.	-1946.	-0.00388	13361.	4.76E+08	-202.7227	5951.	0.00
4.2900	0.03000	109206.	-2144.	-0.00365	13118.	4.76E+08	-196.8732	6498.	0.00
4.3725	0.02649	106987.	-2336.	-0.00343	12851.	4.76E+08	-190.8566	7132.	0.00
4.4550	0.02321	104581.	-2522.	-0.00321	12562.	4.76E+08	-184.6504	7876.	0.00
4.5375	0.02015	101994.	-2701.	-0.00299	12252.	4.76E+08	-178.2250	8758.	0.00
4.6200	0.01729	99232.	-2874.	-0.00278	11920.	4.76E+08	-171.5419	9823.	0.00
4.7025	0.01464	96303.	-3041.	-0.00258	11568.	4.76E+08	-164.5490	11129.	0.00
4.7850	0.01218	93212.	-3200.	-0.00238	11197.	4.76E+08	-157.1741	12770.	0.00
4.8675	0.00992	89967.	-3352.	-0.00219	10807.	4.76E+08	-149.3125	14896.	0.00
4.9500	0.00785	86575.	-3495.	-0.00201	10400.	4.76E+08	-140.8054	17762.	0.00
5.0325	0.00595	83046.	-3630.	-0.00183	9976.	4.76E+08	-131.3934	21859.	0.00
5.1150	0.00422	79388.	-3755.	-0.00166	9536.	4.76E+08	-120.6087	28262.	0.00
5.1975	0.00266	75611.	-3868.	-0.00150	9083.	4.76E+08	-107.4578	39959.	0.00
5.2800	0.00126	71730.	-3965.	-0.00135	8616.	4.76E+08	-89.0477	70206.	0.00
5.3625	-3.14E-06	67761.	-4008.	-0.00120	8140.	4.76E+08	2.3007	724335.	0.00
5.4450	-0.00112	63794.	-3964.	-0.00106	7663.	4.76E+08	86.6022	76391.	0.00
5.5275	-0.00211	59912.	-3871.	-9.35E-04	7197.	4.76E+08	101.4036	47577.	0.00
5.6100	-0.00297	56130.	-3766.	-8.15E-04	6742.	4.76E+08	110.4901	36776.	0.00
5.6925	-0.00372	52456.	-3653.	-7.02E-04	6301.	4.76E+08	116.8685	31078.	0.00
5.7750	-0.00436	48896.	-3535.	-5.96E-04	5873.	4.76E+08	121.6006	27590.	0.00
5.8575	-0.00490	45456.	-3413.	-4.98E-04	5460.	4.76E+08	125.1992	25279.	0.00
5.9400	-0.00535	42138.	-3288.	-4.07E-04	5062.	4.76E+08	127.9557	23681.	0.00
6.0225	-0.00571	38946.	-3160.	-3.22E-04	4678.	4.76E+08	130.0534	22555.	0.00

