Summary and Conclusions

Static Case

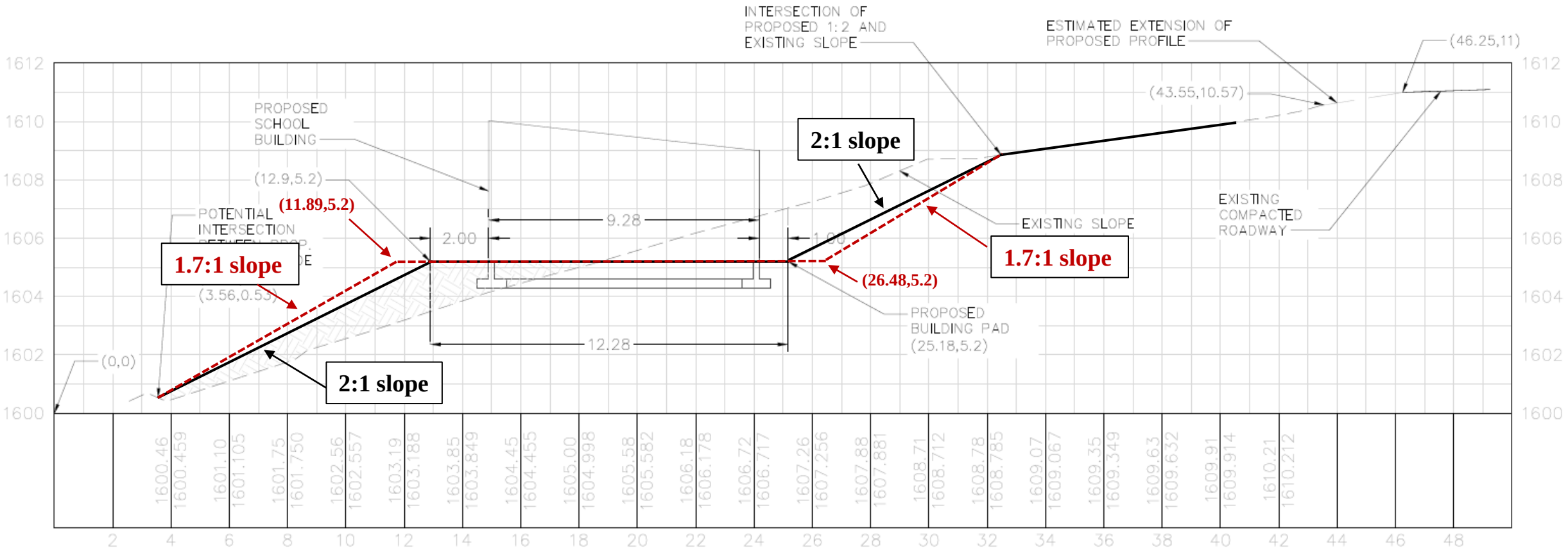
Slip Surface #	Factor of Safety	
	$\phi = 38^0$	$\phi = 42^0$
Slip Surface #1	1.37	1.61
Slip Surface #2	1.31	1.53
Slip Surface #3	3.29	3.87
Slip Surface #1 with assumed GW	1.37	1.61
Slip Surface #2 with assumed GW	1.31	1.53
Slip Surface #3 with assumed GW	2.69	3.15

Dynamic Case

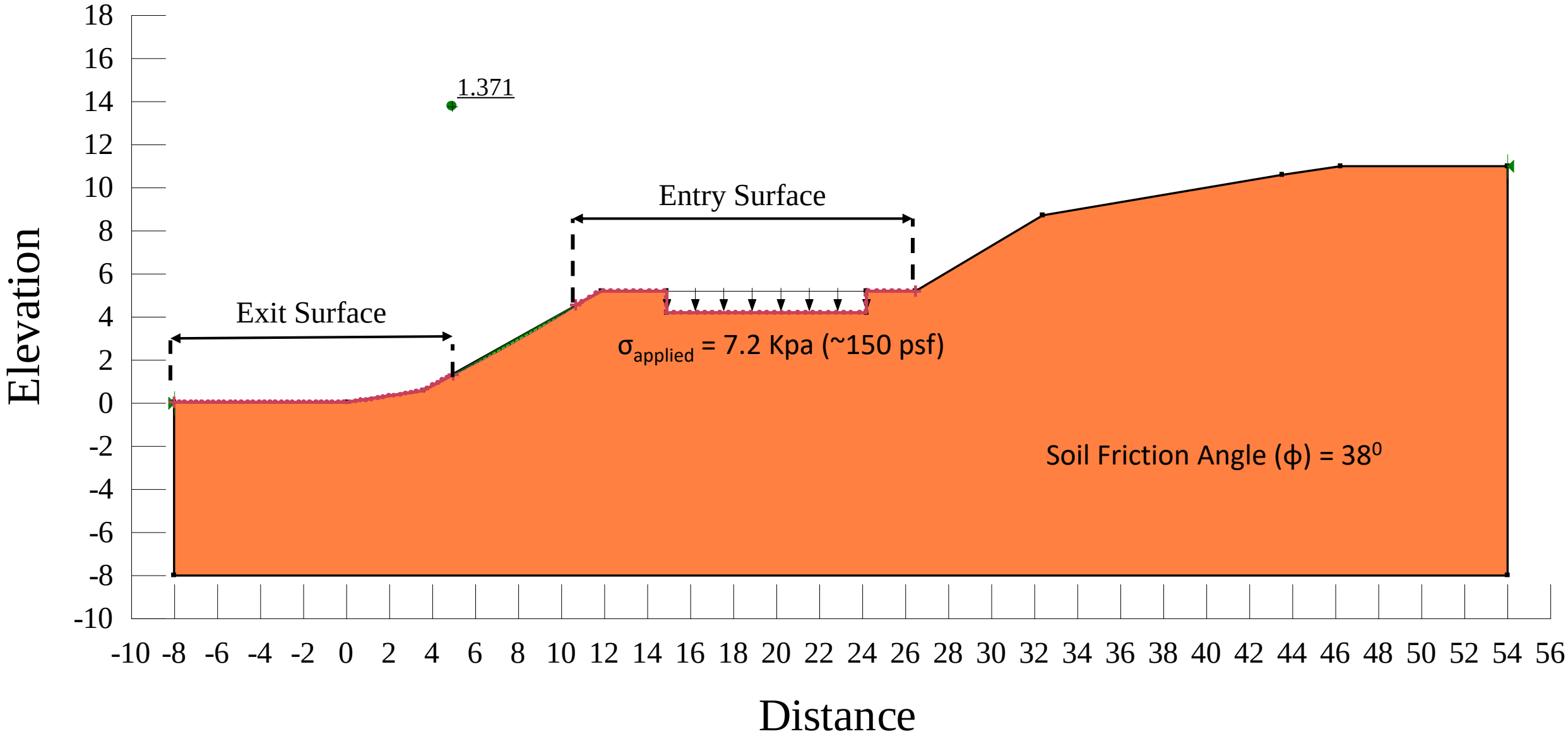
Slip Surface #	Maximum pga for the slope without having any deformation	
	$\phi = 38^0$	$\phi = 42^0$
Slip Surface #3 w/ GW	0.3g	0.4g

- New slope with a friction angle of 38 degrees which is safe against previous proposed slope (1:2) was analyzed, and analysis results did not satisfy design value of 1.5 factor of safety when the slope either is dry or include assumed ground water.
- The new slope (1:1.7) is statically safe as long as the friction angle of the soil is greater than 42 degrees. In other words, the new proposed slope of 1:1.7 **will not** have F.S greater than 1.5, assuming the friction angle less than 41.5 degrees.
- In terms of dynamic analysis, assuming friction angle of 38 degrees, new slope (1:1.7) can still tolerate the maximum seismic acceleration less than 0.3g.

