15 December 2017

Ms. Linlin Huang
Oceanwide Center LLC
88 First Street, 6th Floor
San Francisco, California 94105

Subject: Geotechnical Analysis
FDIC Building – Pile Axial Capacity and Lateral Resistance
Oceanwide Center – 1st and Mission Streets
San Francisco, California
Project No.: 750621401

Dear Ms. Huang:

This letter presents the results of supplemental geotechnical analysis for the pile foundations supporting the FDIC Building at 25 Jessie Street, which is adjacent to the Oceanwide Center project in San Francisco, California. The Oceanwide Center project consists of construction of two new towers over three to four basement levels. The towers will be supported on drilled shafts that extend into bedrock. Construction of the planned basements and foundations will require excavations extending about 72 feet below the existing ground surface for Tower 1 and about 65 feet below the existing ground surface for Tower 2. An internally-braced cutoff wall, consisting of deep soil mixed (DSM) panels, is planned to temporarily support the excavation. We conducted a geotechnical investigation for this project and presented our findings and recommendations in a report dated 1 July 2015.

This supplemental analysis includes an estimation of axial pile capacities and lateral pile group resistance for the piles beneath the FDIC building to assist in the structural evaluation of the building. Based on the structural plans[1] reviewed, we understand the FDIC building is an 18-story steel-framed office building on a pile-supported foundation system consisting of 12-inch-square driven concrete piles. We understand the piles were driven to refusal, with planned pile tips approximately 67 feet below the existing ground surface (about Elevation -60 feet, SFCD), which locates the pile tips on a stratum of dense sand known locally as Colma Formation.

Ultimate Pile Capacities

The structural plans for the FDIC building indicate that the piles were originally designed for an allowable dead plus live load of 200 kips. Assuming a factor of safety of 2.0 for dead plus live loads, this is an ultimate capacity of 400 kips. We evaluated the estimated axial pile capacity using the subsurface information gathered from the Oceanwide Center investigation and conclude an ultimate compressive capacity of about 400 kips is appropriate. From our analysis, we conclude an ultimate uplift (tension) capacity of about 190 kips. This capacity assumes that

[1] "Ecker Square" structural plans prepared by Raj Desai Associates, Inc. and dated 15 June 1981.

the driven piles achieved a minimum embedment of about 10 feet in the dense Colma Formation sand.

Lateral Pier Analysis – Earthquake Loading

At the request of the team, we analyzed the lateral resistance of the piles and pile groups within the 25 Jessie Street seismic frame using loading parameters provided by Nabih Youssef Associates for their seismic evaluation of the structure. Using the estimated dead, live, and seismic load combinations provided by Nabih Youssef Associates, and presented on Figure A-1, we calculated the maximum axial and shear load demands on each of the pile caps for seismic loading in the east-west and north-south directions. These calculated loads are presented on Figure A-2.

For modeling the pile groups, we modeled the concrete pile layout for each pile cap within the seismic frame using the program Group (2016 v. 10.09 by Ensoft) based on the pile cap details presented in the sheet "S10, Pile & Pile Cap Details" of the structural plans. The pile caps were modeled as embedded below the ground surface, as shown on the structural plans (Sheet S3 and S10). We performed our analysis for free-head conditions of 12-inch-square pre-cast pre-stressed piles. When the design axial load is in compression, we used a modulus of elasticity equal to 4.9×10^6 pounds per square inch (psi)[2] and a moment of inertia equal to 1,728 in^4. When subjecting the pile groups to a net uplift case, a value equal to half of the theoretical modulus of elasticity was used. The concrete strength was modeled as 6,500 psi, as shown on Sheet S10 of the structural plans.

The twelve pile groups were analyzed for axial compression and shear loading in the east, west, north, and south loading directions. Four pile groups were analyzed for axial tension and shear loading in the east, west, north and south loading directions. For each loading condition, the maximum deflection, maximum bending moment, depth to maximum bending moment, and maximum shear load in any individual pile within the pile group was calculated. The results are presented in Figures A-3 through A-18.

Lateral Pile Analysis – Excavation-Induced Deformations

Construction of the planned basements and foundations at Oceanwide Center Development will require excavations about 65 feet below the existing ground surface for Tower 2 and 76 feet below the existing ground surface for Tower 1. Brierley and Associates has performed a 3-dimensional numerical analysis of the excavation for Towers 1 and 2. The excavation-induced ground deformations and lateral wall movements were presented in memorandum dated 7 July 2017[3]. The pile foundations at 25 Jessie Street will be subjected to lateral soil movements during the excavation process as the shoring walls deflect laterally. The differential lateral soil movement will induce shear and associated bending moments in the concrete piles.

[2] Assumes modulus of elasticity (E) = $33 * \gamma^{1.5}_{concrete} \sqrt{(f'_c)}$

[3] "Oceanwide Center, 526 Mission Street, San Francisco, 3D Finite Element Analysis Stage 1: Tower 2 Excavation (Rev. 1)" and "Oceanwide Center, 526 Mission Street, San Francisco, 3D Finite Element Analysis Stage 2: Tower 1 Excavation (Rev. 1)"

To estimate the loads and moments imposed on the pile foundations at 25 Jessie Street during the excavation process, we modeled the soil deformations (i.e. soil movement) along the length of the piles using program L-Pile (2016 version 9 by Ensoft). The soil movements were interpreted from the soil and wall deformations presented in Brierley and Associates' analysis. The piles were analyzed for estimated deflections in both the north-south and east-west directions. The piles were modeled as 12-inch-square, pre-cast, pre-stressed piles with a free head condition and an axial load of 100 and 200 kips. The assumed soil deformation profiles at Columns 3, 5, 73, and 75 and the results of our analyses are presented on Figure B-1 through Figure B-16.

We trust this letter provides the information needed. If you have any questions, please call.

Sincerely yours,
Langan Engineering & Environmental Services, Inc.

Justin Ray, PE
Project Engineer

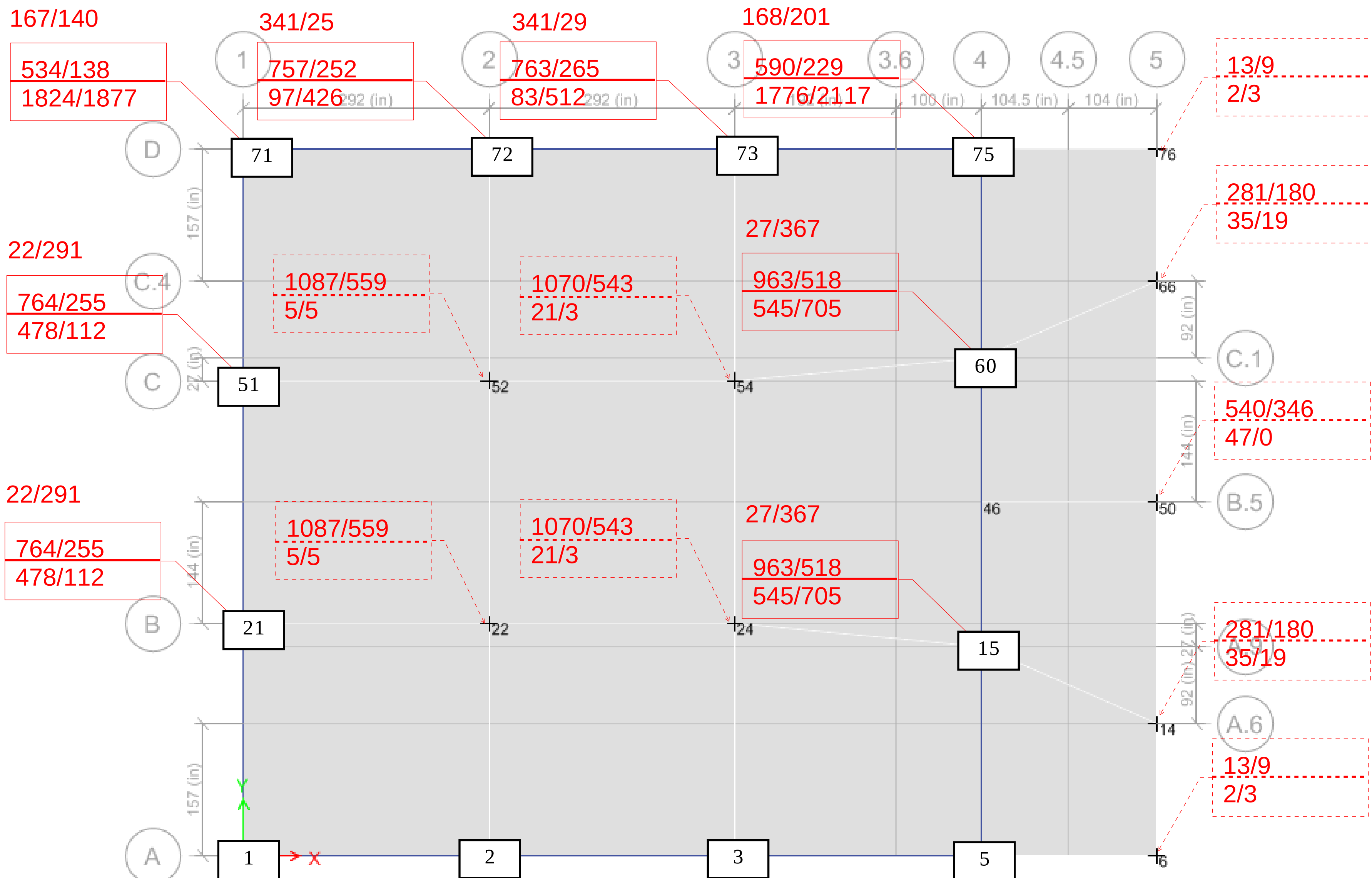
Scott A. Walker, GE
Senior Associate

750621401.60_SAW_GTK Evaluation_FDIC Piles

Attachments: Figures A-1 through A-18 and Figures B-1 through B-16.

FIGURES

FORCE ON PILES PER ASCE 41



LEGEND & NOTES:

VX / VY

DL / LL
EX / EY

INDICATES VERTICAL LOAD DEMAND AT BASE OF COLUMN (DL= DEAD LOAD; LL = LIVE LOAD; EX = SEISMIC ACTION EAST-WEST X DIR.; EY = SEISMIC ACTION NORTH-SOUTH Y DIR.); VX, VY = COLUMN BASE SHEAR IN X/Y DIR.

UNIT: Kips

1. SEISMIC FORCES INCLUDED ACCIDENTAL TORSIONAL EFFECTS.
2. SOLID BOXES ARE FOR SEISMIC FRAME COLUMNS. DASHED BOXES ARE FOR GRAVITY COLUMNS.

Figure A-1

Pile Cap Loading Detail
25 Jessie, SF, CA
KLW
11/1/2017

													Calculated Loads, Directions from Map					
		Pile Cap Thickness		Top of Pile Cap Elevation (ft)		Forces on Piles Caps (kips)						Model North (-z)	Axial Load under downward EQ in East-West (kips)	Axial Load under upward EQ in East-West (kips)	Axial Load under downward EQ in North-South Direction (kips)	Axial Load under upward EQ in North-South Direction (kips)	Shear at Column along Frame Line in East-West Direction (Vx average)	Average Shear along Frame Line in North-South Direction (Vy average)
Column No.	Pile Cap Type	ft	in	Project Datum	SFCD	VX	VY	DL	LL	EX	EY	Direction	= 1.1D+0.275L+Ex (except at corners where Eq = Ex+0.3Ey)	=0.9D-Ex	= 1.1D+0.275L+Ey (except at corners where Eq = Ey+0.3Ex)	=0.9D-Ey	(kips) (colors indicate shear walls)	(kips) (colors indicate shear walls)
1	7	4.5	54	-5.50	1.95	167	140	534	138	1824	1877	South	3012	-1343	3050	-1396	254	216
2	7	4.5	54	-5.50	1.95	341	25	757	252	97	426	South	999	584	1328	255	254	25
3	7	4.5	54	-5.50	1.95	341	29	763	265	83	512	South	995	604	1424	175	254	29
5	8	4.5	54	-13.17	-5.72	168	201	590	229	1776	2117	North	3123	-1245	3362	-1586	254	284
15	10	4.25	51	-13.17	-5.72	27	367	963	518	545	705	North	1747	322	1907	162	27	284
21	7	4.5	54	-5.50	1.95	22	291	764	255	478	112	West	1389	210	1023	576	22	216
51	7	4.5	54	-5.50	1.95	22	291	764	255	478	112	West	1389	210	1023	576	22	216
60	10	4.25	51	-13.17	-5.72	27	367	963	518	545	705	North	1747	322	1907	162	27	284
71	7	4.5	54	-5.50	1.95	167	140	534	138	1824	1877	North	3012	-1343	3050	-1396	254	216
72	7	4.5	54	-5.50	1.95	341	25	757	252	97	426	North	999	584	1328	255	254	25
73	7	4.5	54	-5.50	1.95	341	29	763	265	83	512	North	995	604	1424	175	254	29
75	8	4.5	54	-5.50	1.95	168	201	590	229	1776	2117	North	3123	-1245	3362	-1586	254	284

Pile Tip Elevation (ft)	
Project Datum	SFCD
-67	-59.55

f'c (psi)	6500
wc (pcf)	150
Ec* (psi)	4887733

Shear Modulus, G (psi)	2036556

From: Sudharshan Navalpakkam [mailto:snavalpakkam@nyase.com]
Sent: Friday, September 01, 2017 4:38 PM
To: Linlin Huang; Scott Walker; Justin Ray; Dae-Hwan Kim; Michael Gemmill
Subject: RE: 25 Jessie FDIC Building Pile evaluation - Estimated Foundation demands for Geotech review - Load Combinations

All,

Per our conference call yesterday, please see below for follow-up info. on the ASCE 41 load combinations we need to use to evaluate the pile foundations:

ASCE 41-13 has two load combinations for seismic loads:

1. 1.1D + 0.275L +/- EQ – this load combination governs for downward load (with positive, i.e, downward EQ)
2. 0.9D +/- EQ – this load combination governs for uplift load case (with negative EQ)

where D=dead load; L=live load & EQ= seismic load.

