LONGITUDE
ONE TWENTY°
ENGINEERING & DESIGN

Calculation Package for

Mills Residence Shoring Design

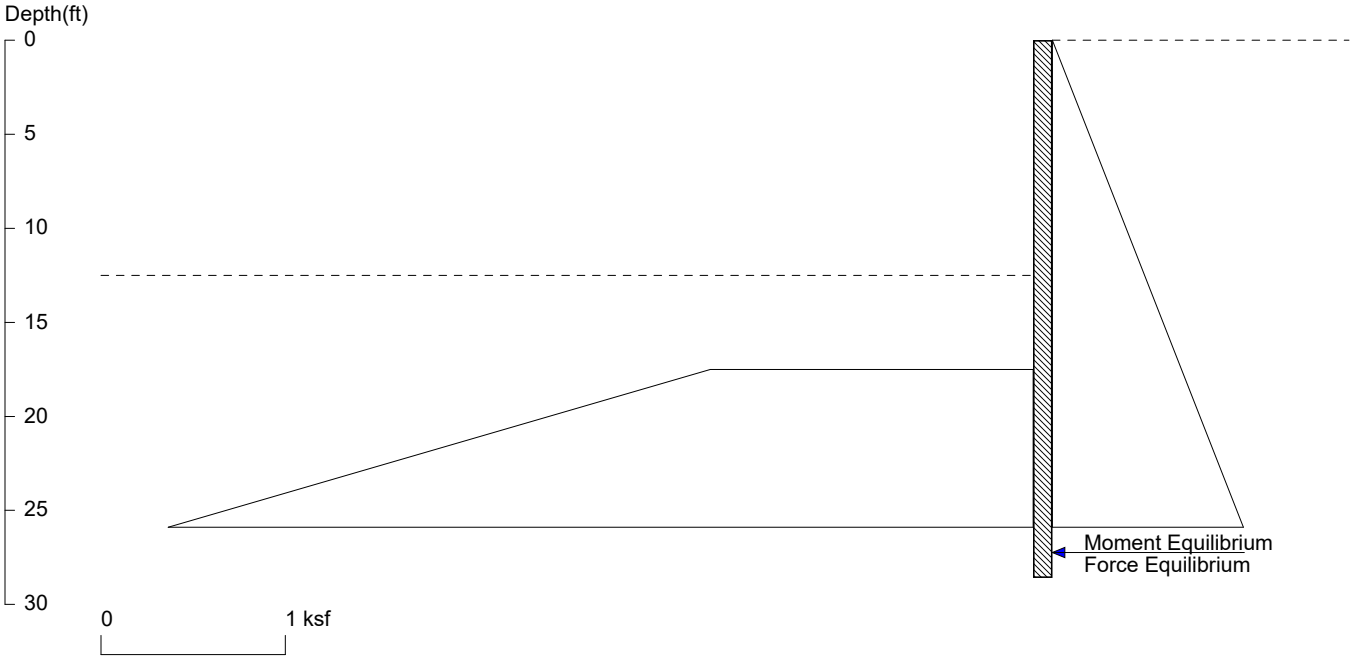
Mercer Island

Project no: S180115

April 20, 2018

(206) 790 9502
L120Engineering.com

Mill's Residence
Soldier Pile S1~S13



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File: C:\Users\e_pen\Desktop\Jobs\Mans\Mills Residence\Shoring Design\Mills_GrE_Piles_S1 - 04_20_18.sh8

Wall Height=12.5 Pile Diameter=2.5 Pile Spacing=6.0 Wall Type: 2. Soldier Pile, Drilled

PILE LENGTH: Min. Embedment=16.08 Min. Pile Length=28.58
MOMENT IN PILE: Max. Moment=229.61 per Pile Spacing=6.0 at Depth=20.32

PILE SELECTION:
Request Min. Section Modulus = 83.5 in3/pile=1368.21 cm3/pile, Fy= 50 ksi = 345 MPa, Fb/Fy=0.66
W16X67 has Section Modulus = 117.0 in3/pile=1917.28 cm3/pile. It is greater than Min. Requirements!
Top Deflection = 0.84(in) based on E (ksi)=29000.00 and I (in4)/pile=954.0

DRIVING PRESSURES (ACTIVE, WATER, & SURCHARGE):

Z1	P1	Z2	P2	Slope
0	0	100	4.000	0.04

PASSIVE PRESSURES:

Z1	P1	Z2	P2	Slope
17.5	1.75	800	275.6	0.35

ACTIVE SPACING:

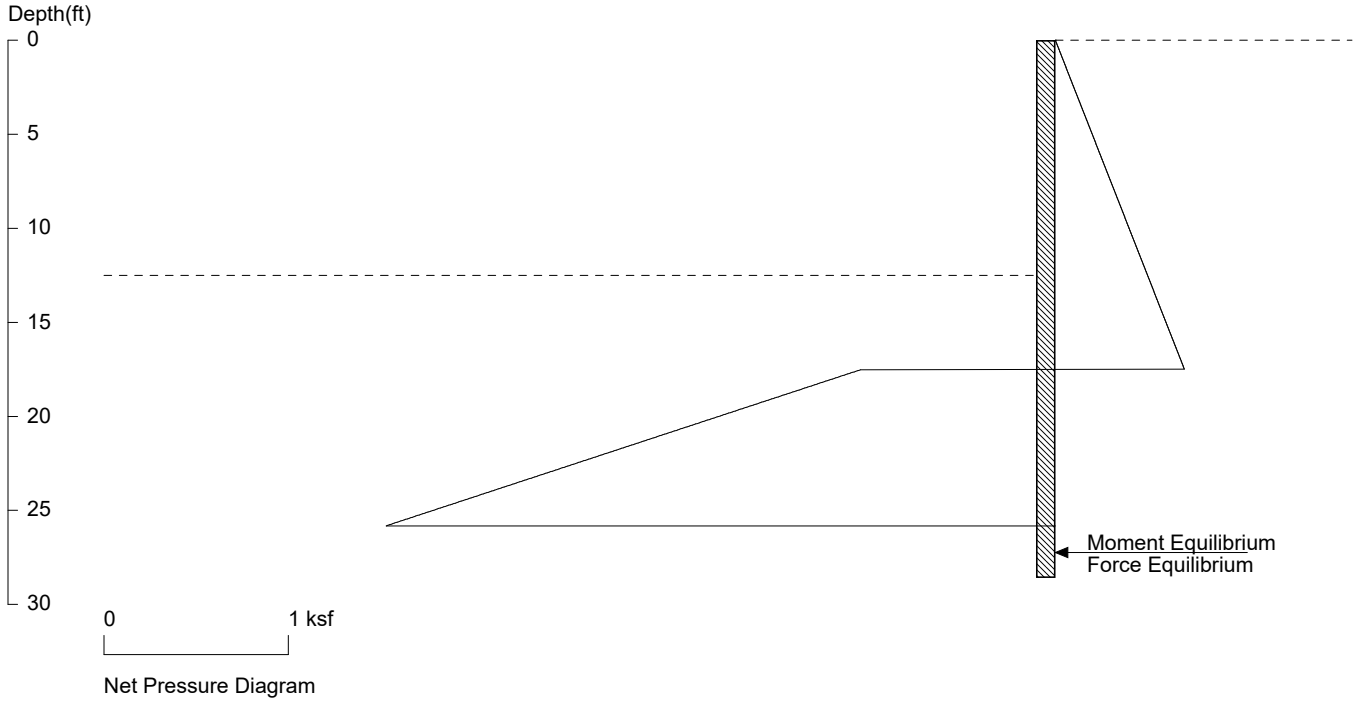
No.	Z depth	Spacing
1	0.00	6.00
2	12.50	2.50