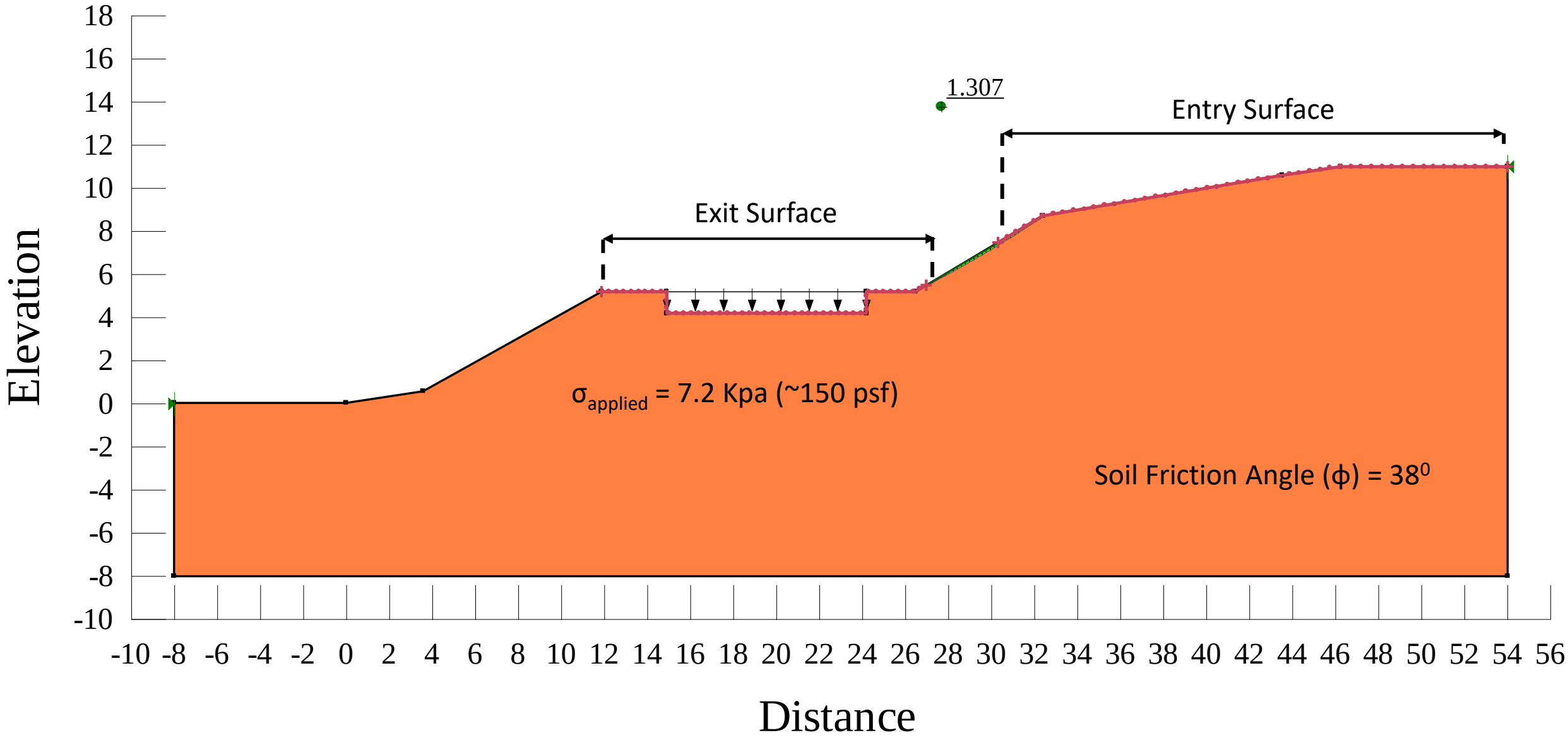
Proposed New Slope: 1.7:1



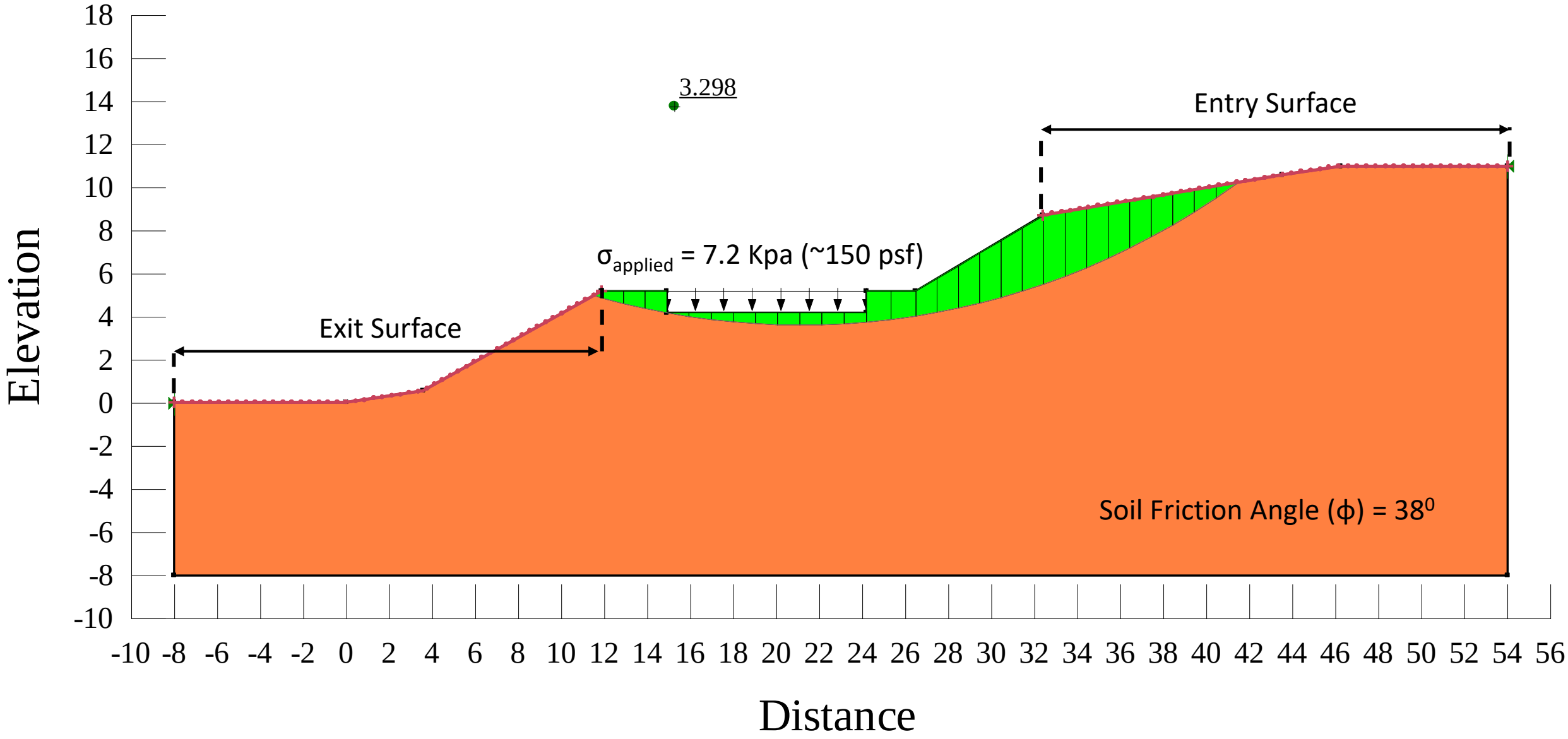