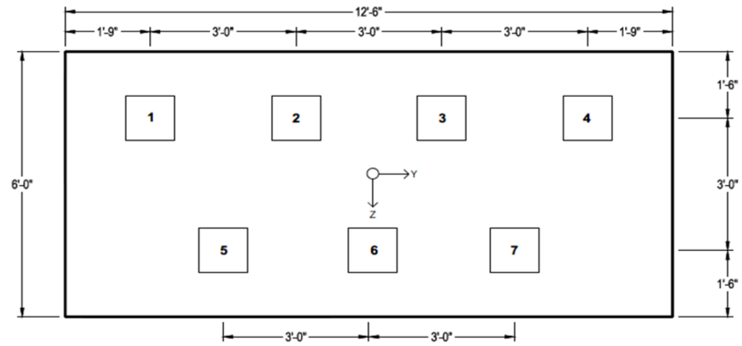
EQ may be taken as the maximum of Ex or Ey for all columns, except the (4) corner columns.
At the (4) corner columns, EQ =100% EX + 30% EY or 100% EY + 30% EX because they are subjected to biaxial loading. So the easiest way to implement this is to use maximum(1.0EX+0.3EY, 0.3EX+1.0EY).

*Note: For the four cases that experience net axial tension, 50% of the gross EI was used assuming a cracked pile cross section

Figure A-2

25 Jessie Street
San Francisco, CA
Pile Response using Group v8.0
KLW
10/6/2017

North



Column 1

Shear Load Direction	East
Axial Load (kips)	3,012
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.36	808,000	41	35,800
Pile #	5,6,7	5	5	1

Shear Load Direction	West
Axial Load (kips)	3,012
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.36	808,000	41	35,800
Pile #	5,6,7	7	7	4

Shear Load Direction	North
Axial Load (kips)	3,050
Shear Load (kips)	216

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.27	618,000	41	27,100
Pile #	All	5 and 7	5 and 7	5 and 7

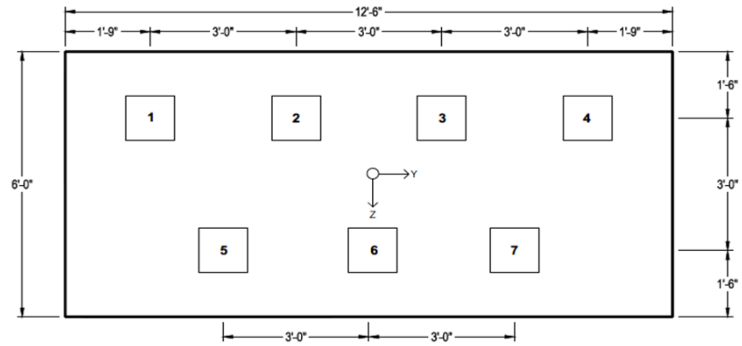
Shear Load Direction	South
Axial Load (kips)	3,050
Shear Load (kips)	216

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.27	621,000	41	28,400
Pile #	All	1 and 4	1 and 4	1 and 4

Figure A-3

25 Jessie Street
San Francisco, CA
Pile Response using Group v8.0
KLW
10/27/2017

North



Column 1

Shear Load Direction	East
Axial Load (kips)	-1,343
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.39	580,000	34	34,900
Pile #	5,6,7	5	5	5

Shear Load Direction	West
Axial Load (kips)	-1,343
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.39	580,000	34	34,900
Pile #	5,6,7	7	7	7

Shear Load Direction	North
Axial Load (kips)	-1,396
Shear Load (kips)	216

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.30	446,000	34	26,700
Pile #	All	5 and 7	5 and 7	5 and 7

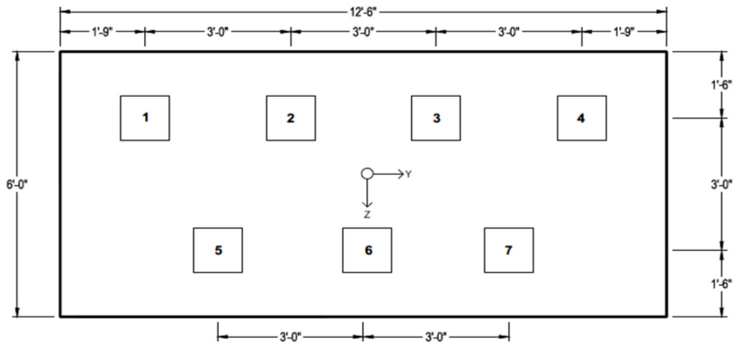
Shear Load Direction	South
Axial Load (kips)	-1,396
Shear Load (kips)	216

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.30	455,000	34	27,200
Pile #	All	1 and 4	1 and 4	1 and 4

Figure A-4

25 Jessie Street
San Francisco, CA
Pile Response using Group v8.0
KLW
10/6/2017

North



Column 2

Shear Load Direction	East
Axial Load (kips)	999
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.35	753,000	41	35,600
Pile #	5,6,7	5	5	5

Shear Load Direction	West
Axial Load (kips)	999
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.35	753,000	41	35,600
Pile #	5,6,7	7	7	7

Shear Load Direction	North
Axial Load (kips)	1,328
Shear Load (kips)	25

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.03	62,400	41	2,960
Pile #	All	5 and 7	5 and 7	5 and 7

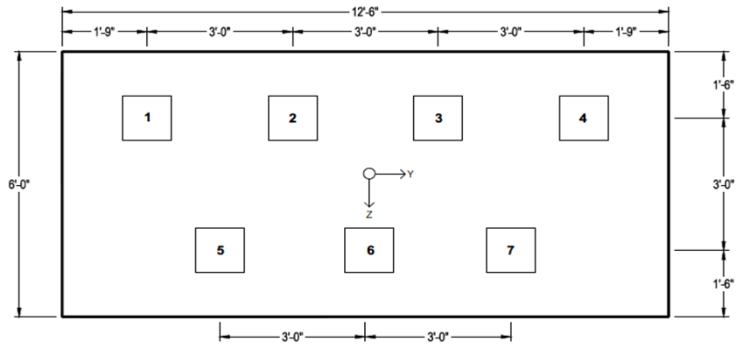
Shear Load Direction	South
Axial Load (kips)	1,328
Shear Load (kips)	25

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.03	75,900	41	3,670
Pile #	All	1 and 4	1 and 4	1 and 4

Figure A-5

25 Jessie Street
San Francisco, CA
Pile Response using Group v8.0
KLW
10/6/2017

North



Column 3

Shear Load Direction	East
Axial Load (kips)	995
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.35	753,000	41	35,600
Pile #	5,6,7	5	5	5

Shear Load Direction	West
Axial Load (kips)	995
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.35	753,000	41	35,600
Pile #	5,6,7	7	7	7

Shear Load Direction	North
Axial Load (kips)	1,424
Shear Load (kips)	29

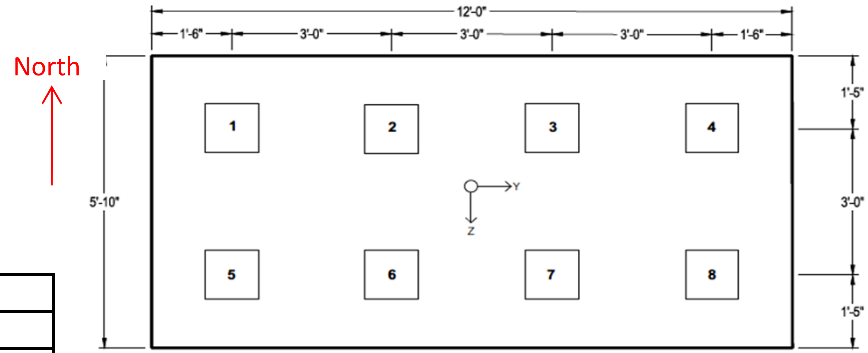
	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.03	72,600	41	3,430
Pile #	All	5 and 7	5 and 7	5 and 7

Shear Load Direction	South
Axial Load (kips)	1,424
Shear Load (kips)	29

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.03	76,100	41	3,670
Pile #	All	1 and 4	1 and 4	1 and 4

Figure A-6

25 Jessie Street
San Francisco, CA
Pile Response using Group v8.0
KLW
10/6/2017



Column 5

Shear Load Direction	East
Axial Load (kips)	3,123
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	1.07	1,600,000	59	36,300
Pile #	All	4 and 8	4 and 8	4 and 8

Shear Load Direction	West
Axial Load (kips)	3,123
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	1.07	1,600,000	59	36,300
Pile #	All	1 and 5	1 and 5	1 and 5

Shear Load Direction	North
Axial Load (kips)	3,362
Shear Load (kips)	284

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	1.21	1,780,000	65	37,500
Pile #	All	1 and 4	1 and 4	1 and 4

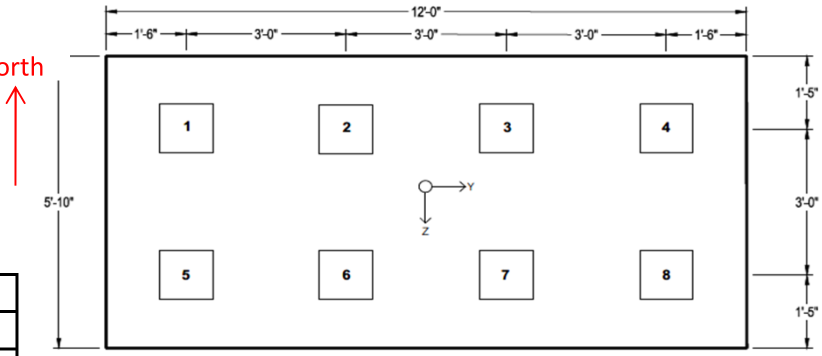
Shear Load Direction	South
Axial Load (kips)	3,362
Shear Load (kips)	284

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	1.21	1,780,000	65	37,500
Pile #	All	5 and 8	5 and 8	5 and 8

Figure A-7

25 Jessie Street
San Francisco, CA
Pile Response using Group v8.0
KLW
10/27/2017

North



Column 5

Shear Load Direction	East
Axial Load (kips)	-1,245
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	1.17	1,080,000	53	35,200
Pile #	All	4 and 8	4 and 8	4 and 8

Shear Load Direction	West
Axial Load (kips)	-1,245
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	1.17	1,080,000	53	35,200
Pile #	All	1 and 5	1 and 5	1 and 5

Shear Load Direction	North
Axial Load (kips)	-1,586
Shear Load (kips)	284

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	1.26	1,150,000	53	36,500
Pile #	All	1 and 4	1 and 4	1 and 4

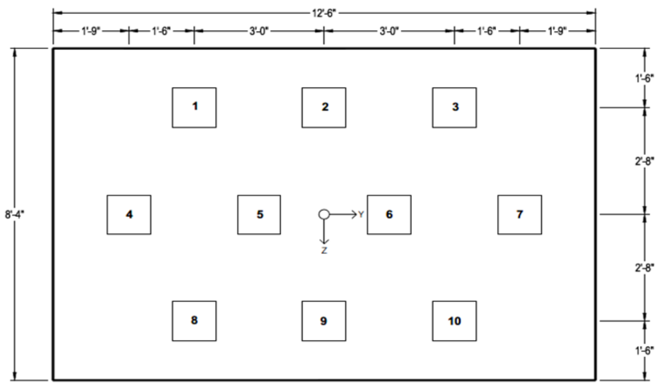
Shear Load Direction	South
Axial Load (kips)	-1,586
Shear Load (kips)	284

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	1.26	1,150,000	53	36,500
Pile #	All	5 and 8	5 and 8	5 and 8

Figure A-8

25 Jessie Street
San Francisco, CA
Pile Response using Group v8.0
KLW
10/6/2017

North



Column 15

Shear Load Direction	East
Axial Load (kips)	1,747
Shear Load (kips)	27

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.04	83,600	48	3,100
Pile #	All	7	7	7

Shear Load Direction	West
Axial Load (kips)	1,747
Shear Load (kips)	27

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.04	83,600	48	3,100
Pile #	All	4	4	4

Shear Load Direction	North
Axial Load (kips)	1,907
Shear Load (kips)	284

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.90	1,320,000	65	32,400
Pile #	All	1 and 3	1 and 3	1 and 3

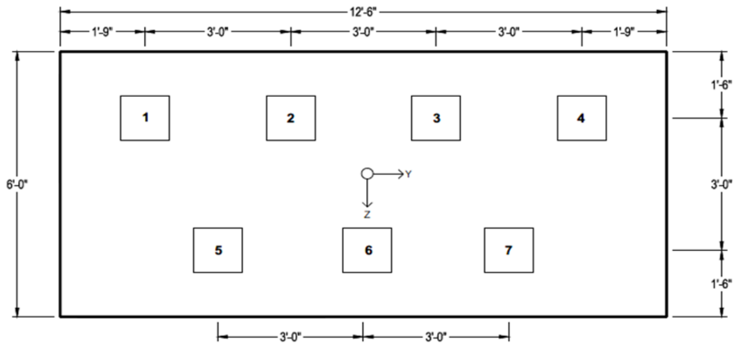
Shear Load Direction	South
Axial Load (kips)	1,907
Shear Load (kips)	284