6.1050	-0.00599	35881.	-3031.	-2.44E-04	4310.	4.76E+08	131.6159	21762.	0.00
6.1875	-0.00619	32945.	-2900.	-1.73E-04	3957.	4.76E+08	132.7306	21220.	0.00
6.2700	-0.00633	30139.	-2768.	-1.07E-04	3620.	4.76E+08	133.4618	20875.	0.00
6.3525	-0.00640	27464.	-2636.	-4.72E-05	3299.	4.76E+08	133.8582	20691.	0.00
6.4350	-0.00642	24921.	-2503.	7.33E-06	2994.	4.76E+08	133.9575	20647.	0.00
6.5175	-0.00639	22508.	-2371.	5.67E-05	2704.	4.76E+08	133.7889	20728.	0.00
6.6000	-0.00631	20227.	-2238.	1.01E-04	2430.	4.76E+08	133.3756	20923.	0.00
6.6825	-0.00619	18076.	-2107.	1.41E-04	2171.	4.76E+08	132.7359	21230.	0.00
6.7650	-0.00603	16056.	-1976.	1.77E-04	1929.	4.76E+08	131.8841	21647.	0.00
6.8475	-0.00584	14164.	-1846.	2.08E-04	1701.	4.76E+08	130.8309	22178.	0.00
6.9300	-0.00562	12401.	-1717.	2.36E-04	1490.	4.76E+08	129.5841	22829.	0.00
7.0125	-0.00537	10765.	-1589.	2.60E-04	1293.	4.76E+08	128.1485	23610.	0.00
7.0950	-0.00511	9255.	-1463.	2.81E-04	1112.	4.76E+08	126.5262	24536.	0.00
7.1775	-0.00482	7869.	-1339.	2.98E-04	945.1840	4.76E+08	124.7160	25627.	0.00
7.2600	-0.00451	6604.	-1216.	3.13E-04	793.3286	4.76E+08	122.7138	26911.	0.00
7.3425	-0.00420	5460.	-1096.	3.26E-04	655.9204	4.76E+08	120.5112	28425.	0.00
7.4250	-0.00387	4435.	-977.6970	3.36E-04	532.7002	4.76E+08	118.0954	30220.	0.00
7.5075	-0.00353	3525.	-862.0933	3.45E-04	423.3835	4.76E+08	115.4473	32367.	0.00
7.5900	-0.00319	2728.	-749.2398	3.51E-04	327.6586	4.76E+08	112.5396	34966.	0.00
7.6725	-0.00284	2041.	-639.4125	3.56E-04	245.1832	4.76E+08	109.3336	38167.	0.00
7.7550	-0.00248	1462.	-532.9346	3.60E-04	175.5798	4.76E+08	105.7733	42202.	0.00
7.8375	-0.00212	985.9086	-430.1974	3.62E-04	118.4293	4.76E+08	101.7766	47447.	0.00
7.9200	-0.00176	609.8889	-331.6955	3.64E-04	73.2610	4.76E+08	97.2169	54563.	0.00
8.0025	-0.00140	329.1514	-238.0891	3.65E-04	39.5383	4.76E+08	91.8869	64839.	0.00
8.0850	-0.00104	138.4724	-150.3263	3.65E-04	16.6336	4.76E+08	85.4117	81200.	0.00
8.1675	-6.79E-04	31.5053	-69.9355	3.66E-04	3.7845	4.76E+08	76.9939	112187.	0.00
8.2500	-3.17E-04	0.00	0.00	3.66E-04	0.00	4.76E+08	64.2901	100245.	0.00

* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

```
Pile-head deflection            =     0.50000000 inches
Computed slope at pile head     =    -0.01234567 radians
Maximum bending moment          =        120092. inch-lbs
Maximum shear force             =         -4008. lbs
Depth of maximum bending moment =     3.46500000 feet below pile head
Depth of maximum shear force    =     5.36250000 feet below pile head
Number of iterations            =             21
Number of zero deflection points =             2
```