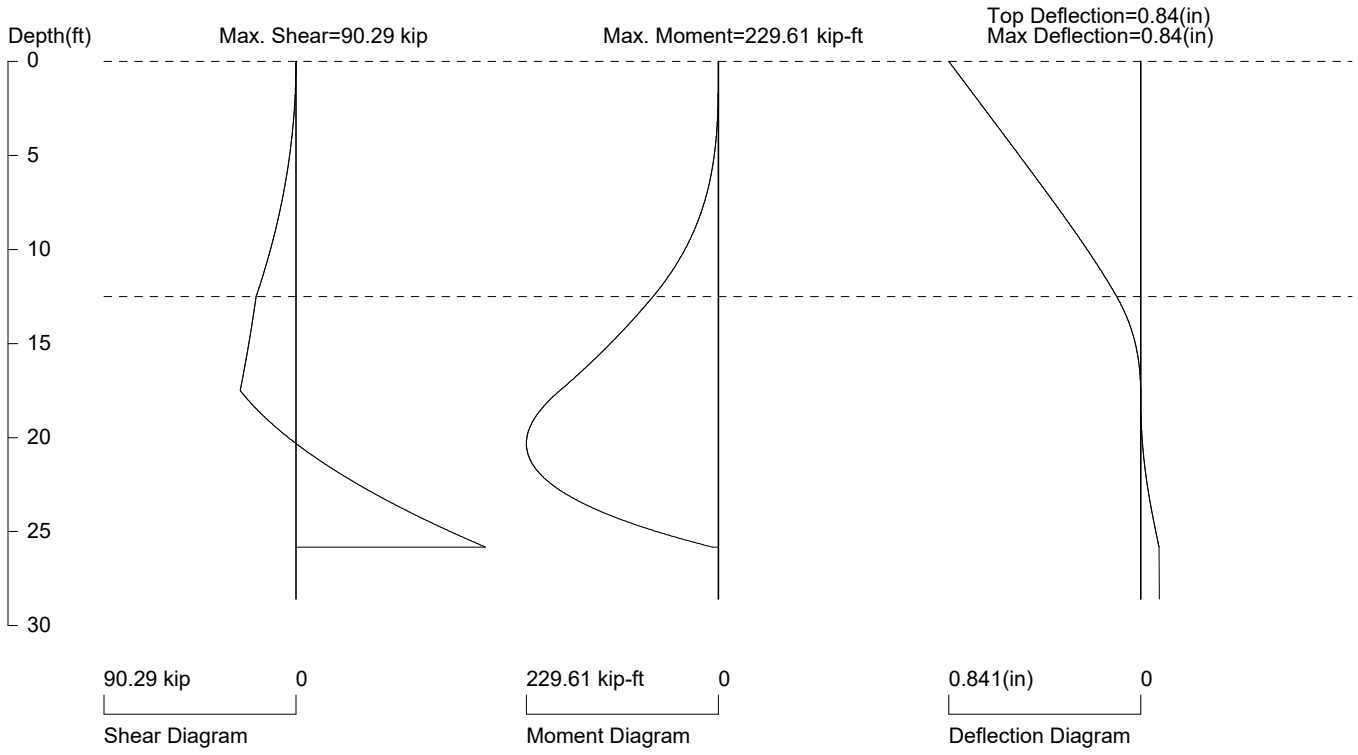
PASSIVE SPACING:

No.	Z depth	Spacing
1	12.50	5.00

UNITS: Width,Spacing,Diameter,Length,and Depth - ft; Force - kip; Moment - kip-ft
Friction,Bearing,and Pressure - ksf; Pres. Slope - kip/ft3; Deflection - in

Mill's Residence
Soldier Pile S1~S13





PRESSURE, SHEAR, MOMENT, AND DEFLECTION DIAGRAMS

Based on pile spacing: 6.0 foot or meter

User Input Pile, W16X67: E (ksi)=29000.0, I (in4)/pile=954.0

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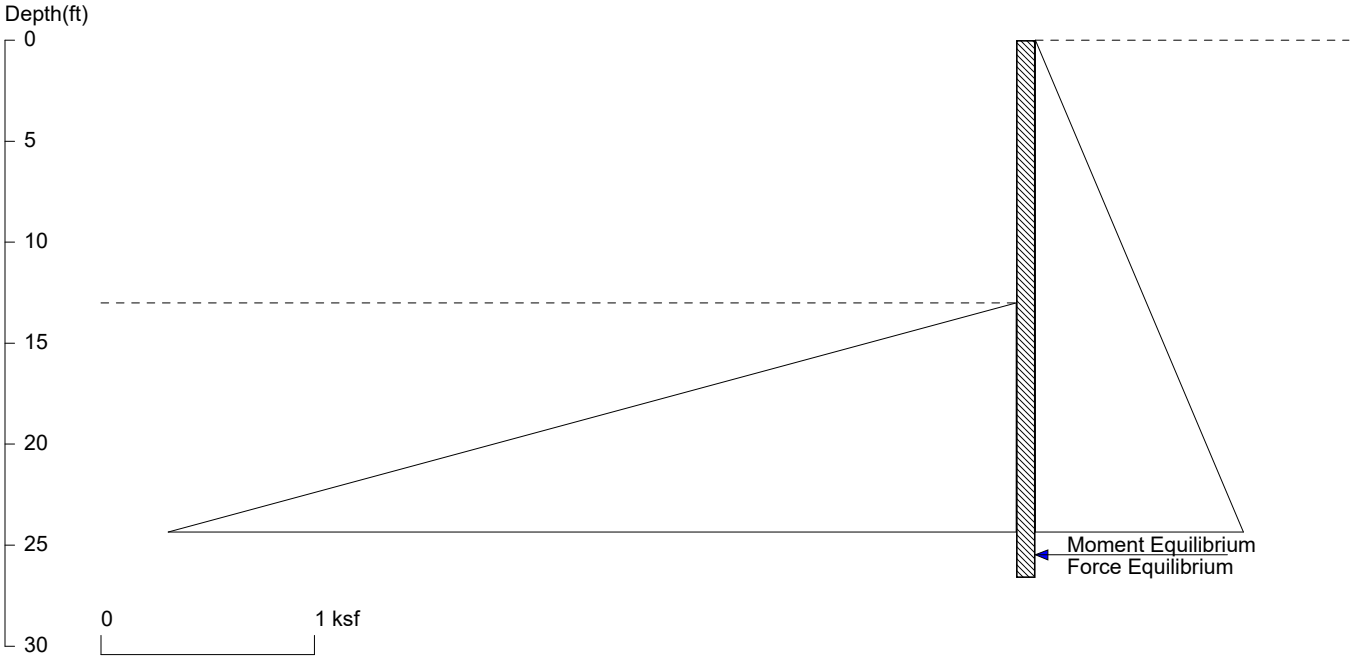
Mill's Residence
Soldier Pile S14~S17