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.90	1,320,000	65	32,400
Pile #	All	8 and 10	8 and 10	8 and 10

Figure A-9

25 Jessie Street
San Francisco, CA
Pile Response using Group v8.0
KLW
10/6/2017

→ North



Column 21

Shear Load Direction	East
Axial Load (kips)	1,389
Shear Load (kips)	22

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.02	55,000	41	2,600
Pile #	All	5 and 7	5 and 7	5 and 7

Shear Load Direction	West
Axial Load (kips)	1,389
Shear Load (kips)	22

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.03	76,000	41	3,670
Pile #	All	1 and 4	1 and 4	1 and 4

Shear Load Direction	North
Axial Load (kips)	1,023
Shear Load (kips)	216

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.29	634,000	41	29,900
Pile #	5,6, 7	7	7	4 and 7

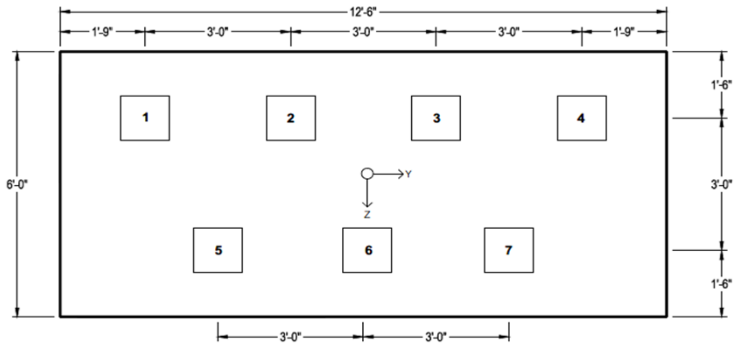
Shear Load Direction	South
Axial Load (kips)	1,023
Shear Load (kips)	216

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.29	634,000	41	29,900
Pile #	5,6, 7	5	5	1 and 5

Figure A-10

25 Jessie Street
San Francisco, CA
Pile Response using Group v8.0
KLW
10/6/2017

→ North



Column 51

Shear Load Direction	East
Axial Load (kips)	1,389
Shear Load (kips)	22

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.02	55,000	41	2,600
Pile #	All	5 and 7	5 and 7	5 and 7

Shear Load Direction	West
Axial Load (kips)	1,389
Shear Load (kips)	22

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.03	76,000	41	3,670
Pile #	All	1 and 4	1 and 4	1 and 4

Shear Load Direction	North
Axial Load (kips)	1,023
Shear Load (kips)	216

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.29	634,000	41	29,900
Pile #	5,6, 7	7	7	4 and 7

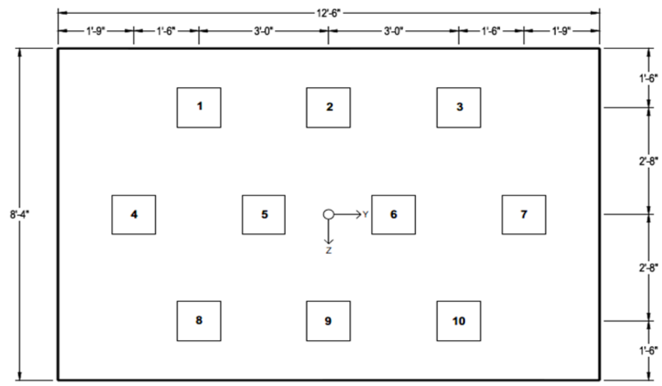
Shear Load Direction	South
Axial Load (kips)	1,023
Shear Load (kips)	216

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.29	634,000	41	29,900
Pile #	5,6, 7	5	5	1 and 5

Figure A-11

25 Jessie Street
San Francisco, CA
Pile Response using Group v8.0
KLW
10/6/2017

North



Column 60

Shear Load Direction	East
Axial Load (kips)	1,747
Shear Load (kips)	27

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.04	83,600	48	3,100
Pile #	All	7	7	7

Shear Load Direction	West
Axial Load (kips)	1,747
Shear Load (kips)	27

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.04	83,600	48	3,100
Pile #	All	4	4	4

Shear Load Direction	North
Axial Load (kips)	1,907
Shear Load (kips)	284

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.90	1,320,000	65	32,400
Pile #	All	1 and 3	1 and 3	1 and 3

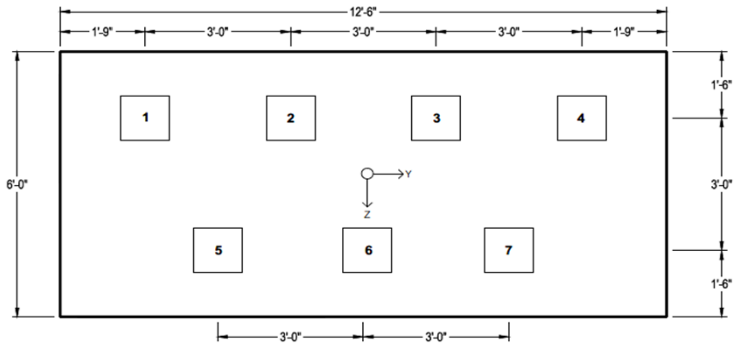
Shear Load Direction	South
Axial Load (kips)	1,907
Shear Load (kips)	284

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.90	1,320,000	65	32,400
Pile #	All	8 and 10	8 and 10	8 and 10

Figure A-12

25 Jessie Street
San Francisco, CA
Pile Response using Group v8.0
KLW
9/20/2017

North



Column 71

Shear Load Direction	East
Axial Load (kips)	3,012
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.36	808,000	41	35,800
Pile #	5, 6, and 7	7	7	4

Shear Load Direction	West
Axial Load (kips)	3,012
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.363	808,000	41	35,800
Pile #	5, 6, and 7	5	5	1

Shear Load Direction	North
Axial Load (kips)	3,050
Shear Load (kips)	216

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.27	621,000	41	28,400
Pile #	All	1 and 4	1 and 4	1 and 4

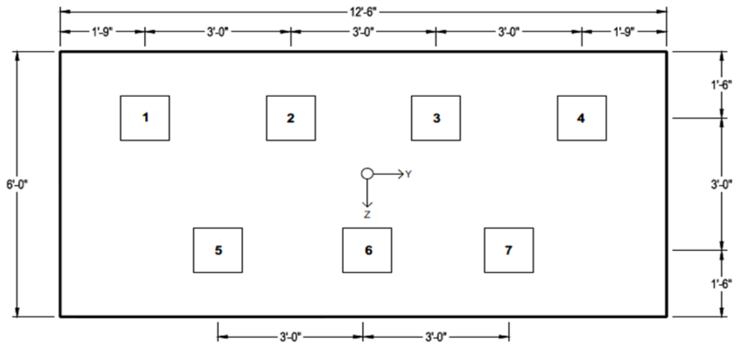
Shear Load Direction	South
Axial Load (kips)	3,050
Shear Load (kips)	216

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.27	618,000	41	27,100
Pile #	All	5 and 7	5 and 7	5 and 7

Figure A-13

25 Jessie Street
San Francisco, CA
Pile Response using Group v8.0
KLW
10/27/2017

North



Column 71

Shear Load Direction	East
Axial Load (kips)	-1,343
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.33	705,000	41	35,900
Pile #	5, 6, and 7	7	7	7

Shear Load Direction	West
Axial Load (kips)	-1,343
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.33	705,000	41	35,900
Pile #	5, 6, and 7	5	5	5

Shear Load Direction	North
Axial Load (kips)	-1,396
Shear Load (kips)	216

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.25	556,000	41	28,400
Pile #	All	1 and 4	1 and 4	1 and 4

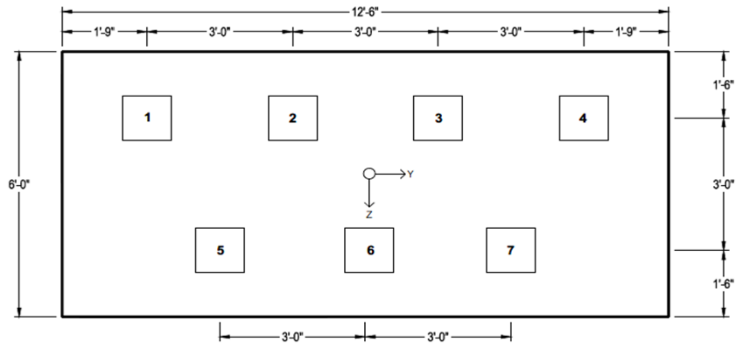
Shear Load Direction	South
Axial Load (kips)	-1,396
Shear Load (kips)	216

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.25	546,000	41	27,700
Pile #	All	5 and 7	5 and 7	5 and 7

Figure A-14

25 Jessie Street
San Francisco, CA
Pile Response using Group v8.0
KLW
10/6/2017

North



Column 72

Shear Load Direction	East
Axial Load (kips)	999
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.35	753,000	41	35,600
Pile #	5, 6, and 7	7	7	7

Shear Load Direction	West
Axial Load (kips)	999
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.35	753,000	41	35,600
Pile #	5, 6, and 7	5	5	5

Shear Load Direction	North
Axial Load (kips)	1,328
Shear Load (kips)	25

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.03	75,900	41	3,670
Pile #	All	1 and 4	1 and 4	1 and 4

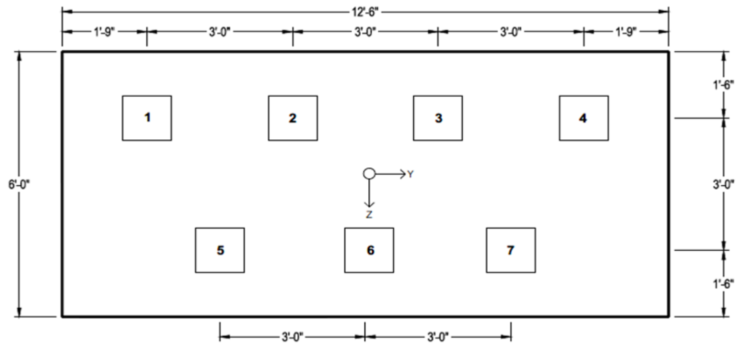
Shear Load Direction	South
Axial Load (kips)	1,328
Shear Load (kips)	25

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.03	74,900	41	3,550
Pile #	All	5 and 7	5 and 7	5 and 7

Figure A-15

25 Jessie Street
San Francisco, CA
Pile Response using Group v8.0
KLW
10/6/2017

North



Column 73

Shear Load Direction	East
Axial Load (kips)	995
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.35	753,000	41	35,600
Pile #	5, 6, and 7	7	7	7

Shear Load Direction	West
Axial Load (kips)	995
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.35	753,000	41	35,600
Pile #	5, 6, and 7	5	5	5

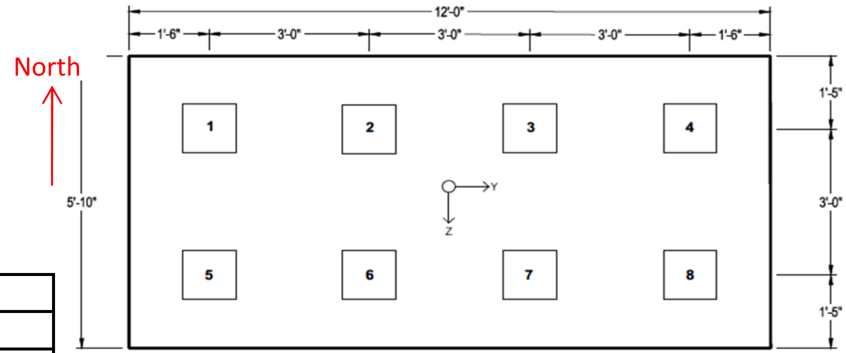
Shear Load Direction	North
Axial Load (kips)	1,424
Shear Load (kips)	29

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.03	76,100	41	3,670
Pile #	All	1 and 4	1 and 4	1 and 4

Shear Load Direction	South
Axial Load (kips)	1,424
Shear Load (kips)	29

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.03	72,600	41	3,430
Pile #	All	5 and 7	5 and 7	5 and 7

25 Jessie Street
San Francisco, CA
Pile Response using Group v8.0
KLW
10/6/2017



Column 75

Shear Load Direction	East
Axial Load (kips)	3,123
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.31	695,000	41	31,600
Pile #	All	4 and 8	4 and 8	4 and 8

Shear Load Direction	West
Axial Load (kips)	3,123
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.309	695,000	41	31,600
Pile #	All	1 and 5	1 and 5	1 and 5

Shear Load Direction	North
Axial Load (kips)	3,362
Shear Load (kips)	284

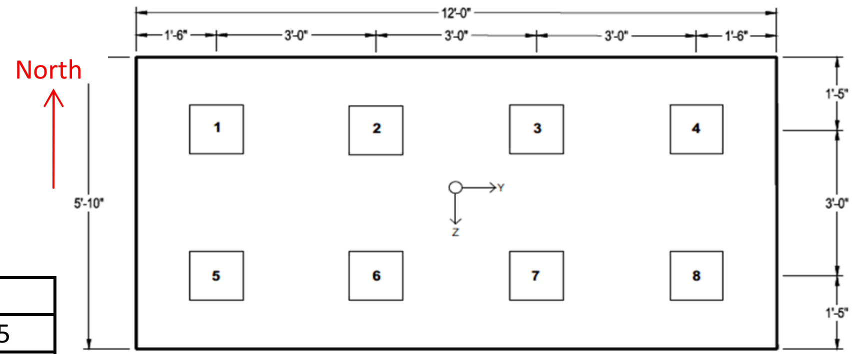
	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.33	739,000	41	33,100
Pile #	All	1 and 4	1 and 4	1 and 4