Summary of Pile-head Responses for Conventional Analyses

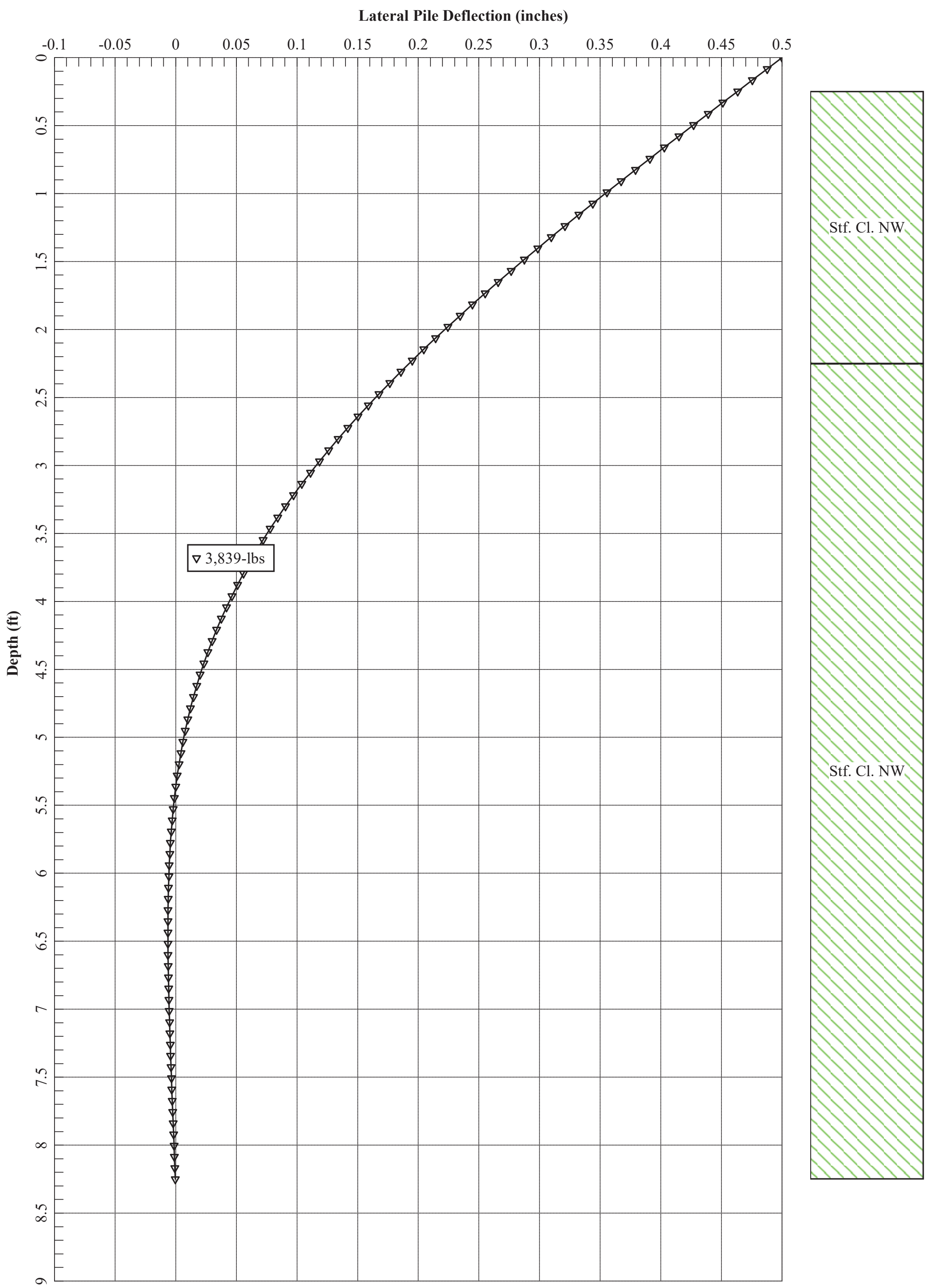
Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	y, in	0.5000	M, in-lb	0.00	0.00	0.5000	-0.01235	-4008.	120092.

Maximum pile-head deflection = 0.5000000000 inches
Maximum pile-head rotation = -0.0123456701 radians = -0.707355 deg.

The analysis ended normally.


Lateral Pile Deflection (inches)
-0.1
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
Depth (ft)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
8
8.5
9
▽ 3,839-lbs
Stf. Cl. NW
Stf. Cl. NW

APPENDIX B

Soil Chemical Test Report - Essential Corrosion Protection, LLC

12/11/2019

ESSENTIAL CORROSION PROTECTION

G2 Consulting Group Laboratory Soil Sample Analysis Results

Project	Sample ID	As-Is Resistivity (ohm-cm)	"Wetted" Resistivity (ohm-cm)	Redox (mV)	pH	Chloride (ppm)	Sulfate (ppm)	Sulfides
193508 Mercer Solar	B-1	3,200	2,000	340	6.7	50	5	Not Present
	TP-1	7,900	7,400	353	6.4	45	<5	Not Present
	TP-9	14,000	7,000	437	5.1	20	<5	Not Present
	TP-11	5,100	4,300	359	6.6	65	<5	Not Present
	TP-13	15,000	6,900	404	5.3	20	<5	Not Present