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File: C:\Users\e_pen\Desktop\Jobs\Mans\Mills Residence\Shoring Design\Mills_GrE_Piles_S14 - 04_20_18.sh8

Wall Height=13.0 Pile Diameter=2.5 Pile Spacing=6.0 Wall Type: 2. Soldier Pile, Drilled

PILE LENGTH: Min. Embedment=13.61 Min. Pile Length=26.61
MOMENT IN PILE: Max. Moment=173.71 per Pile Spacing=6.0 at Depth=18.80

PILE SELECTION:
Request Min. Section Modulus = 63.2 in3/pile=1035.15 cm3/pile, Fy= 50 ksi = 345 MPa, Fb/Fy=0.66
W16X67 has Section Modulus = 117.0 in3/pile=1917.28 cm3/pile. It is greater than Min. Requirements!
Top Deflection = 0.75(in) based on E (ksi)=29000.00 and I (in4)/pile=954.0

DRIVING PRESSURES (ACTIVE, WATER, & SURCHARGE):

Z1	P1	Z2	P2	Slope
0	0	100	4.000	0.04

PASSIVE PRESSURES:

Z1	P1	Z2	P2	Slope
13	0	800	275.450	0.35

ACTIVE SPACING:

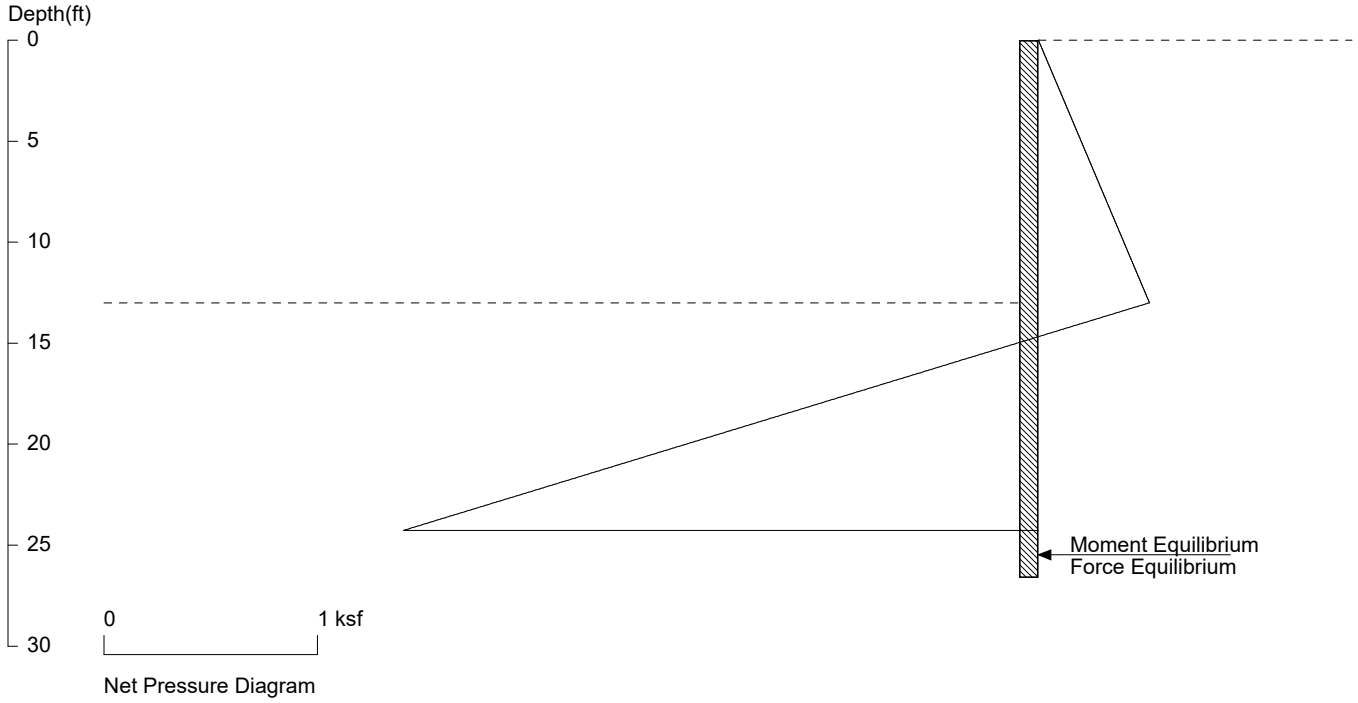
No.	Z depth	Spacing
1	0.00	6.00
2	13.00	2.50

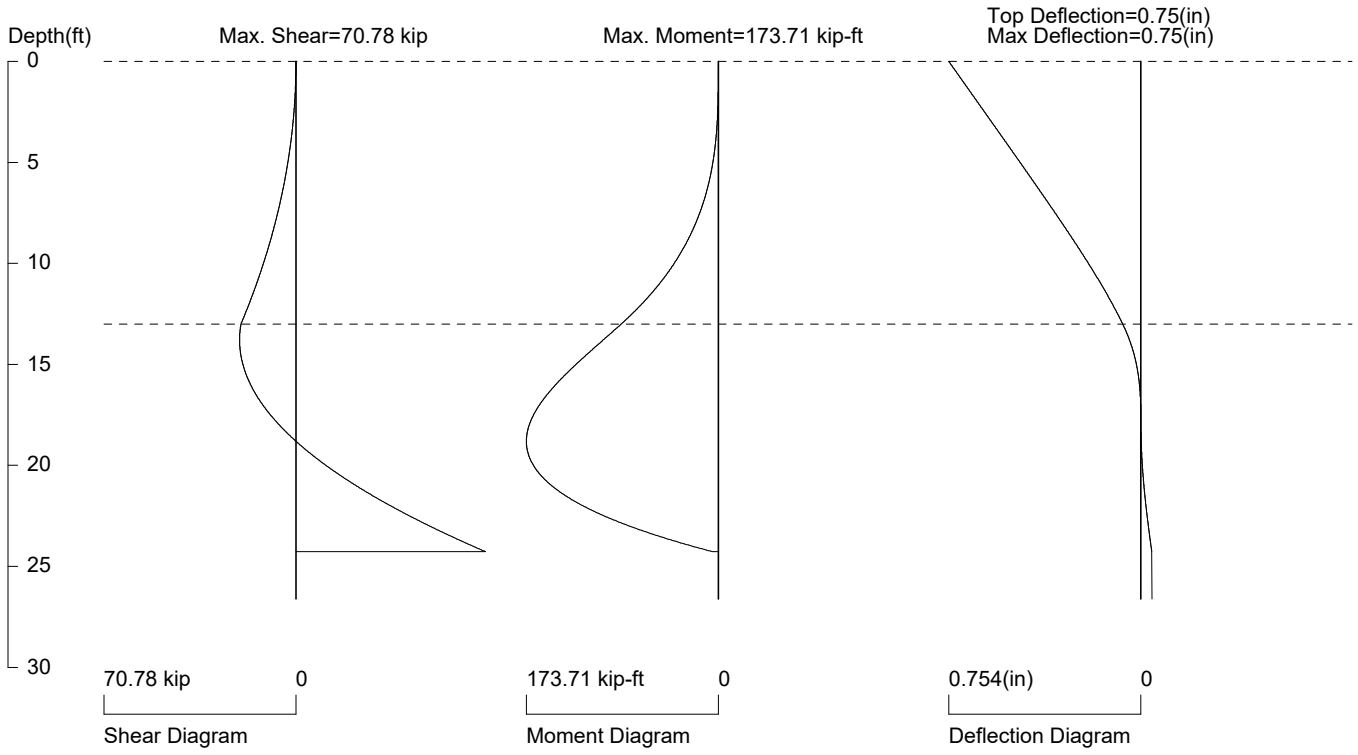
PASSIVE SPACING:

No.	Z depth	Spacing
1	13.00	5.00

UNITS: Width,Spacing,Diameter,Length,and Depth - ft; Force - kip; Moment - kip-ft
Friction,Bearing,and Pressure - ksf; Pres. Slope - kip/ft3; Deflection - in

Mill's Residence
Soldier Pile S14~S17





PRESSURE, SHEAR, MOMENT, AND DEFLECTION DIAGRAMS

Based on pile spacing: 6.0 foot or meter

User Input Pile, W16X67: E (ksi)=29000.0, I (in4)/pile=954.0

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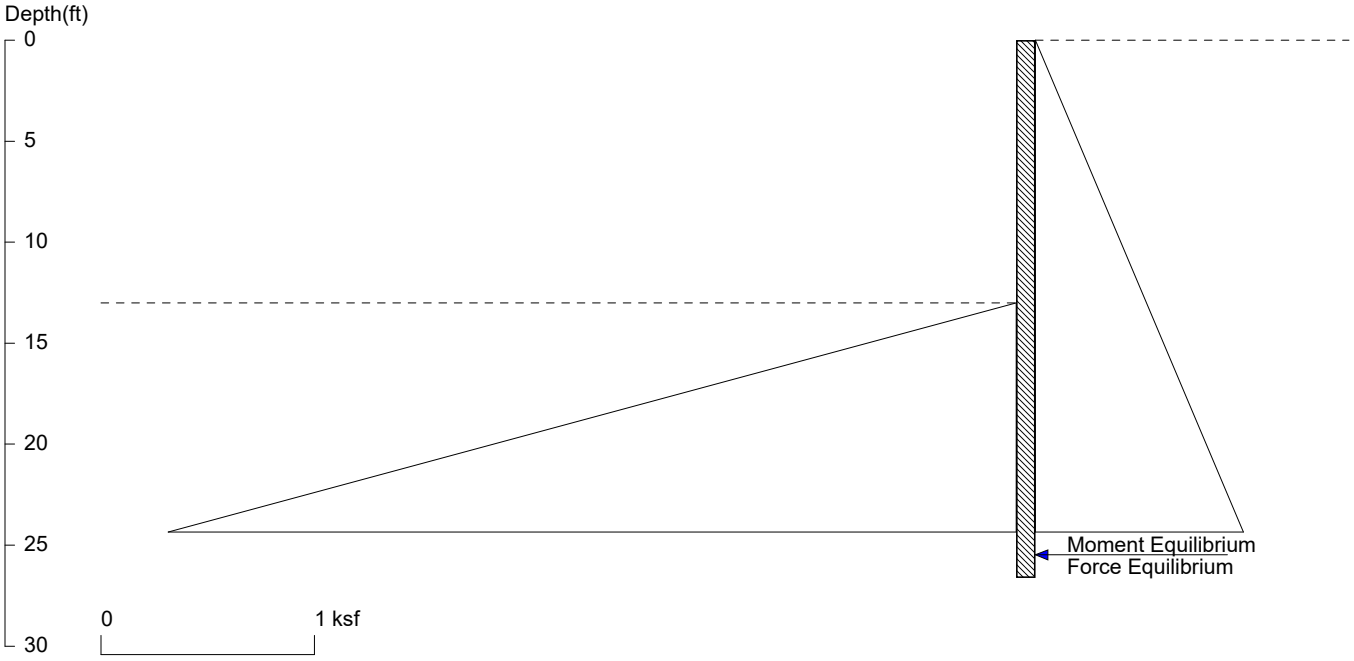
Mill's Residence
Soldier Pile S18~S23



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Wall Height=13.0 Pile Diameter=2.5 Pile Spacing=6.0 Wall Type: 2. Soldier Pile, Drilled

PILE LENGTH: Min. Embedment=13.61 Min. Pile Length=26.61
MOMENT IN PILE: Max. Moment=173.71 per Pile Spacing=6.0 at Depth=18.80

PILE SELECTION:
Request Min. Section Modulus = 63.2 in3/pile=1035.15 cm3/pile, Fy= 50 ksi = 345 MPa, Fb/Fy=0.66
W16X67 has Section Modulus = 117.0 in3/pile=1917.28 cm3/pile. It is greater than Min. Requirements!
Top Deflection = 0.75(in) based on E (ksi)=29000.00 and I (in4)/pile=954.0

DRIVING PRESSURES (ACTIVE, WATER, & SURCHARGE):

Z1	P1	Z2	P2	Slope
0	0	100	4.000	0.04

PASSIVE PRESSURES:

Z1	P1	Z2	P2	Slope
13	0	800	275.450	0.35

ACTIVE SPACING:

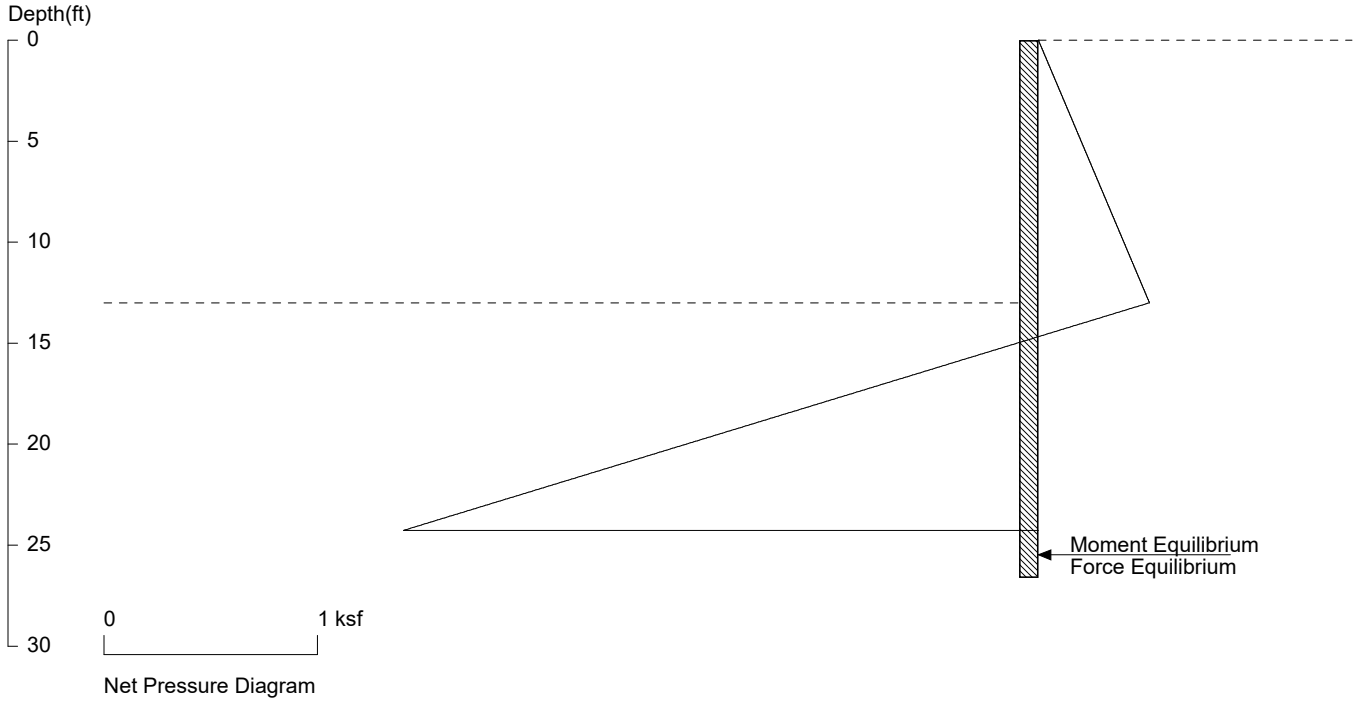
No.	Z depth	Spacing
1	0.00	6.00
2	13.00	2.50

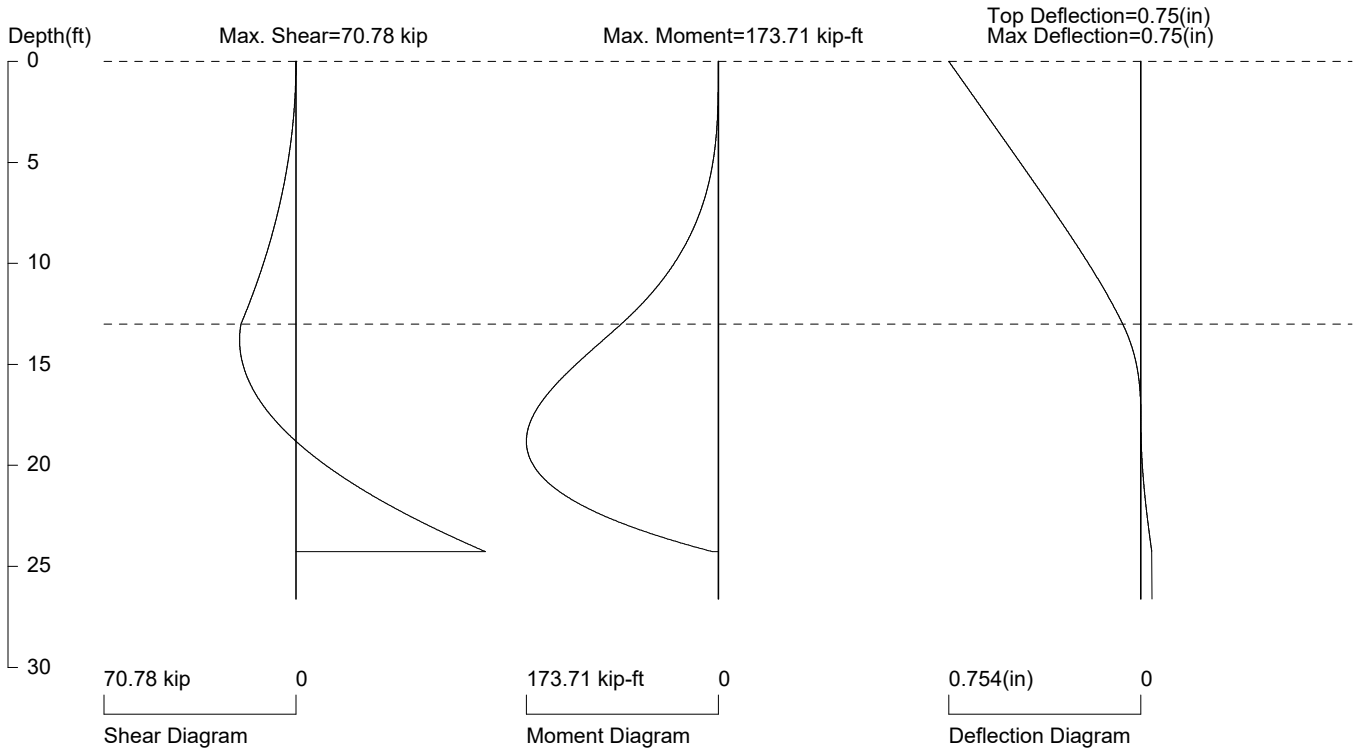
PASSIVE SPACING:

No.	Z depth	Spacing
1	13.00	5.00

UNITS: Width,Spacing,Diameter,Length,and Depth - ft; Force - kip; Moment - kip-ft
Friction,Bearing,and Pressure - ksf; Pres. Slope - kip/ft3; Deflection - in