Shear Load Direction	South
Axial Load (kips)	3,362
Shear Load (kips)	284

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.33	739,000	41	33,100
Pile #	All	5 and 8	5 and 8	5 and 8

Figure A-17

25 Jessie Street
San Francisco, CA
Pile Response using Group v8.0
KLW
10/27/2017



Column 75

Shear Load Direction	East
Axial Load (kips)	-1,245
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.29	626,000	41	31,700
Pile #	All	4 and 8	4 and 8	4 and 8

Shear Load Direction	West
Axial Load (kips)	-1,245
Shear Load (kips)	254

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Y-Direction	Z-direction	Z-direction	Y-Direction
Maximum	0.29	626,000	41	31,700
Pile #	All	1 and 5	1 and 5	1 and 5

Shear Load Direction	North
Axial Load (kips)	-1,586
Shear Load (kips)	284

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.30	658,000	41	33,300
Pile #	All	1 and 4	1 and 4	1 and 4

Shear Load Direction	South
Axial Load (kips)	-1,586
Shear Load (kips)	284

	Deflection (in)	Bending Moment (lb-in)	Depth to Maximum Moment (in)	Shear (lbs)
	Z-Direction	Y-direction	Y-direction	Z-Direction
Maximum	0.30	658,000	41	33,300
Pile #	All	5 and 8	5 and 8	5 and 8

Figure A-18

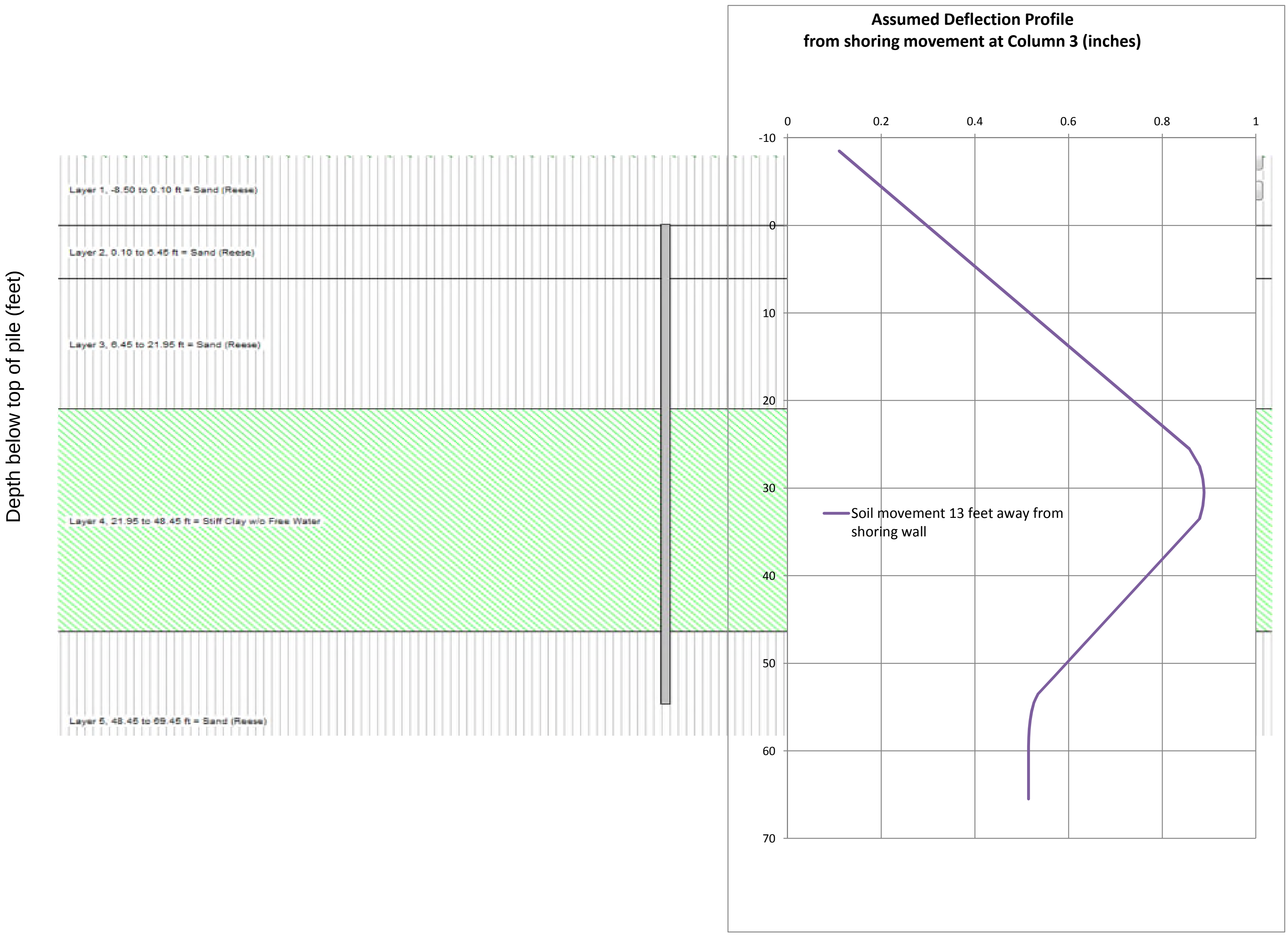

Depth below top of pile (feet)
Layer 1, -8.50 to 0.10 ft = Sand (Reese)
Layer 2, 0.10 to 6.45 ft = Sand (Reese)
Layer 3, 6.45 to 21.95 ft = Sand (Reese)
Layer 4, 21.95 to 48.45 ft = Stiff Clay w/o Free Water
Layer 5, 48.45 to 69.45 ft = Sand (Reese)
Assumed Deflection Profile
from shoring movement at Column 3 (inches)
0
0.2
0.4
0.6
0.8
1
-10
0
10
20
30
40
50
60
70
Soil movement 13 feet away from shoring wall