6700 Alexander Bell Dr. Suite 200
Columbia, MD 21046
(443)-510-8955

APPENDIX C

Equipment Product Information

310K EP/310K

Engine	310K EP			310K		
Manufacturer and Model	John Deere PowerTech™ E 4045HT072 turbo-charged, standard			John Deere PowerTech™ Plus 4045HT073 turbo-charged, standard		
Non-Road Emissions Standard	EPA Interim Tier 4/EU Stage IIIB			EPA Interim Tier 4/EU Stage IIIB		
Displacement	4.5 L (276 cu. in.)			4.5 L (276 cu. in.)		
Net Peak Power (ISO 9249)	52 kW (70 hp) at 2,000 rpm			66 kW (88 hp) at 2,000 rpm		
Net Peak Torque (ISO 9249)	304 Nm (224 lb.-ft.) at 1,300 rpm			374 Nm (276 lb.-ft.) at 1,400 rpm		
Net Torque Rise	38%			39%		
Lubrication	Pressure system with spin-on filter and cooler			Pressure system with spin-on filter and cooler		
Air Cleaner	Dual-stage dry type with safety element and evacuator valve			Dual-stage dry type with safety element and evacuator valve		
Cooling						
Fan Type	Suction type			Electronically controlled, variable-rate suction type		
Engine Coolant Rating	–40 deg. C (–40 deg. F)			–40 deg. C (–40 deg. F)		
Engine Oil Cooler	Oil to water			Oil to water		
Powertrain						
Transmission	4 speed, helical-cut gears, full PowerShift™ transmission with hydraulic reverser standard; electric clutch cutoff on loader lever					
Torque Converter	Single stage, dual phase with 2.63:1 stall ratio, 280 mm (11 in.)					
Maximum Travel Speeds with Standard Engine, Measured with 19.5L-24 Rear Tires	*Forward*	*Reverse*		*Forward*	*Reverse*	
Gear 1	5.2 km/h (3.3 mph)	6.6 km/h (4.1 mph)		5.6 km/h (3.5 mph)	7.0 km/h (4.4 mph)	
Gear 2	9.6 km/h (5.9 mph)	12.0 km/h (7.5 mph)		10.2 km/h (6.3 mph)	12.9 km/h (8.0 mph)	
Gear 3	19.4 km/h (12.1 mph)	—		20.9 km/h (13.0 mph)	—	
Gear 4	29.9 km/h (18.6 mph)	—		33.1 km/h (20.6 mph)	—	
Axles						
Axle Oscillation, Stop to Stop, Front Axle	22 deg.			22 deg.		
Axle Ratings	*Non-Powered Front*	*Mechanical-Front-Wheel Drive (MFWD)*	*Rear*	*Non-Powered Front*	*Mechanical-Front-Wheel Drive (MFWD)*	*Rear*
Static	18 000 kg (39,683 lb.)	12 000 kg (26,455 lb.)	13 000 kg (28,660 lb.)	18 000 kg (39,683 lb.)	12 000 kg (26,455 lb.)	13 000 kg (28,660 lb.)
Dynamic	7200 kg (15,873 lb.)	6000 kg (13,228 lb.)	7000 kg (15,432 lb.)	7200 kg (15,873 lb.)	6000 kg (13,228 lb.)	7000 kg (15,432 lb.)
Ultimate	32 950 kg (72,642 lb.)	28 200 kg (62,170 lb.)	30 600 kg (67,461 lb.)	32 950 kg (72,642 lb.)	28 200 kg (62,170 lb.)	30 600 kg (67,461 lb.)
Differentials						
MFWD Axle	Open – standard; automatic, limited-slip traction control – optional			Open – standard; automatic, limited-slip traction control – optional		
Rear Axle	Foot actuated, hydraulically engaged 100% mechanical lock			Foot actuated, hydraulically engaged 100% mechanical lock		
Steering (ISO 5010)	Hydrostatic power steering and emergency steering			Hydrostatic power steering and emergency steering		
Axle	*Non-Powered Front*	*MFWD*		*Non-Powered Front*	*MFWD*	
Curb-Turning Radius						
With Brakes	3.44 m (11 ft. 4 in.)	3.58 m (11 ft. 9 in.)		3.44 m (11 ft. 4 in.)	3.58 m (11 ft. 9 in.)	
Without Brakes	3.94 m (12 ft. 11 in.)	4.08 m (13 ft. 5 in.)		3.94 m (12 ft. 11 in.)	4.08 m (13 ft. 5 in.)	
Bucket Clearance Circle						
With Brakes	9.89 m (32 ft. 5 in.)	10.11 m (33 ft. 2 in.)		9.89 m (32 ft. 5 in.)	10.11 m (33 ft. 2 in.)	
Without Brakes	10.76 m (35 ft. 4 in.)	11.05 m (36 ft. 3 in.)		10.76 m (35 ft. 4 in.)	11.05 m (36 ft. 3 in.)	
Steering Wheel Turns (lock to lock)	3.2	2.7		3.2	2.7	
Final Drive, Mechanical-Front Wheel and Rear Axle	Heavy duty, outboard planetary final drives distribute shock loads over 3 gears					
Brakes (ISO 3450)						
Service	Power assisted, hydraulic wet disc, mounted inboard, self-adjusting and self-equalizing					
Parking	Spring applied, hydraulically released, wet, multi-disc, independent of service brakes with electric switch control					
Hydraulics						
Main Pump	Open center, gear type, tandem with unloader			Open center, single gear		
Pump Flow at 2,200 rpm						
Backhoe	119 L/m (31.5 gpm)			106 L/m (28 gpm)		
Loader	98 L/m (26 gpm)			106 L/m (28 gpm)		
System Relief Pressure						
Backhoe	24 993 kPa (3,625 psi)			24 993 kPa (3,625 psi)		
Loader	22 063 kPa (3,200 psi)			22 063 kPa (3,200 psi)		