Mill's Residence
Soldier Pile S18~S23





PRESSURE, SHEAR, MOMENT, AND DEFLECTION DIAGRAMS

Based on pile spacing: 6.0 foot or meter

User Input Pile, W16X67: E (ksi)=29000.0, I (in4)/pile=954.0

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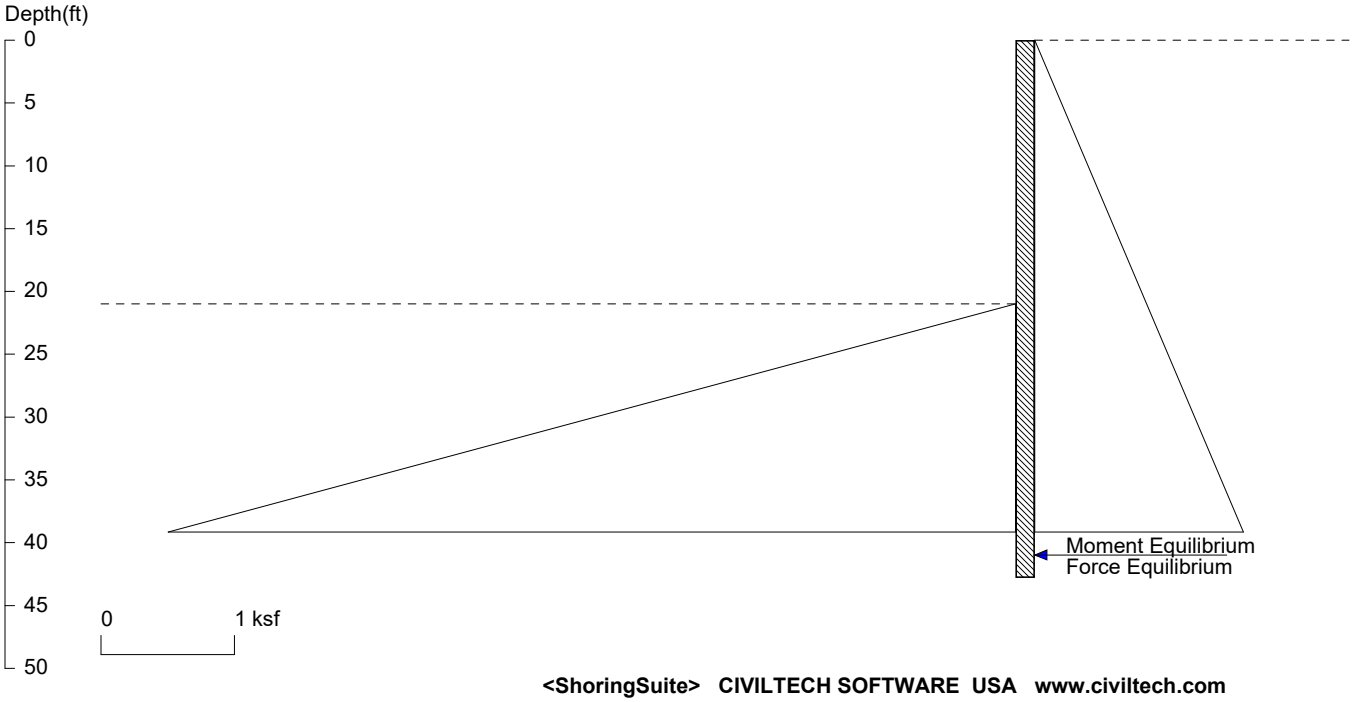
Mill's Residence
Soldier Pile S24~S26



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File: C:\Users\e_pen\Desktop\Jobs\Mans\Mills Residence\Shoring Design\Mills_GrE_Piles_S18 - 04_20_18.sh8

Wall Height=21.0 Pile Diameter=2.5 Pile Spacing=3.5 Wall Type: 2. Soldier Pile, Drilled

PILE LENGTH: Min. Embedment=21.79 Min. Pile Length=42.79
MOMENT IN PILE: Max. Moment=443.36 per Pile Spacing=3.5 at Depth=30.50

PILE SELECTION:
Request Min. Section Modulus = 161.2 in3/pile=2641.94 cm3/pile, Fy= 50 ksi = 345 MPa, Fb/Fy=0.66
W21X111 has Section Modulus = 249.0 in3/pile=4080.36 cm3/pile. It is greater than Min. Requirements!
Top Deflection = 1.72(in) based on E (ksi)=29000.00 and I (in4)/pile=2670.0

DRIVING PRESSURES (ACTIVE, WATER, & SURCHARGE):

Z1	P1	Z2	P2	Slope
0	0	100	4.000	0.04

PASSIVE PRESSURES:

Z1	P1	Z2	P2	Slope
21	0	800	272.650	0.35

ACTIVE SPACING:

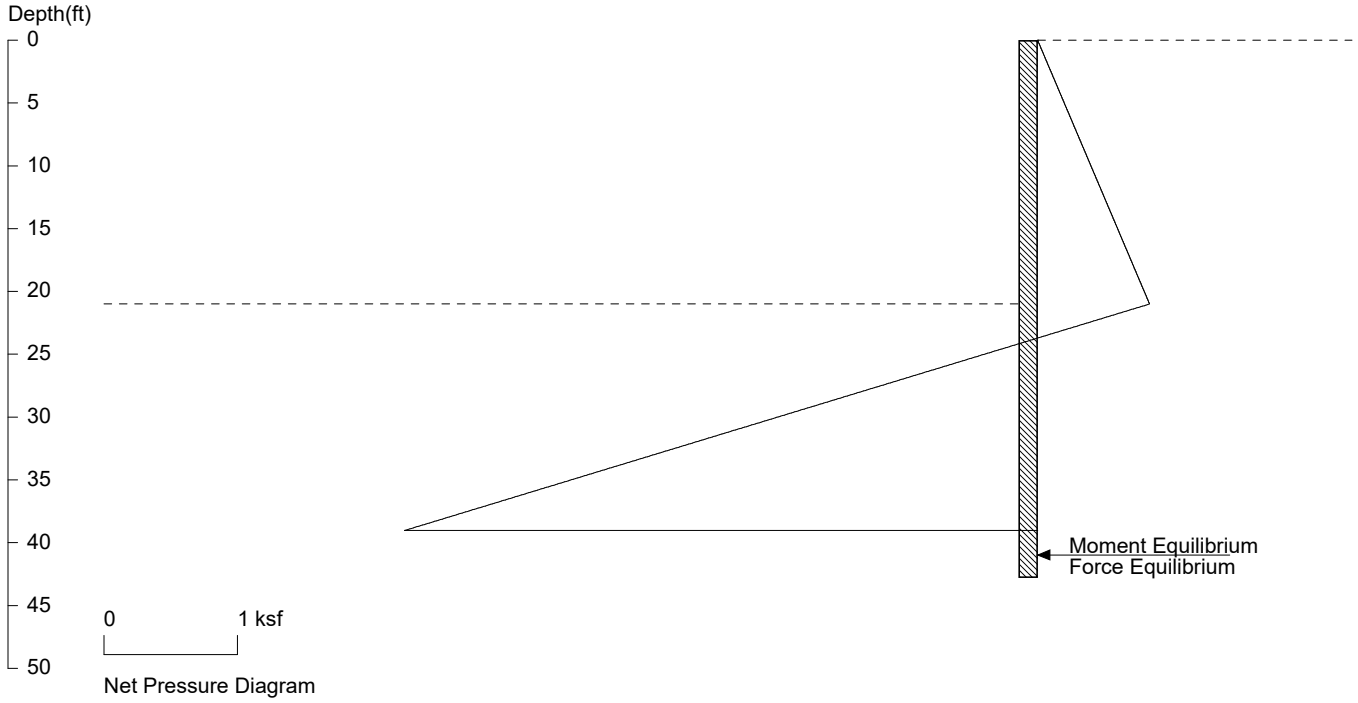
No.	Z depth	Spacing
1	0.00	3.50
2	21.00	2.50