Figure B-1

Column 3 - North-South Deflection

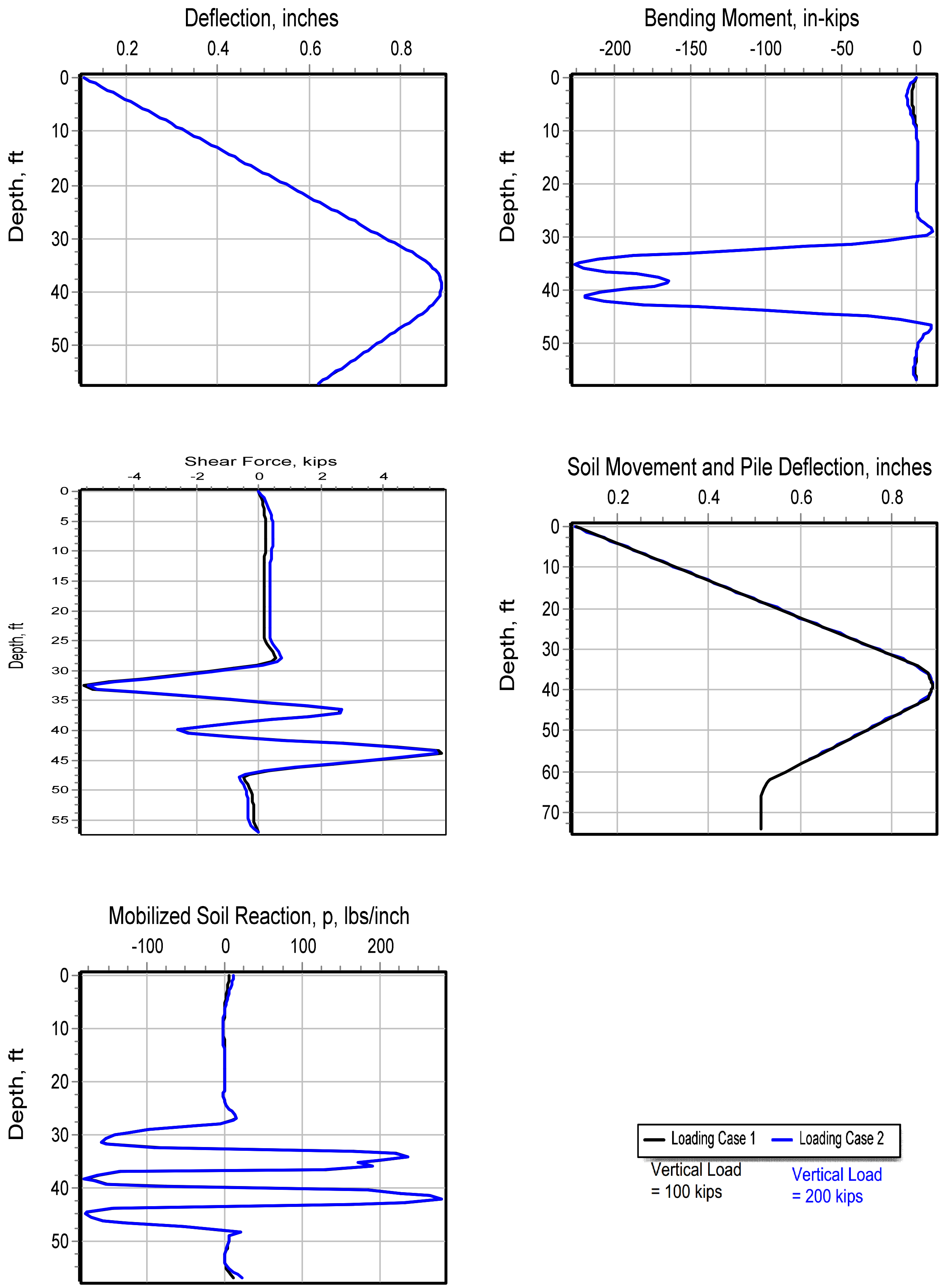


Figure B-2

Column 3 - West-East Deflection

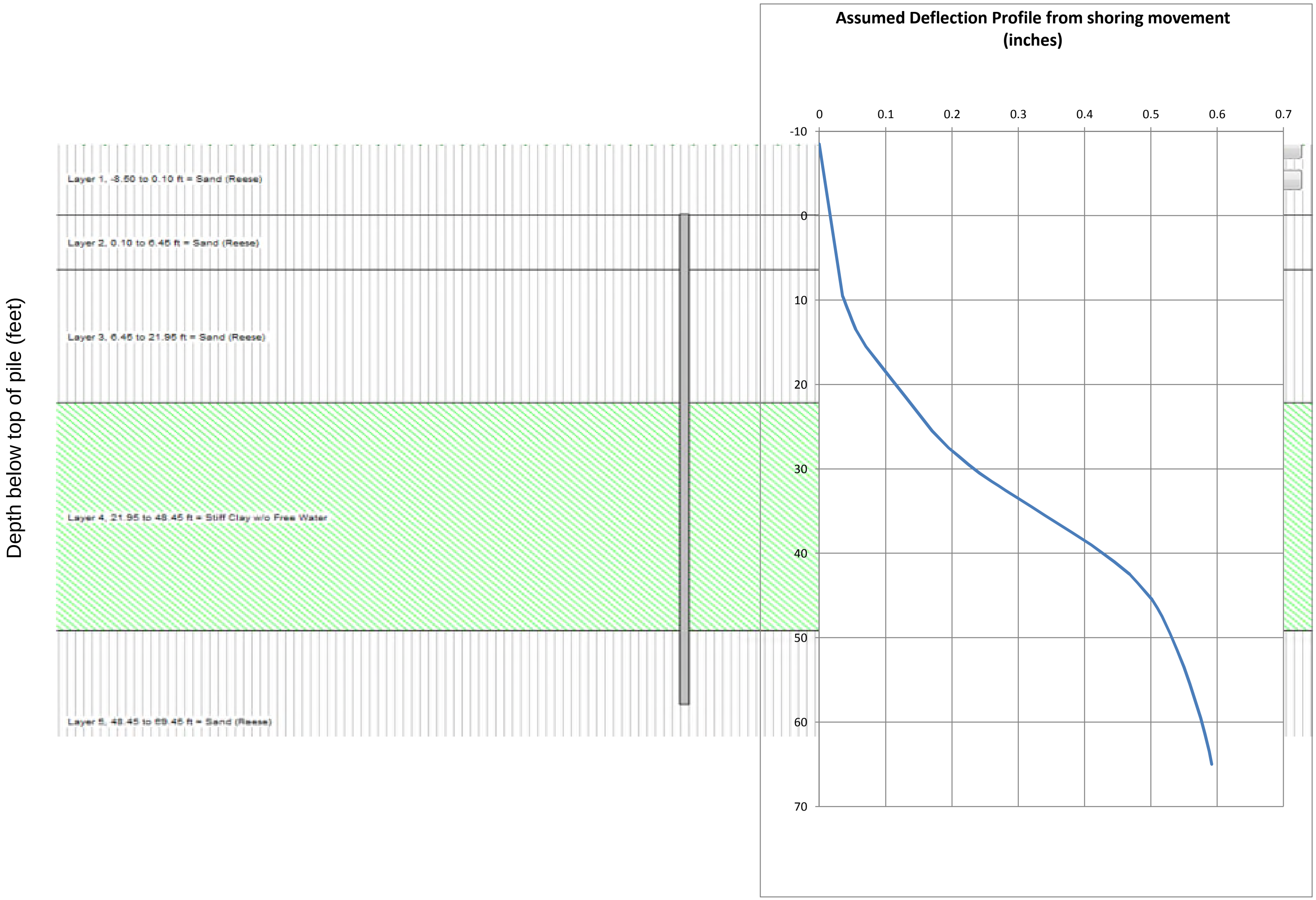


Figure B-3

Column 3 - West-East Deflection

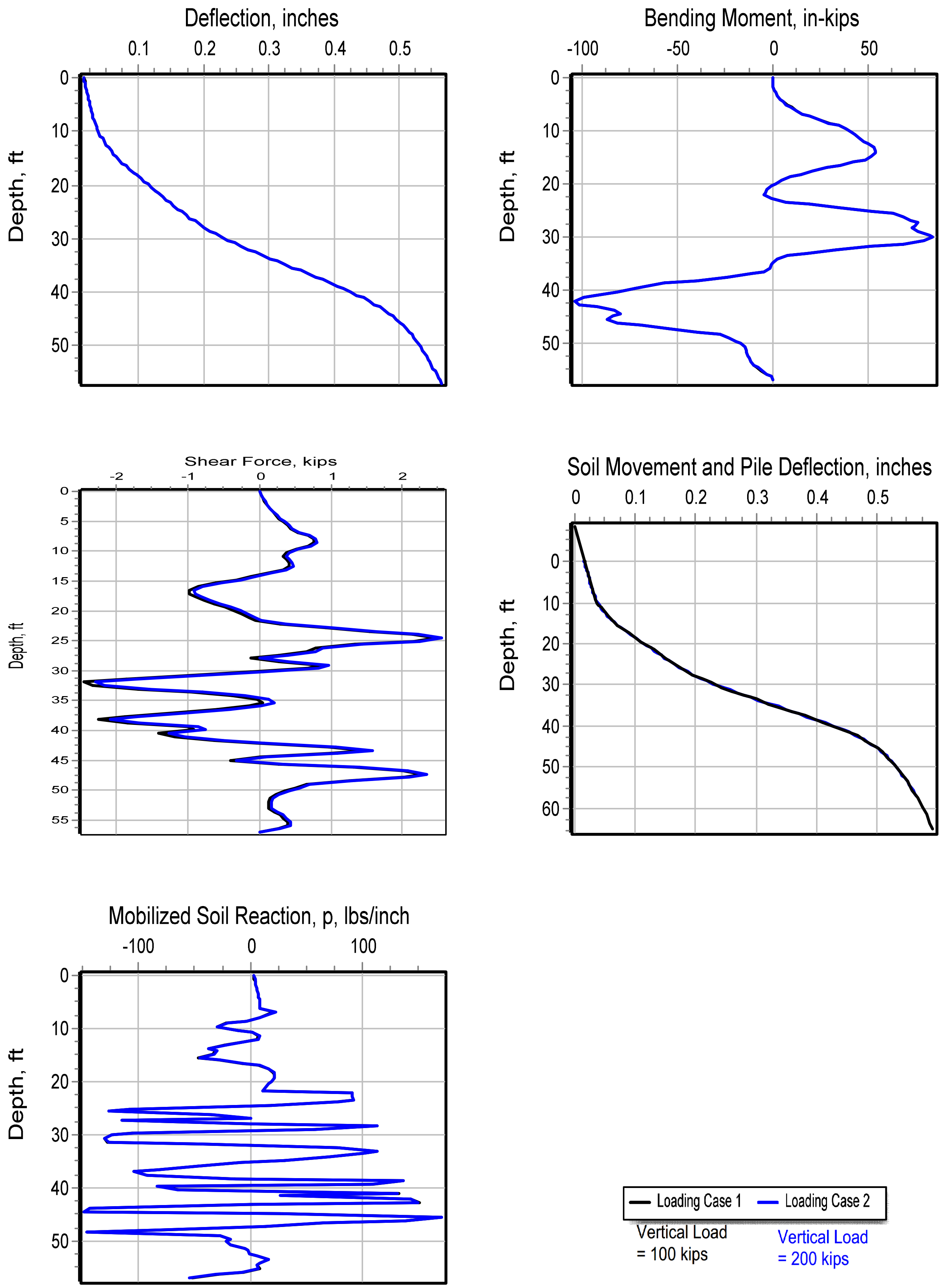


Figure B-4

Column 5 - North-South Deflection

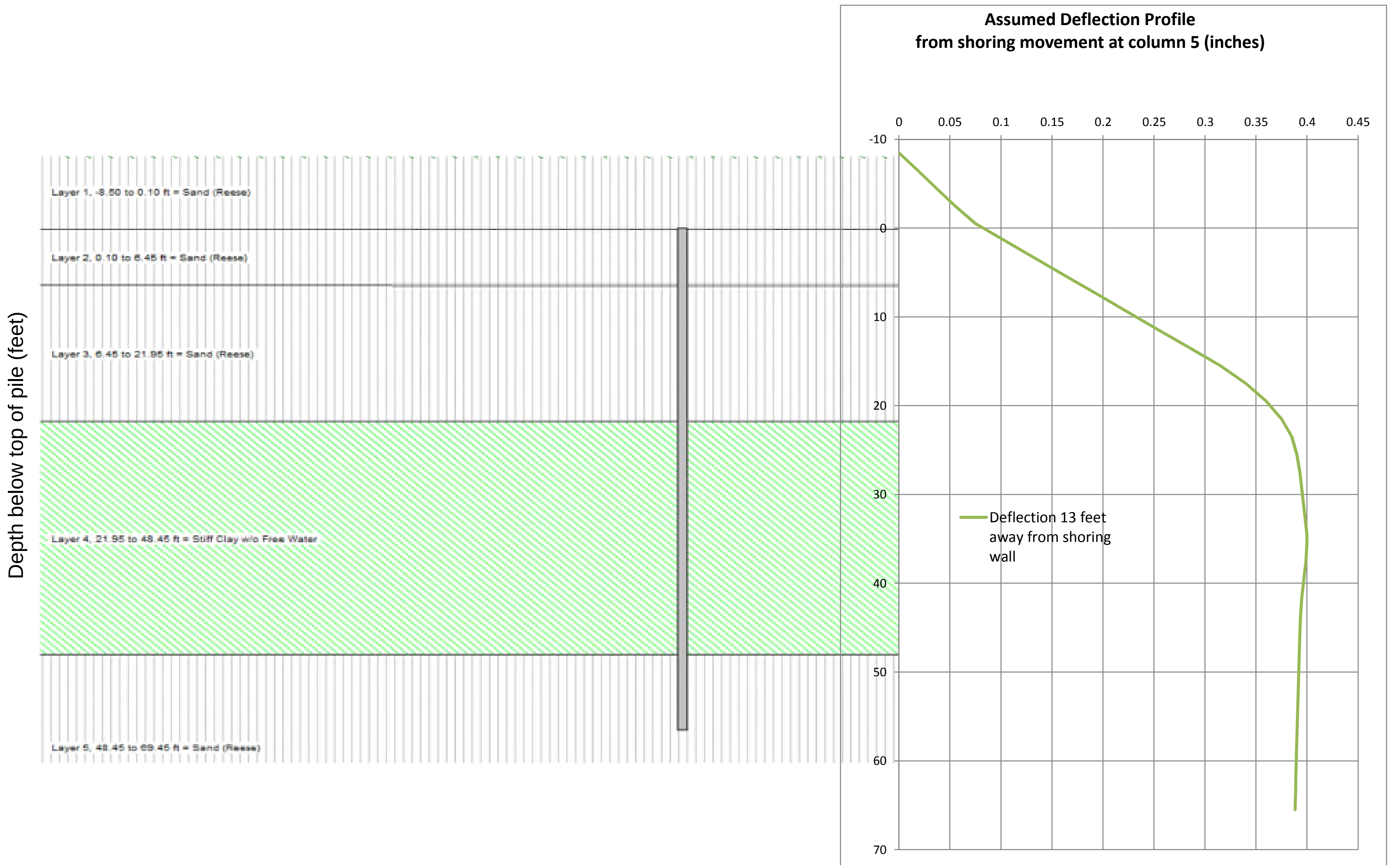
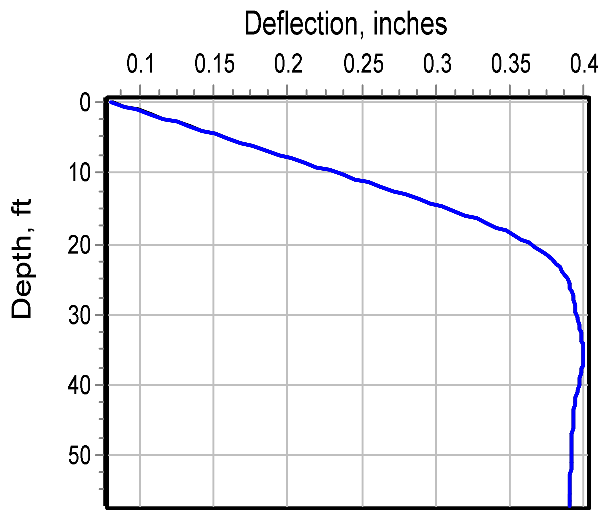
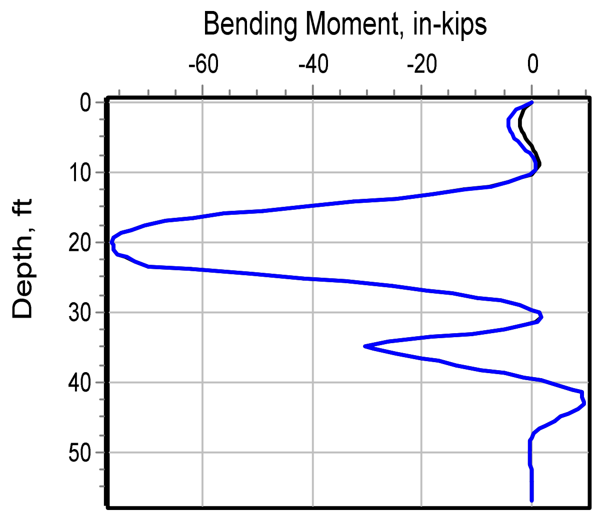
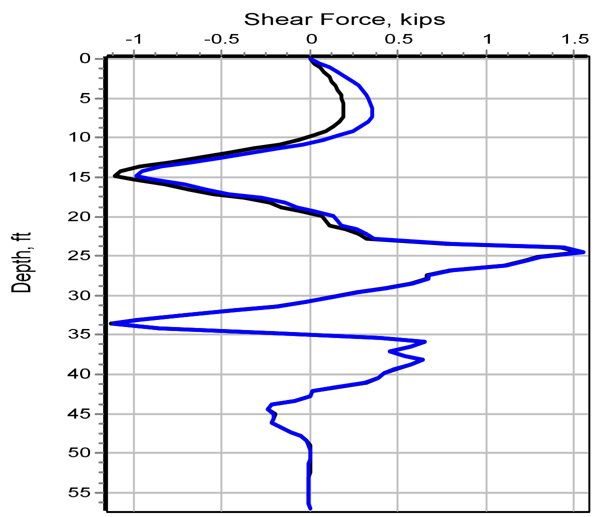
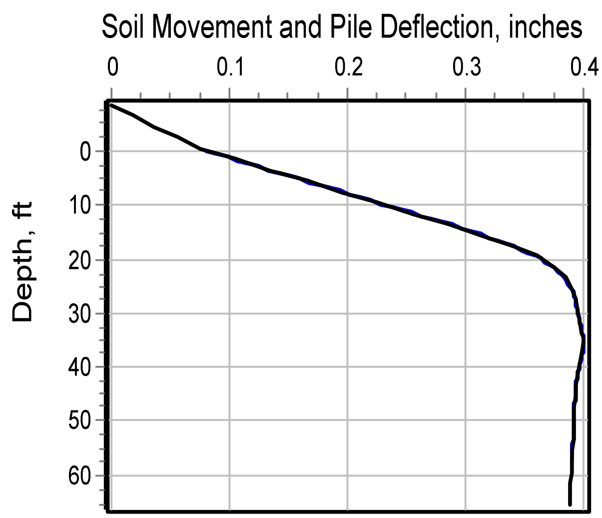


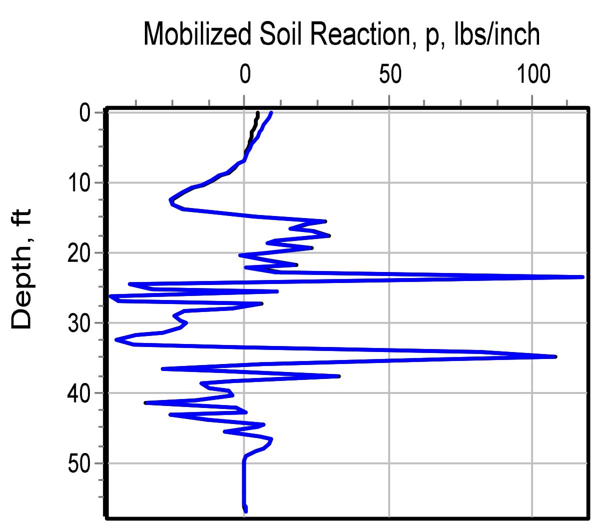
Figure B-5


Deflection, inches
0.1
0.15
0.2
0.25
0.3
0.35
0.4
Depth, ft
0
10
20
30
40
50


Bending Moment, in-kips
-60
-40
-20
0
Depth, ft
0
10
20
30
40
50


Shear Force, kips
-1
-0.5
0
0.5
1
1.5
Depth, ft
0
5
10
15
20
25
30
35
40
45
50
55