Hydraulics *(continued)*	**310K EP**	**310K**
Controls		
Backhoe	2-lever manual standard; pilot controls with pattern select, 3-lever manual controls with foot swing, and manual and/or electric auxiliary functions optional	
Loader	Single-lever control with electric clutch cutoff switch standard; manual auxiliary function (2nd lever) optional	

Cylinders	**310K EP / 310K**		
Type	Heat-treated, chrome-plated, polished rods; hardened steel (replaceable bushings) pivot pins		
	Bore	*Rod Diameter*	*Stroke*
Loader Boom (2)	80 mm (3.15 in.)	50 mm (1.97 in.)	790 mm (31.10 in.)
Loader Bucket (1)	90 mm (3.54 in.)	50 mm (1.97 in.)	744 mm (29.29 in.)
Backhoe Boom (1)	110 mm (4.33 in.)	56 mm (2.20 in.)	821 mm (32.32 in.)
Backhoe Crowd (1)	110 mm (4.33 in.)	63 mm (2.48 in.)	553 mm (21.77 in.)
Backhoe Bucket (1)	80 mm (3.15 in.)	50 mm (1.97 in.)	892 mm (35.12 in.)
Backhoe Swing (2)	80 mm (3.15 in.)	45 mm (1.77 in.)	310 mm (12.20 in.)
Backhoe Extendable Dipperstick (1)	63 mm (2.48 in.)	32 mm (1.26 in.)	1062 mm (41.81 in.)
Backhoe Stabilizer (2)	80 mm (3.15 in.)	50 mm (1.97 in.)	500 mm (19.69 in.)
Non-Powered Axle (1)	70 mm (2.76 in.)	42 mm (1.65 in.)	213 mm (8.39 in.)
MFWD (1)	67 mm (2.64 in.)	42 mm (1.65 in.)	210 mm (8.27 in.)