Proposed New Slope (1.7:1) – GeoSlope Analysis – Slip Surface #1 - $\phi = 38^0$



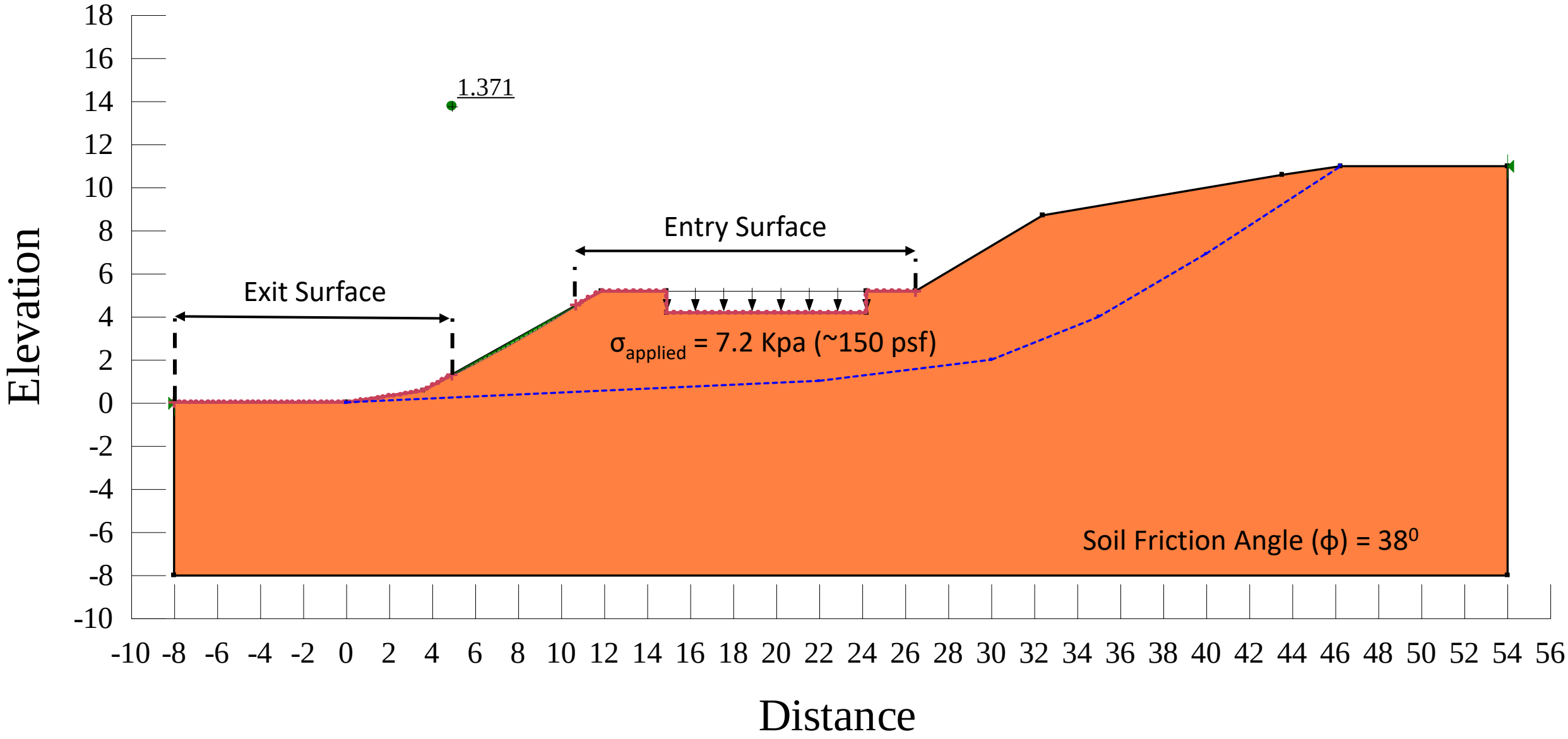