Soil Movement and Pile Deflection, inches
0
0.1
0.2
0.3
0.4
Depth, ft
0
10
20
30
40
50
60


Mobilized Soil Reaction, p, lbs/inch
0
50
100
Depth, ft
0
10
20
30
40
50

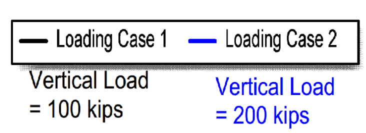

Loading Case 1
Loading Case 2
Vertical Load
= 100 kips
Vertical Load
= 200 kips

Figure B-6

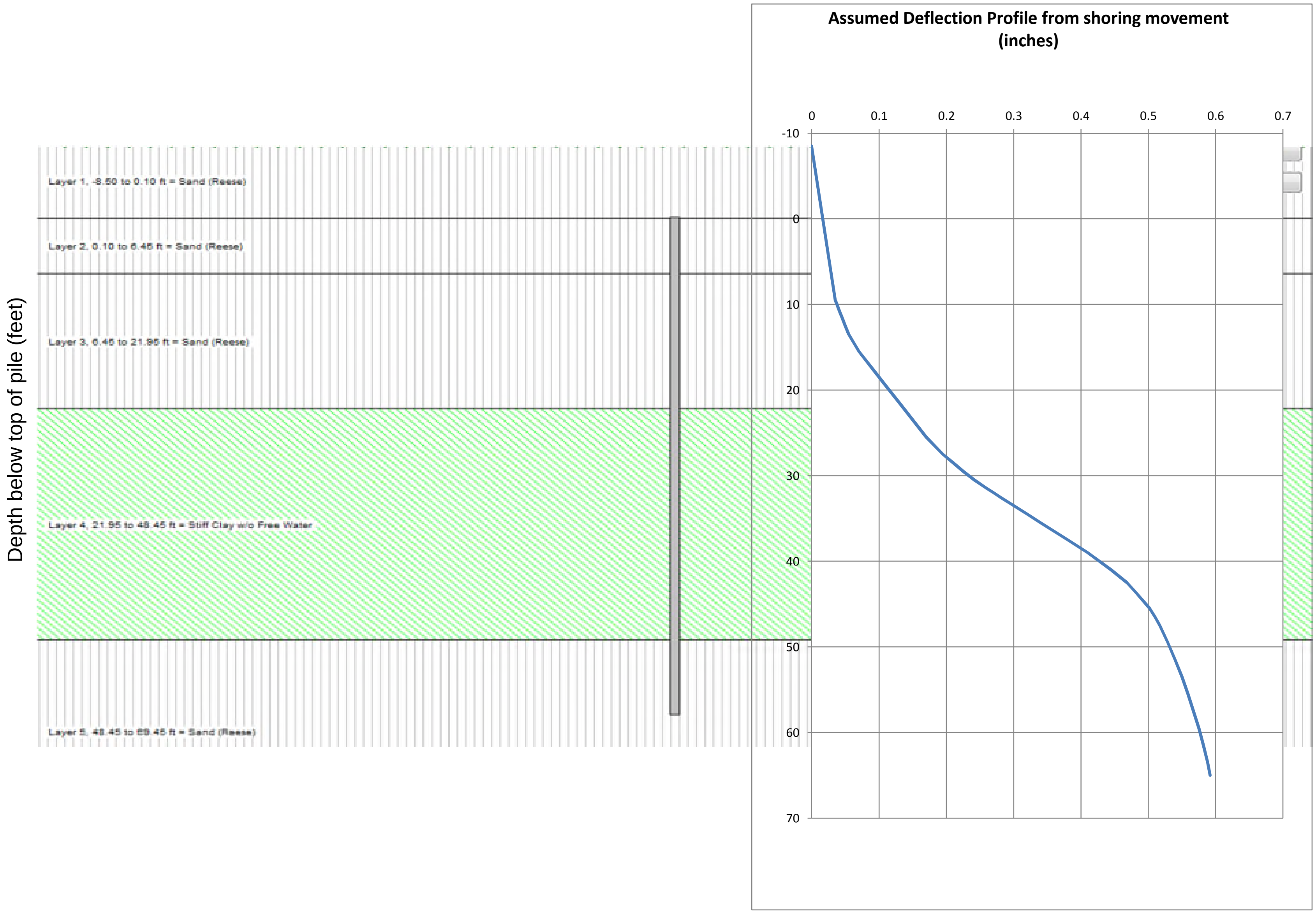

Assumed Deflection Profile from shoring movement (inches)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
-10
0
10
20
30
40
50
60
70
Depth below top of pile (feet)
Layer 1, -8.50 to 0.10 ft = Sand (Reese)
Layer 2, 0.10 to 6.45 ft = Sand (Reese)
Layer 3, 6.45 to 21.95 ft = Sand (Reese)
Layer 4, 21.95 to 48.45 ft = Stiff Clay w/o Free Water
Layer 5, 48.45 to 69.45 ft = Sand (Reese)

Figure B-7

Column 5 - West-East Deflection

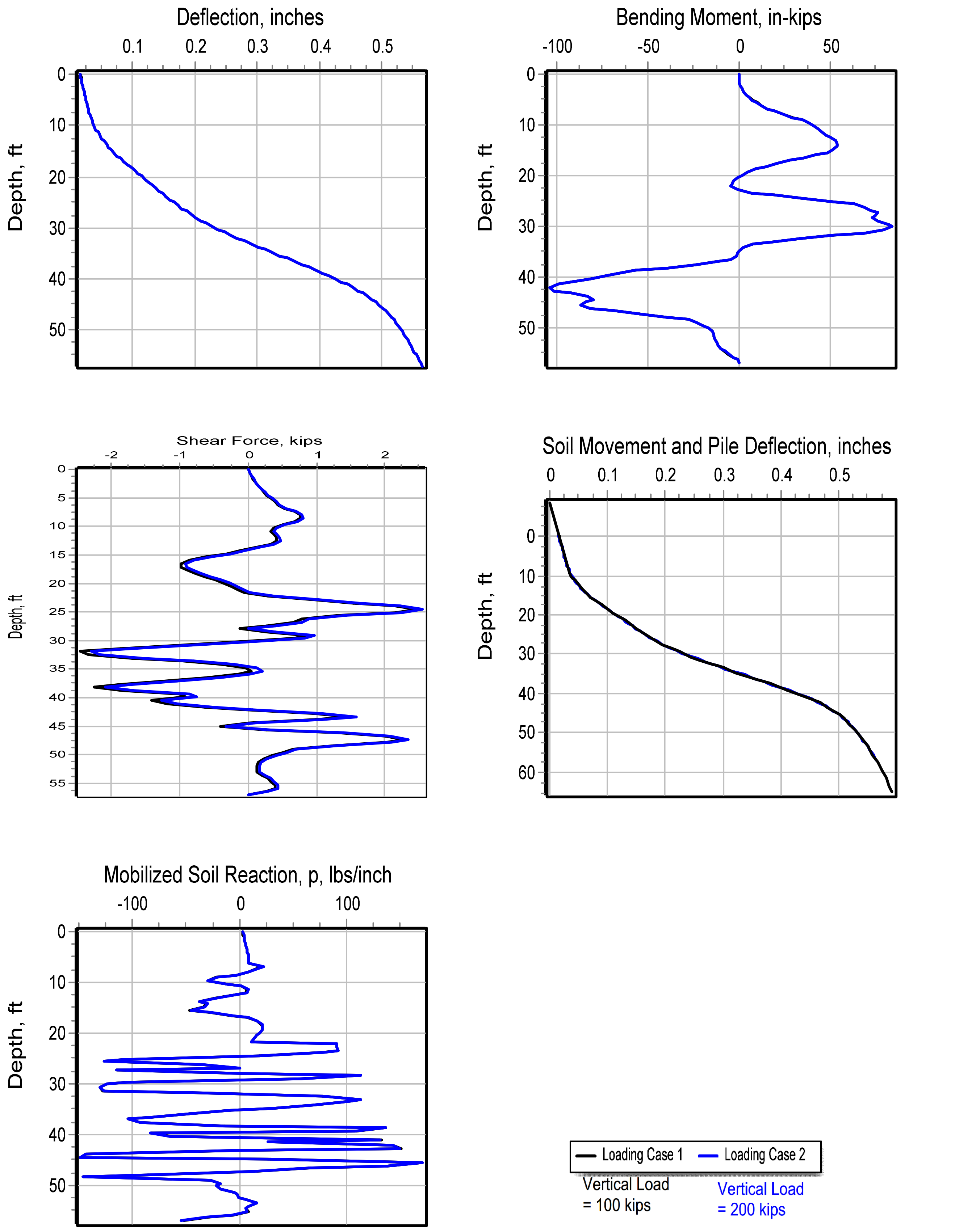


Figure B-8

Column 73 - North-South Deflection

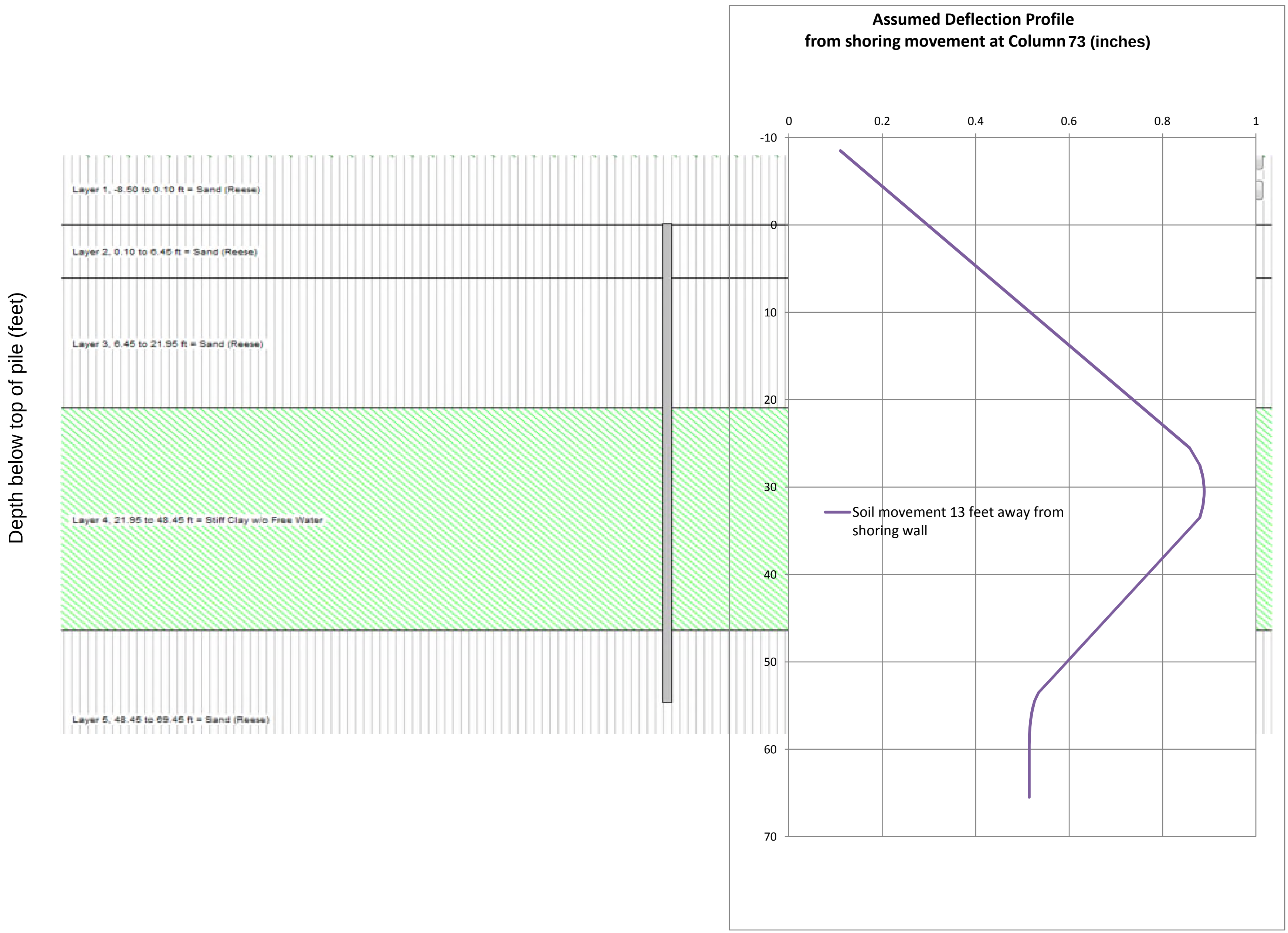
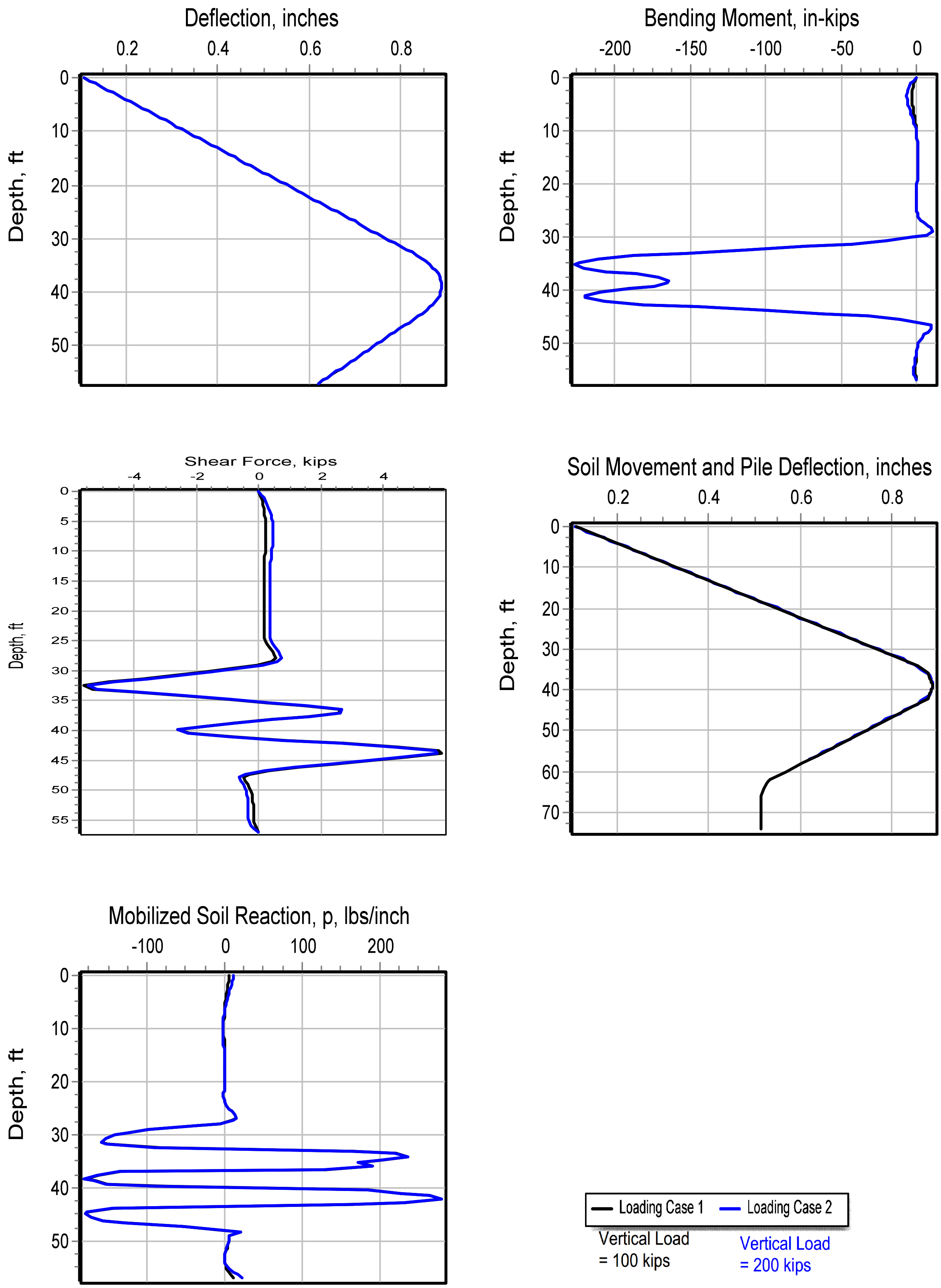