Electrical	**310K EP**	**310K**
Voltage	12 volt	12 volt
Alternator Rating	90 amp	120 amp
Lights	10 halogen: 4 front, 4 rear, and 2 side docking (32,500 candlepower each); turn signals and flashers: 2 front and 2 rear; stop and taillights; and 2 rear reflectors	

Operator Station	
Type (SAE J1040)	Canopy, isolation mounted, ROPS/FOPS, left/right access, with molded roof

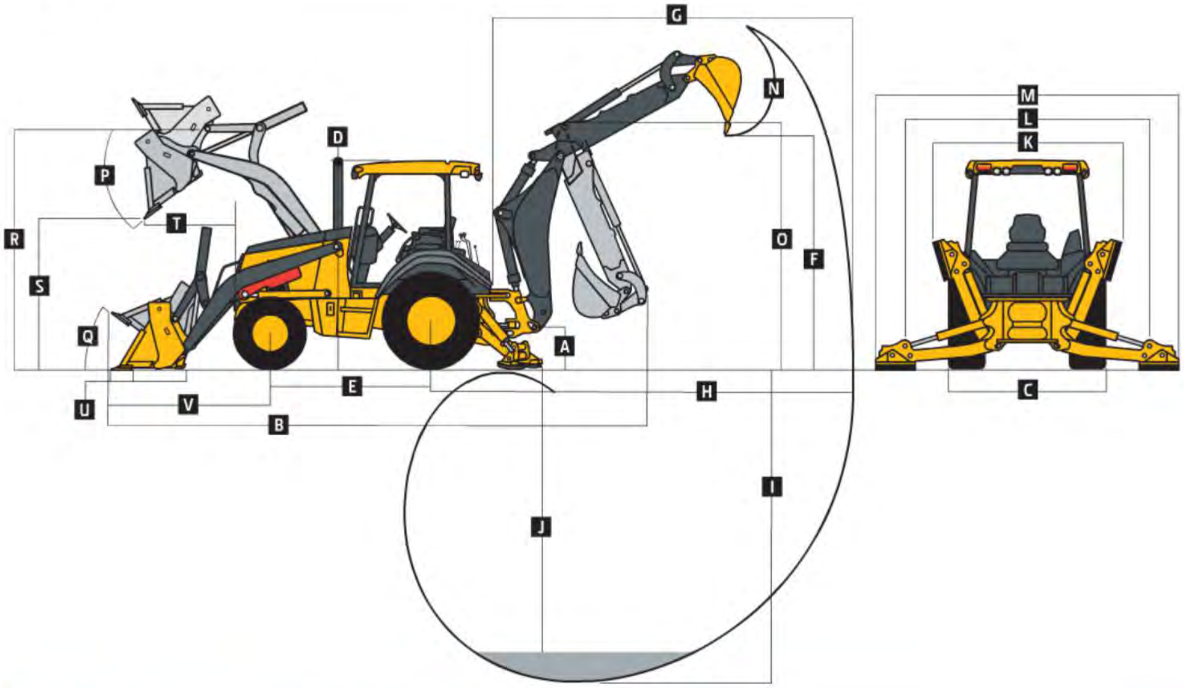
Tires/Wheels				
	Front	*Rear*	*Front*	*Rear*
Non-Powered Front Axle	11L-16 F-3 (12)	19.5L-24 R-4 (10)	11L-16 F-3 (12)	19.5L-24 R-4 (10)
	11L-16 F-3 (12)	16.9-28 R-4 (10)	11L-16 F-3 (12)	16.9-28 R-4 (10)
MFWD	12-16.5 NHS (8)	19.5L-24 R-4 (10)	12-16.5 NHS (8)	19.5L-24 R-4 (10)
	305/70D16.5 NHS (10)	19.5L-24 R-4 (10)	305/70D16.5 NHS (10)	19.5L-24 R-4 (10)
	—	—	12.5/80-18 I-3 (12)	19.5L-24 R-4 (10)
	—	—	12.5/80-18 I-3 (12)	21L-24 R-4 (12)