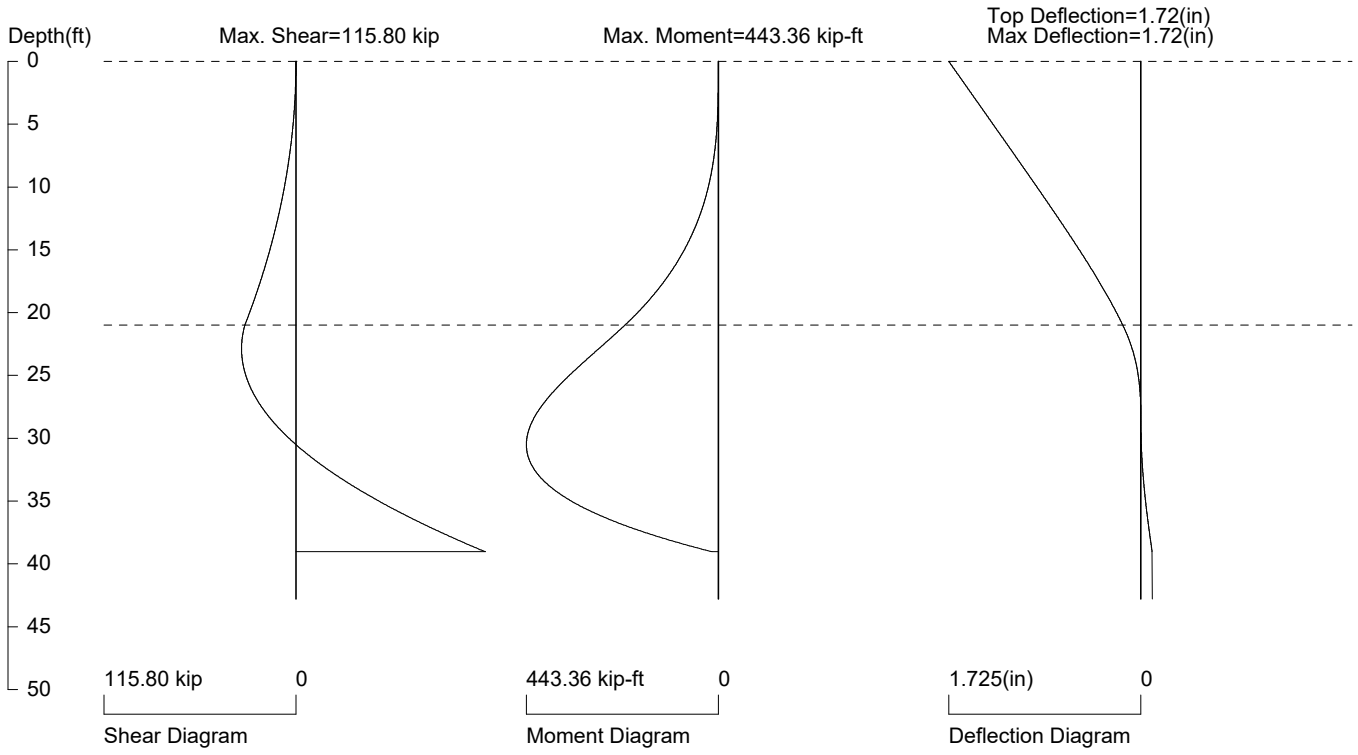
PASSIVE SPACING:

No.	Z depth	Spacing
1	21.00	3.50

UNITS: Width,Spacing,Diameter,Length,and Depth - ft; Force - kip; Moment - kip-ft
Friction,Bearing,and Pressure - ksf; Pres. Slope - kip/ft3; Deflection - in

Mill's Residence
Soldier Pile S24~S26





PRESSURE, SHEAR, MOMENT, AND DEFLECTION DIAGRAMS

Based on pile spacing: 3.5 foot or meter

User Input Pile, W21X111: E (ksi)=29000.0, I (in4)/pile=2670.0

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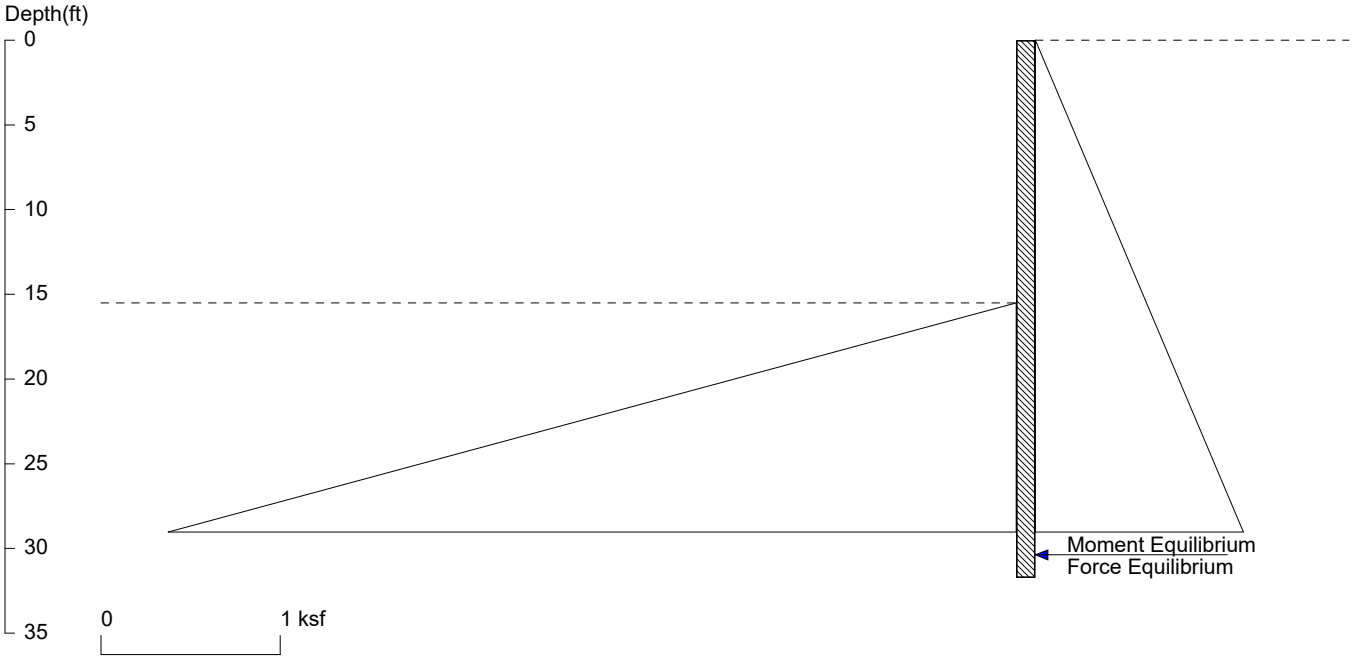
Mill's Residence
Soldier Pile S27~S32



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Wall Height=15.5 Pile Diameter=2.5 Pile Spacing=6.0 Wall Type: 2. Soldier Pile, Drilled

PILE LENGTH: Min. Embedment=16.23 Min. Pile Length=31.73
MOMENT IN PILE: Max. Moment=294.44 per Pile Spacing=6.0 at Depth=22.41

PILE SELECTION:
Request Min. Section Modulus = 107.1 in3/pile=1754.55 cm3/pile, Fy= 50 ksi = 345 MPa, Fb/Fy=0.66
W16X89 has Section Modulus = 155.0 in3/pile=2539.99 cm3/pile. It is greater than Min. Requirements!
Top Deflection = 1.33(in) based on E (ksi)=29000.00 and I (in4)/pile=1300.0

DRIVING PRESSURES (ACTIVE, WATER, & SURCHARGE):

Z1	P1	Z2	P2	Slope
0	0	100	4.000	0.04

PASSIVE PRESSURES:

Z1	P1	Z2	P2	Slope
15.5	0	800	274.575	0.35

ACTIVE SPACING:

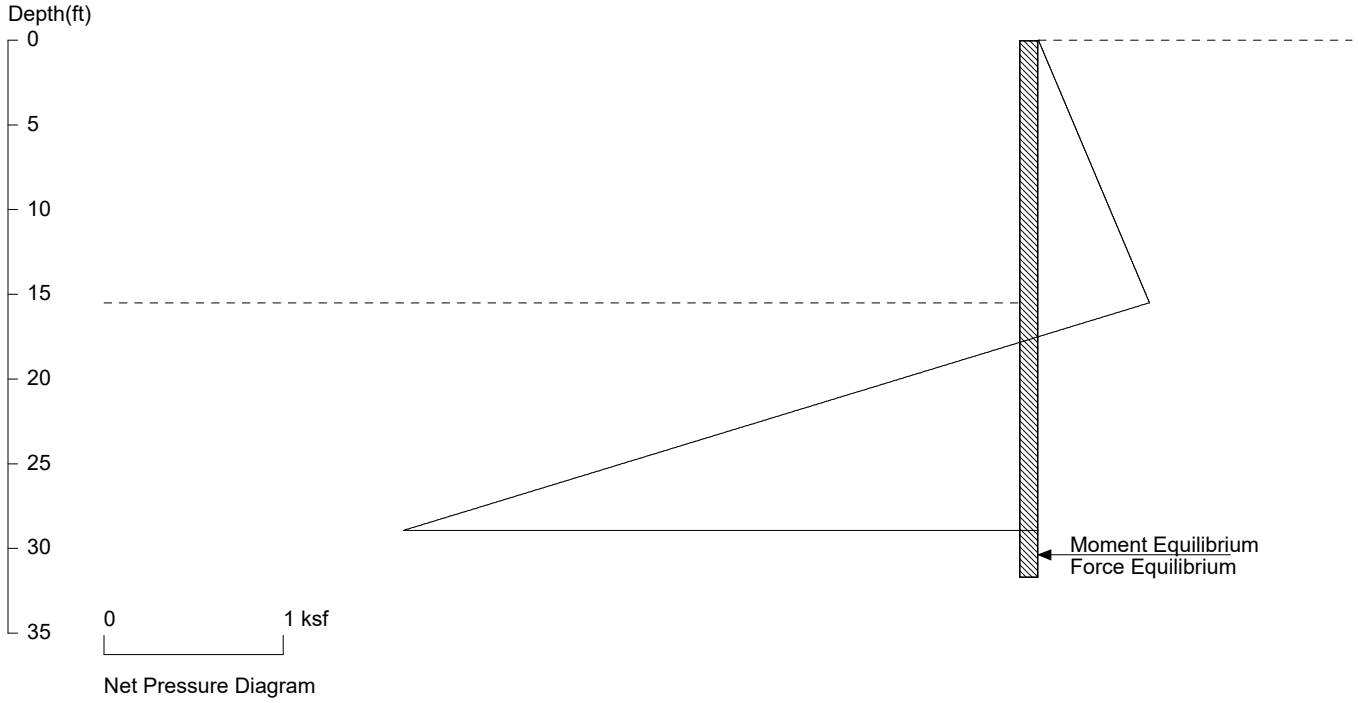
No.	Z depth	Spacing
1	0.00	6.00
2	15.50	2.50

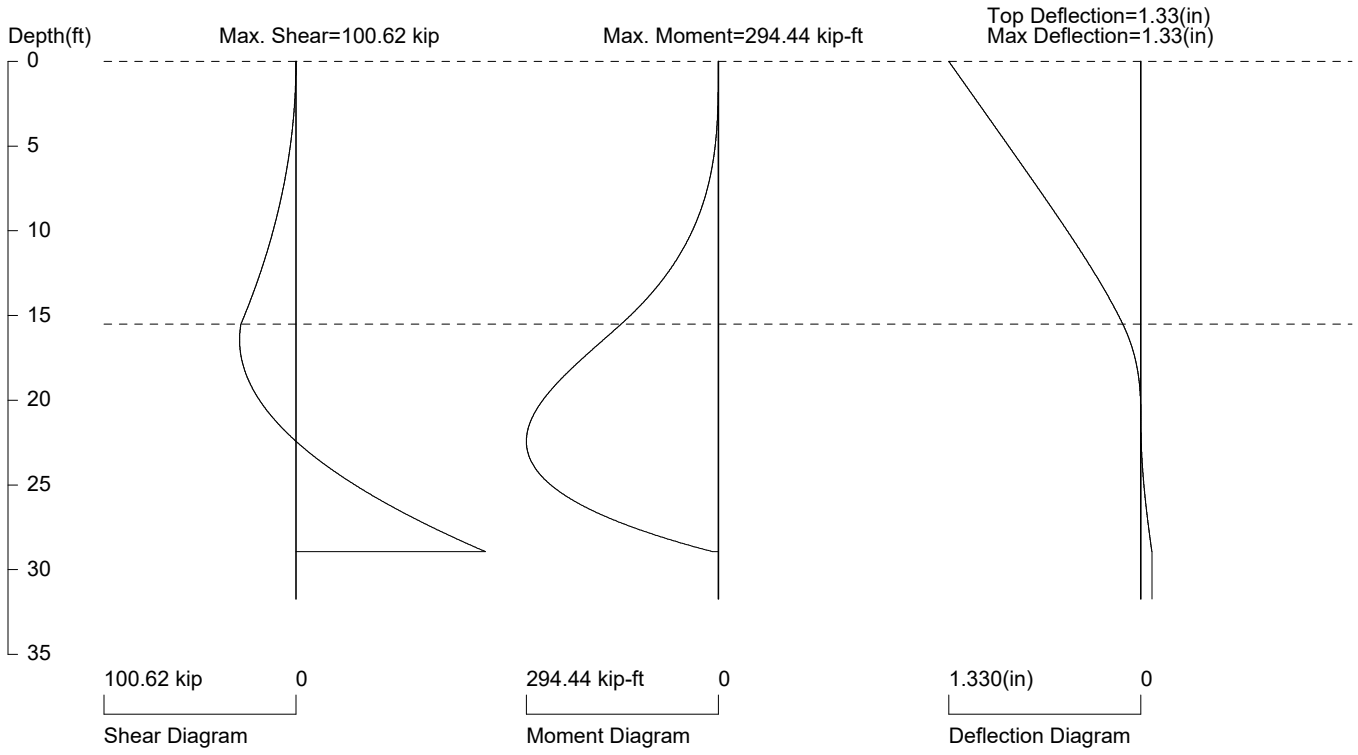
PASSIVE SPACING:

No.	Z depth	Spacing
1	15.50	5.00

UNITS: Width,Spacing,Diameter,Length,and Depth - ft; Force - kip; Moment - kip-ft
Friction,Bearing,and Pressure - ksf; Pres. Slope - kip/ft3; Deflection - in

Mill's Residence
Soldier Pile S27~S32





PRESSURE, SHEAR, MOMENT, AND DEFLECTION DIAGRAMS

Based on pile spacing: 6.0 foot or meter

User Input Pile, W16X89: E (ksi)=29000.0, I (in4)/pile=1300.0

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