Figure B-9



Loading Case 1 — Vertical Load = 100 kips

Loading Case 2 — Vertical Load = 200 kips

Figure B-10

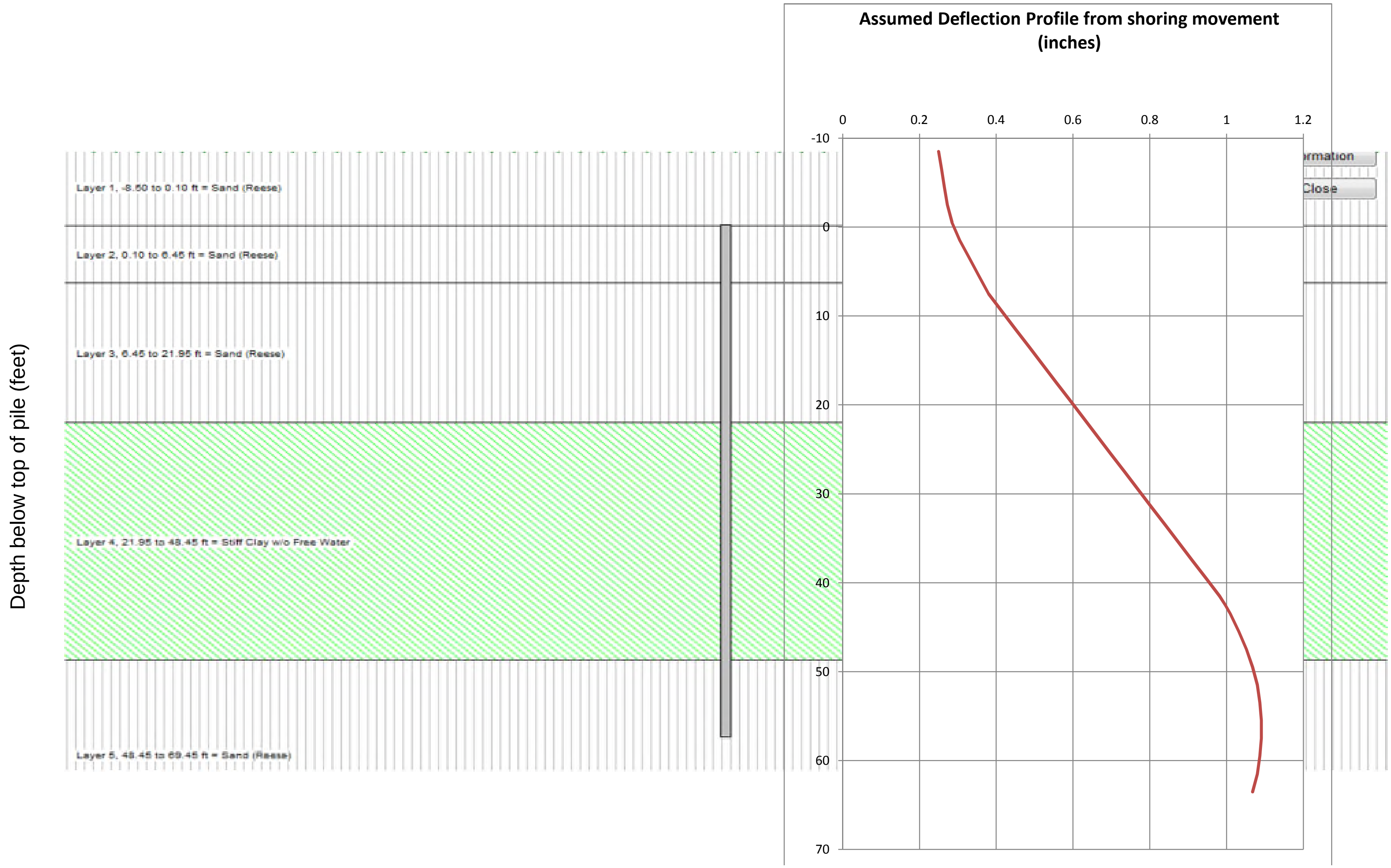

Assumed Deflection Profile from shoring movement (inches)
0
0.2
0.4
0.6
0.8
1
1.2
-10
0
10
20
30
40
50
60
70
Depth below top of pile (feet)
Layer 1, -8.50 to 0.10 ft = Sand (Reese)
Layer 2, 0.10 to 6.45 ft = Sand (Reese)
Layer 3, 6.45 to 21.95 ft = Sand (Reese)
Layer 4, 21.95 to 48.45 ft = Stiff Clay w/o Free Water
Layer 5, 48.45 to 69.45 ft = Sand (Reese)
Close