Proposed New Slope (1.7:1) – GeoSlope Analysis – Slip Surface #2



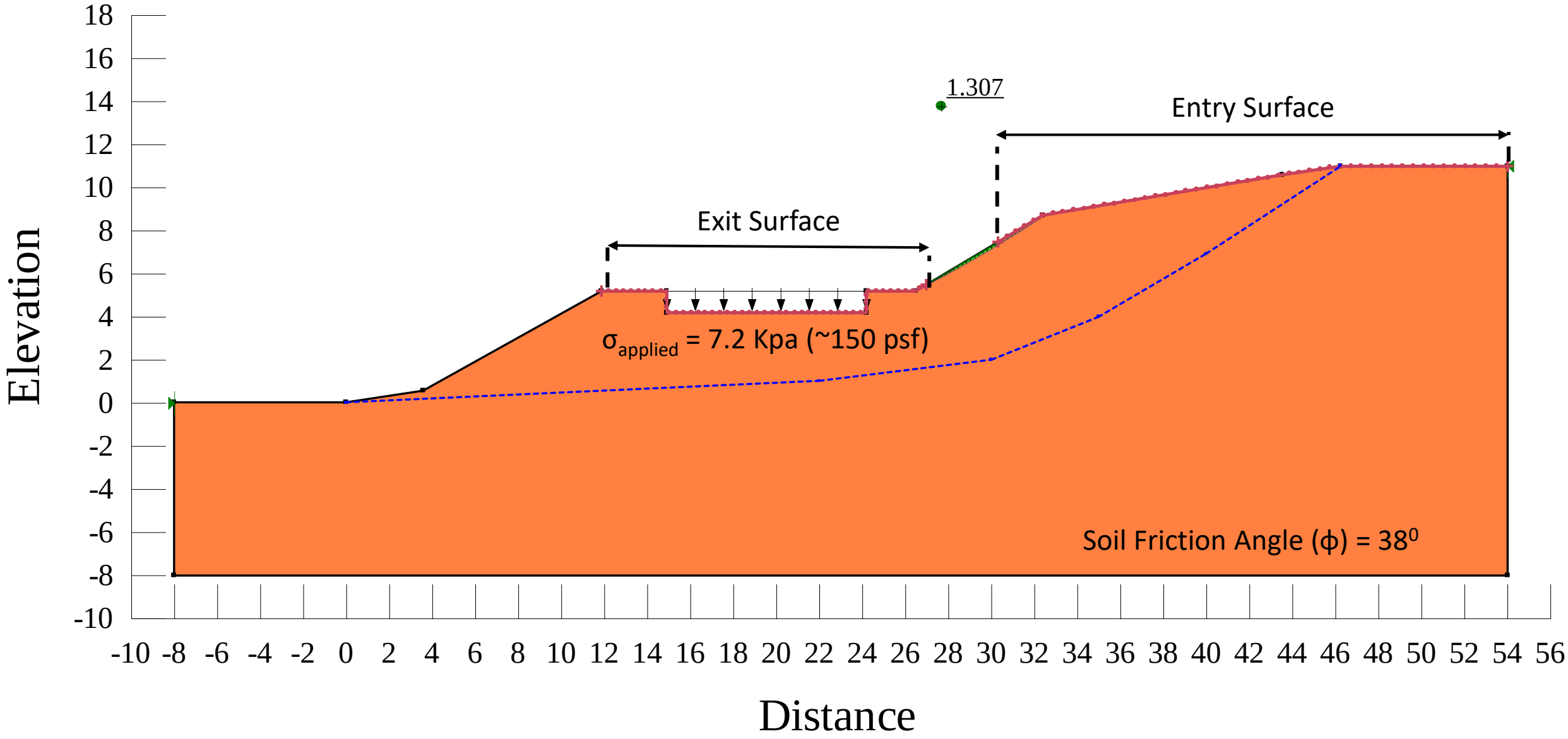