Serviceability	**310K EP / 310K**
Hydraulic Oil Filter, Spin-On Enclosed Replaceable Element	6-micron filtration; 1,000 break-in/service hours
Refill Capacities	
Cooling System	32.9 L (34.8 qt.)
Rear Axle	18 L (19 qt.)
Engine Oil (including vertical spin-on filter)	13 L (13.7 qt.)
Torque Converter and Transmission	15.1 L (16 qt.)
Fuel Tank (with ground-level fueling)	155.2 L (41 gal.)
Hydraulic System	89.3 L (23.6 gal.)
Hydraulic Reservoir	37.1 L (9.8 gal.)
MFWD Housing	
Axle	6.5 L (6.9 qt.)
Planetary (each)	0.9 L (1 qt.)

Operating Weights	**310K EP**	**310K**
With Full Fuel Tank, 79-kg (175 lb.) Operator, and Standard Equipment	6311 kg (13,913 lb.)	6364 kg (14,030 lb.)
Typical with Cab, MFWD, Extendable Dipperstick, and 454-kg (1,000 lb.) Counterweight	7380 kg (16,270 lb.)	7433 kg (16,387 lb.)
Optional Components (weight difference between base equipment and option)		
Cab	263 kg (580 lb.)	263 kg (580 lb.)
MFWD with Tires	168 kg (370 lb.)	168 kg (370 lb.)
Extendable Dipperstick	200 kg (440 lb.)	200 kg (440 lb.)
Front Loader Coupler	286 kg (630 lb.)	286 kg (630 lb.)
Backhoe Bucket Coupler	59 kg (130 lb.)	59 kg (130 lb.)

Equipment Product Information
Page 3 of 5

Overall Dimensions	310K EP / 310K
A Ground Clearance, Minimum	305 mm (12 in.)
B Overall Length, Transport	7.09 m (23 ft. 3 in.)
C Width Over Tires	2.18 m (7 ft. 2 in.)
D Height to Top of ROPS/Cab	2.74 m (9 ft. 0 in.)
E Length from Axle to Axle	
Non-Powered Front Axle	2.11 m (6 ft. 11 in.)
MFWD Axle	2.14 m (7 ft. 0 in.)



Backhoe Dimensions/Performance	310K EP / 310K		
Backhoe specifications are with 610-mm x 0.18-m³ (24 in. x 6.5 cu. ft.) bucket			
Bucket Range	305–762 mm (12–30 in.)		
Digging Force			
Bucket Cylinder	49.4 kN (11,106 lb.)		
Crowd Cylinder	31.2 kN (7,006 lb.)		
Swing Arc	180 deg.		
Operator Control	2 levers		
Leveling Angle	14 deg.		
Stabilizer Angle Rearward	18 deg.		
		With Optional Extendable Dipperstick	
	With Standard Backhoe	*Retracted*	*Extended*
F Loading Height, Truck Loading Position	3.33 m (10 ft. 11 in.)	3.38 m (11 ft. 1 in.)	4.24 m (13 ft. 11 in.)
G Reach from Center of Swing Pivot	5.44 m (17 ft. 10 in.)	5.51 m (18 ft. 1 in.)	6.53 m (21 ft. 5 in.)
H Reach from Center of Rear Axle	6.50 m (21 ft. 4 in.)	6.58 m (21 ft. 7 in.)	7.59 m (24 ft. 11 in.)
I Digging Depth (SAE maximum)	4.34 m (14 ft. 3 in.)	4.39 m (14 ft. 5 in.)	5.46 m (17 ft. 11 in.)
J Digging Depth (SAE)			
610-mm (2 ft.) Flat Bottom	4.32 m (14 ft. 2 in.)	4.37 m (14 ft. 4 in.)	5.44 m (17 ft. 10 in.)
2440-mm (8 ft.) Flat Bottom	3.96 m (13 ft. 0 in.)	4.06 m (13 ft. 4 in.)	5.18 m (17 ft. 0 in.)
K Stabilizer Width, Transport	2.18 m (7 ft. 2 in.)	2.18 m (7 ft. 2 in.)	2.18 m (7 ft. 2 in.)
L Stabilizer Spread, Operating	3.10 m (10 ft. 2 in.)	3.10 m (10 ft. 2 in.)	3.10 m (10 ft. 2 in.)
M Stabilizer Overall Width, Operating	3.53 m (11 ft. 7 in.)	3.53 m (11 ft. 7 in.)	3.53 m (11 ft. 7 in.)
N Bucket Rotation	190 deg.	190 deg.	190 deg.
O Transport Height	3.43 m (11 ft. 3 in.)	3.40 m (11 ft. 2 in.)	3.40 m (11 ft. 2 in.)