Figure B-11

Column 73 - West-East Deflection

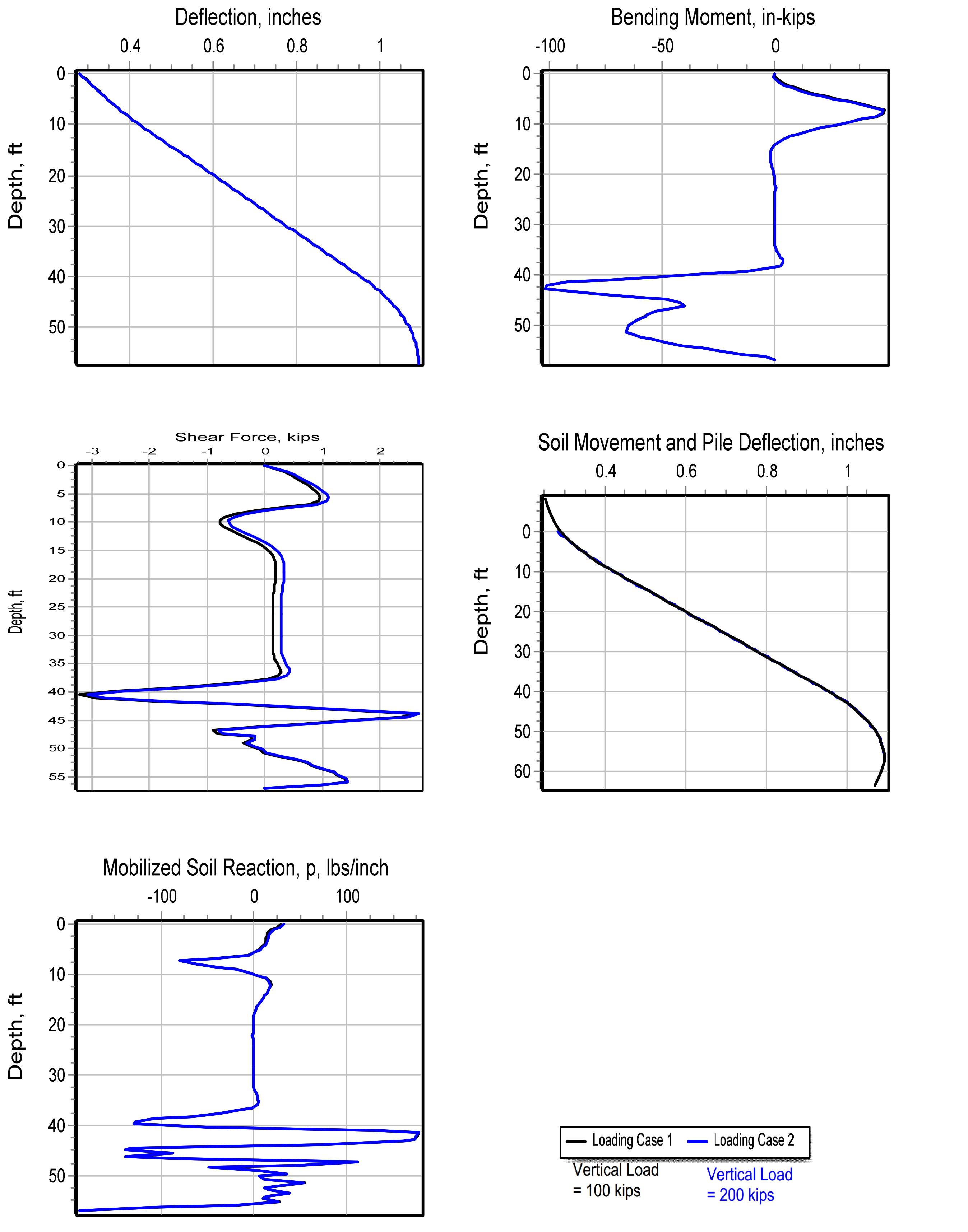


Figure B-12

Column 75 - North-South Deflection

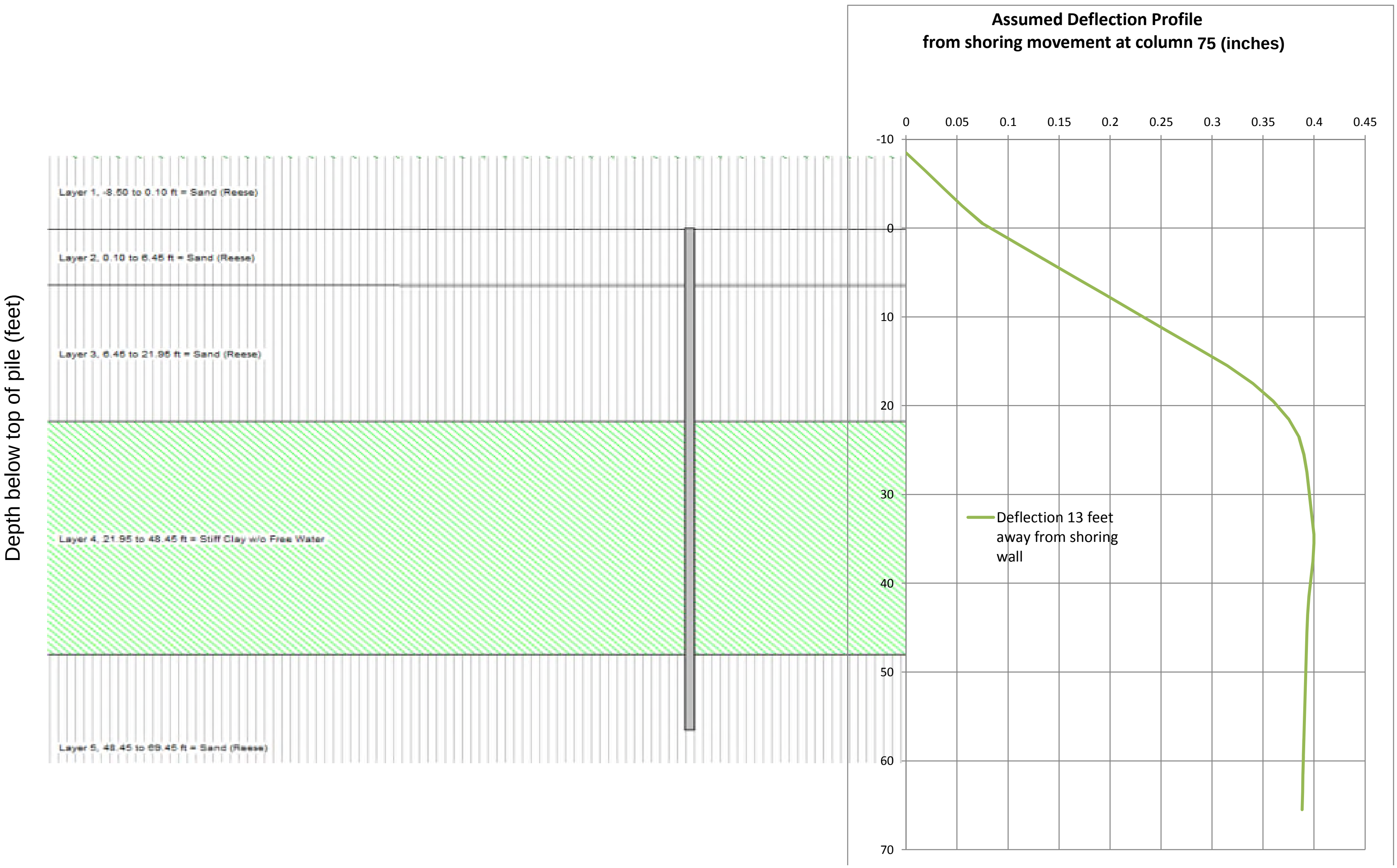


Figure B-13

Column 75 - North-South Deflection

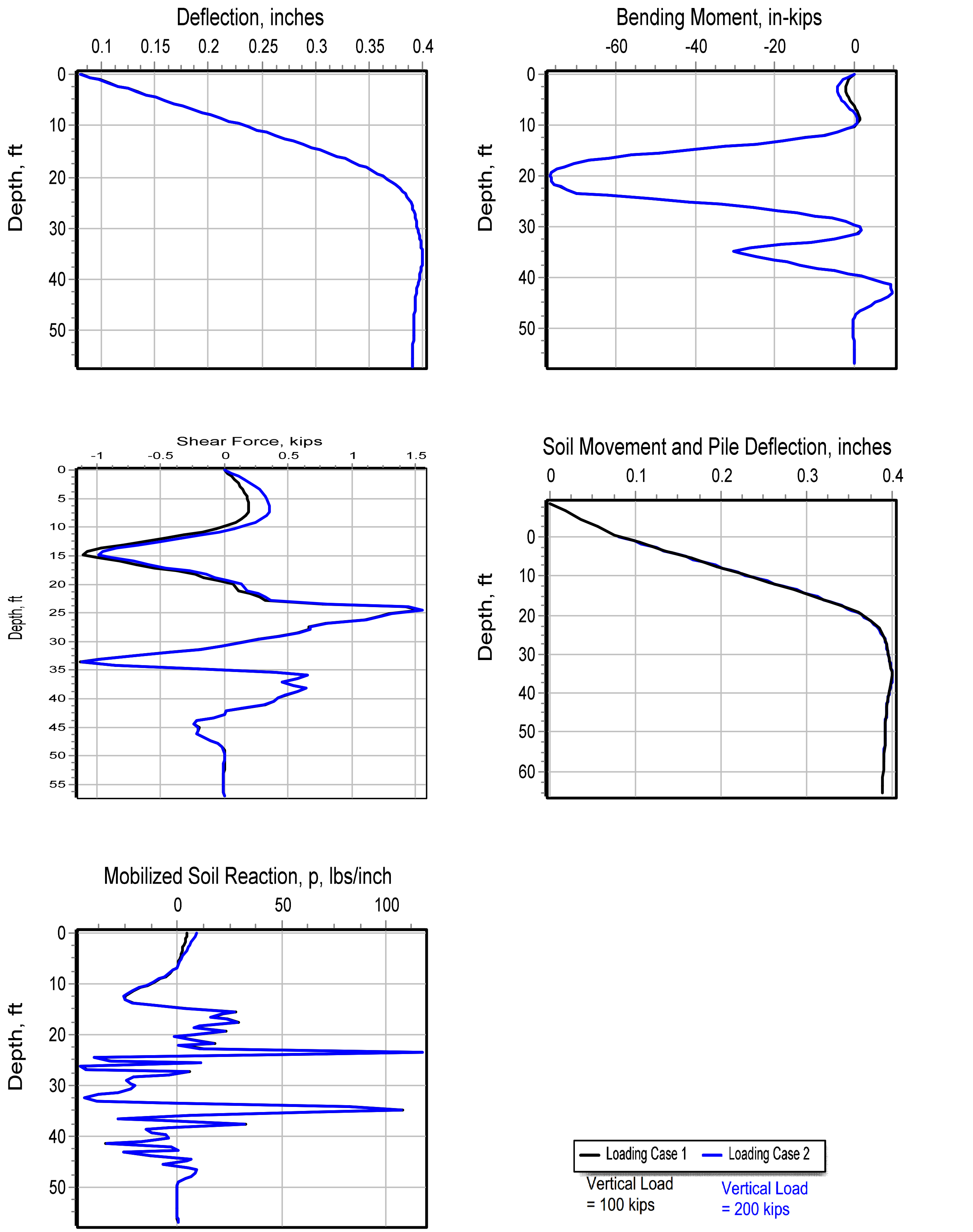


Figure B-14

Column 75 - West-East Deflection

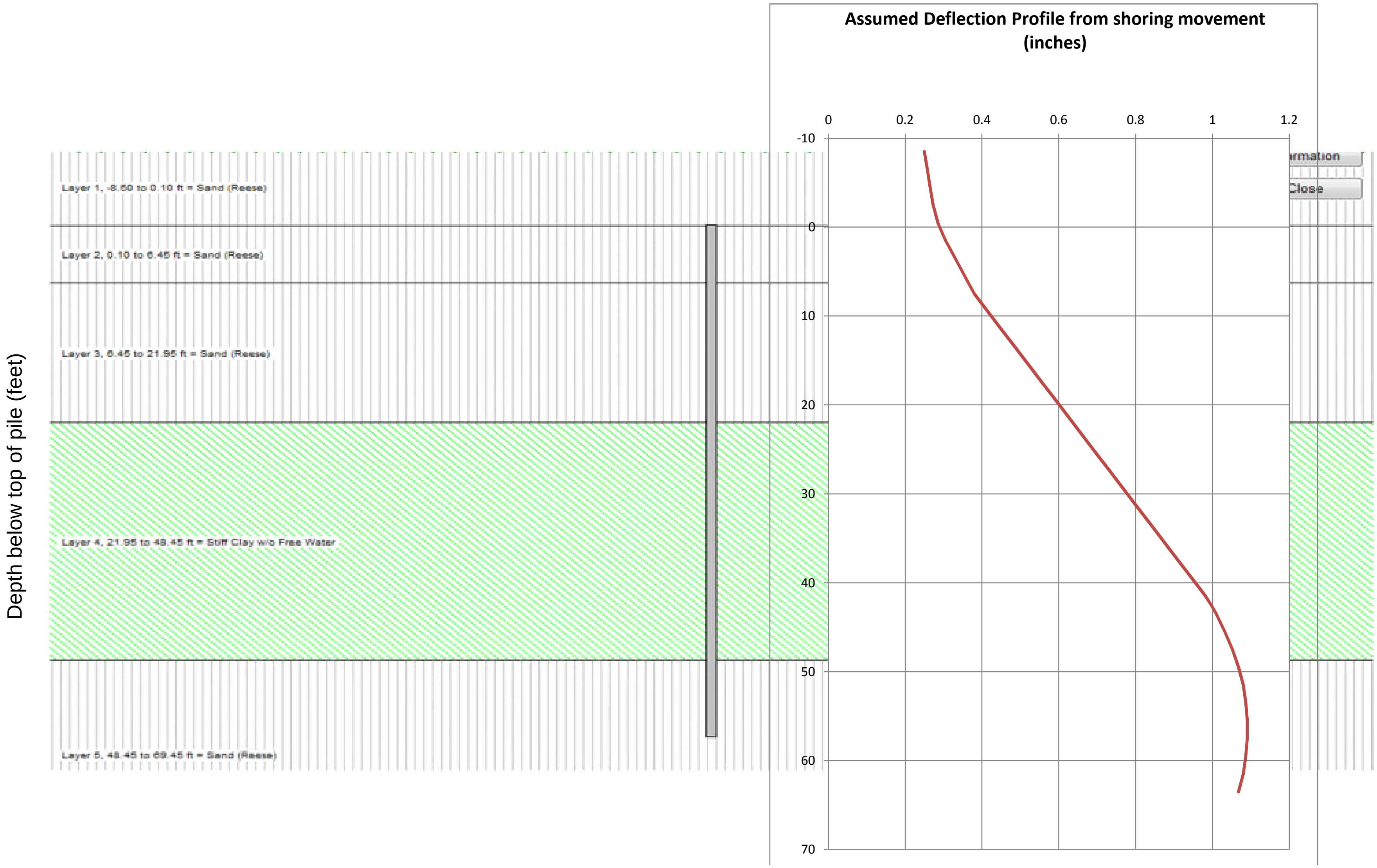


Figure B-15

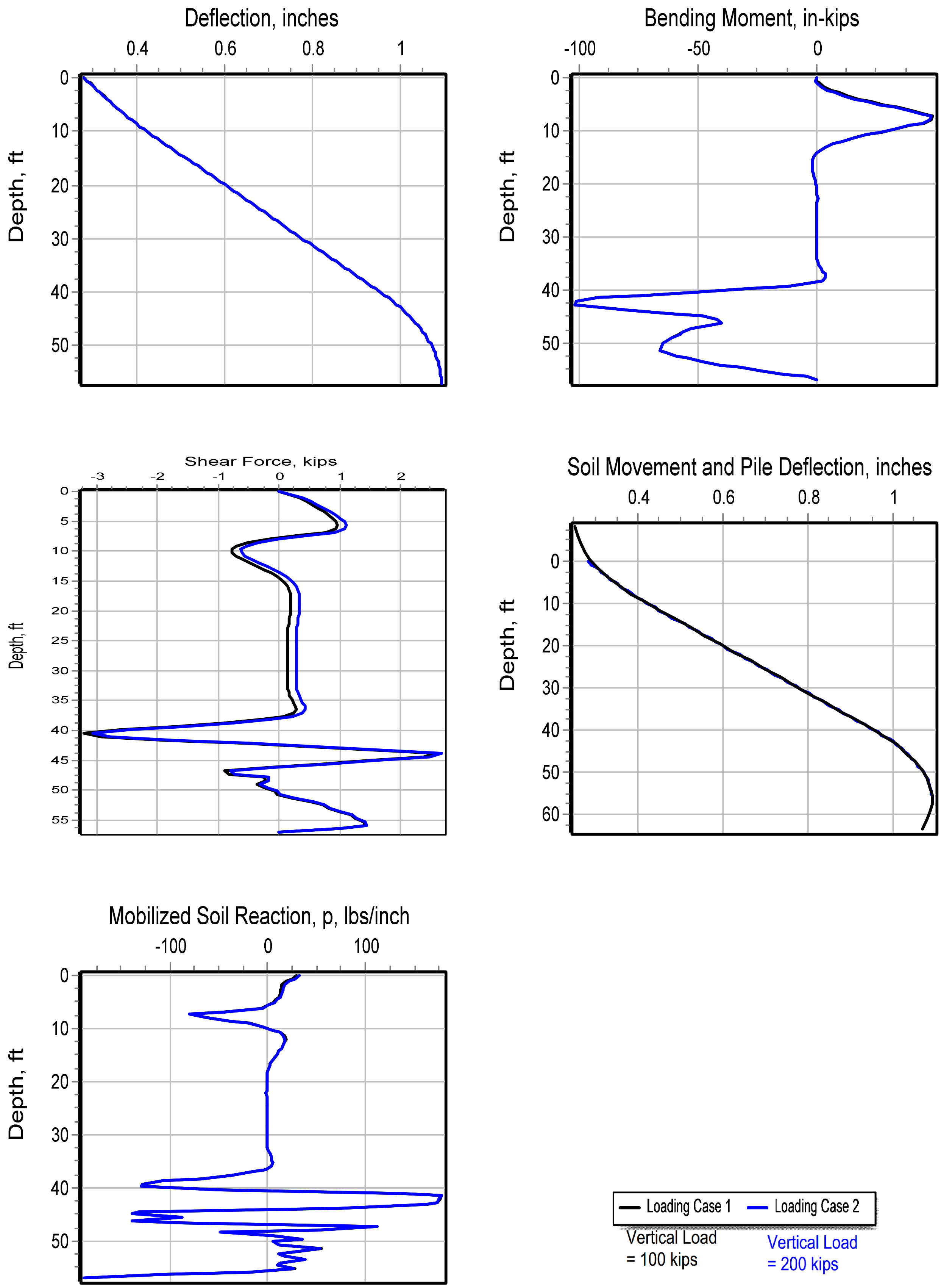

Deflection, inches
0.4
0.6
0.8
1
Depth, ft
0
10
20
30
40
50
Bending Moment, in-kips
-100
-50
0
Shear Force, kips
-3
-2
-1
0
1
2
5
15
25
35
45
55
Soil Movement and Pile Deflection, inches
60
Mobilized Soil Reaction, p, lbs/inch
100
Loading Case 1
Loading Case 2
Vertical Load = 100 kips
Vertical Load = 200 kips

Figure B-16