Proposed Slope (1.7:1) – GeoSlope Analysis – Slip Surface #3



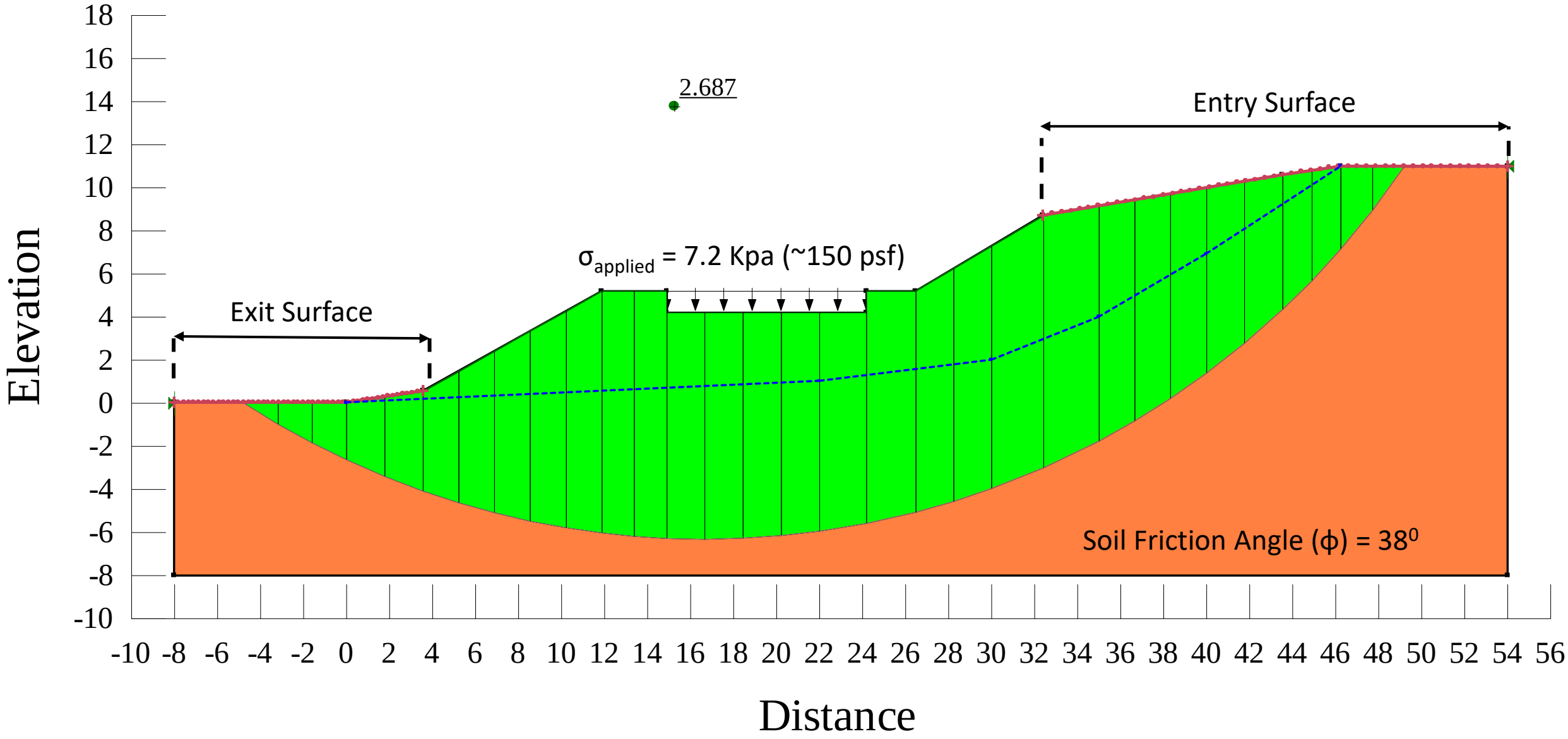