F6/9

FRD FURUKAWA | KENT® FORMERLY KENT DEMOLITION TOOLS

F6, F9

Versatility and power are the benefits of the F6 and F9. These hammers are available with Furukawa's unique Switch Hitch™ side plate mounting system for rubber-tired backhoes. An indexing disc inserted in the side plate can be easily changed to accommodate quick couplers for many popular backhoes, including Case®, John Deere® and Caterpillar®. Attachment is as simple as rotating the disc to the OEM center dimension of the carrier then attach the hammer in the normal manner. There's no need for separate OEM specific mounting brackets for each carrier. This design also increases "tuck" for better over the road transport and aids in loading and unloading of the equipment.

The F6 and F9 also comes in the popular Qt version to accommodate work environments that demand a reduced noise level. These mid-size hammers are engineered with a higher back head pressure and larger pistons for an increase in impact energy of 20-30%. The F6 is available with a one-piece skid-steer loader bracket for large series skid-steer loaders. All Furukawa hammers come complete with Furukawa's exclusive Pro-Pak for ease of installation. The Pro-Pak includes hose whips, mounting hardware, standard working steel and tool kit with operating manual at no additional charge.

Features and Benefits:

- Increase in back head pressure and larger diameter piston results in 25% greater impact energy
- Longer thrust bushing improves piston alignment during impact and incorporates grease holes to evenly distribute grease in the front head
- CD designed side bolt threads provide even load distribution and greater surface contact between the nut and bolt reducing the chances of thru-bolt failure
- Increased front head wall thickness for added service life

MEDIUM SERIES HYDRAULIC BREAKERS

F6/9

IMPACT ENERGY CLASS	F6 - 1000 ft lb	F9 - 1500 ft lb
Weight in lbs (kg)*		
TLB Version	700 (317)	1,120 (508)
SS Version	939 (426)	n/a
FSP Version	875 (397)**	1,121 (554)**
Qt Version	958 (434**)	1,403 (636)**
Length in inches (mm)*		
TLB Version	57 (1,448)	63.25 (1,606)
SS Version	63 (1,600)	n/a
FSP Version	56.5 (1,435)**	75.5 (1,918)**
Qt Version	55.25 (1,403)	74.5 (1,461)
Working Steel***		
Diameter in inches (mm)	3 (76.2)	3.5 (90)
New length measured from fronthead (in)	17.75	19.5
Replaceable length measured from fronthead (in)	12.25	13.75
General Specifications		
Adjustable BPM	650 ~ 1,500	550 ~ 900
Acceptable GPM Range (LPM)	13 ~ 40 (50 ~ 150)	17 ~ 30 (65 ~ 114)
Acceptable PSI Range (Bar)	1,450 ~ 2,320 (100 ~ 160)	1,700 ~ 2,150 (120 ~ 150)
85 dB(A) Qt version@	10 - meters	11 - meters
Recommended Carrier Range in U.S. tons	6 ~ 7	7 ~ 10
Carrier Options		

Notes 1. Weights and lengths for all versions include Working Steel
2. All weights and lengths for FSP's & Qt versions marked**include a "Universal" Top Cap

CARRIER OPTIONS

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