Proposed Slope (1.7:1) – GeoSlope Analysis – Slip Surface #1 w/ GW



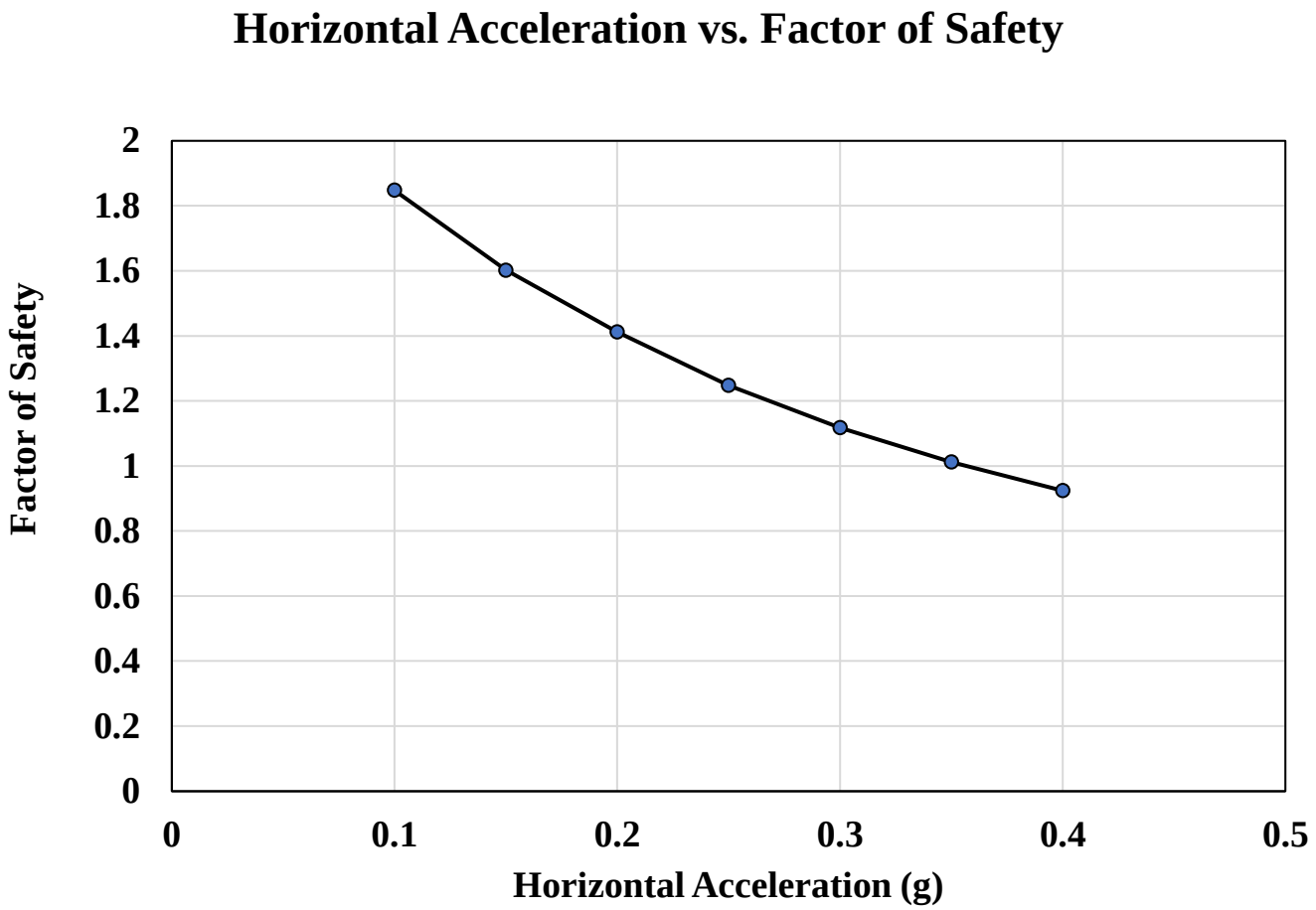
Proposed Slope (1.7:1) – GeoSlope Analysis – Slip Surface #2 w/ GW



Proposed Slope (1.7:1) – GeoSlope Analysis – Slip Surface #3 w/ GW

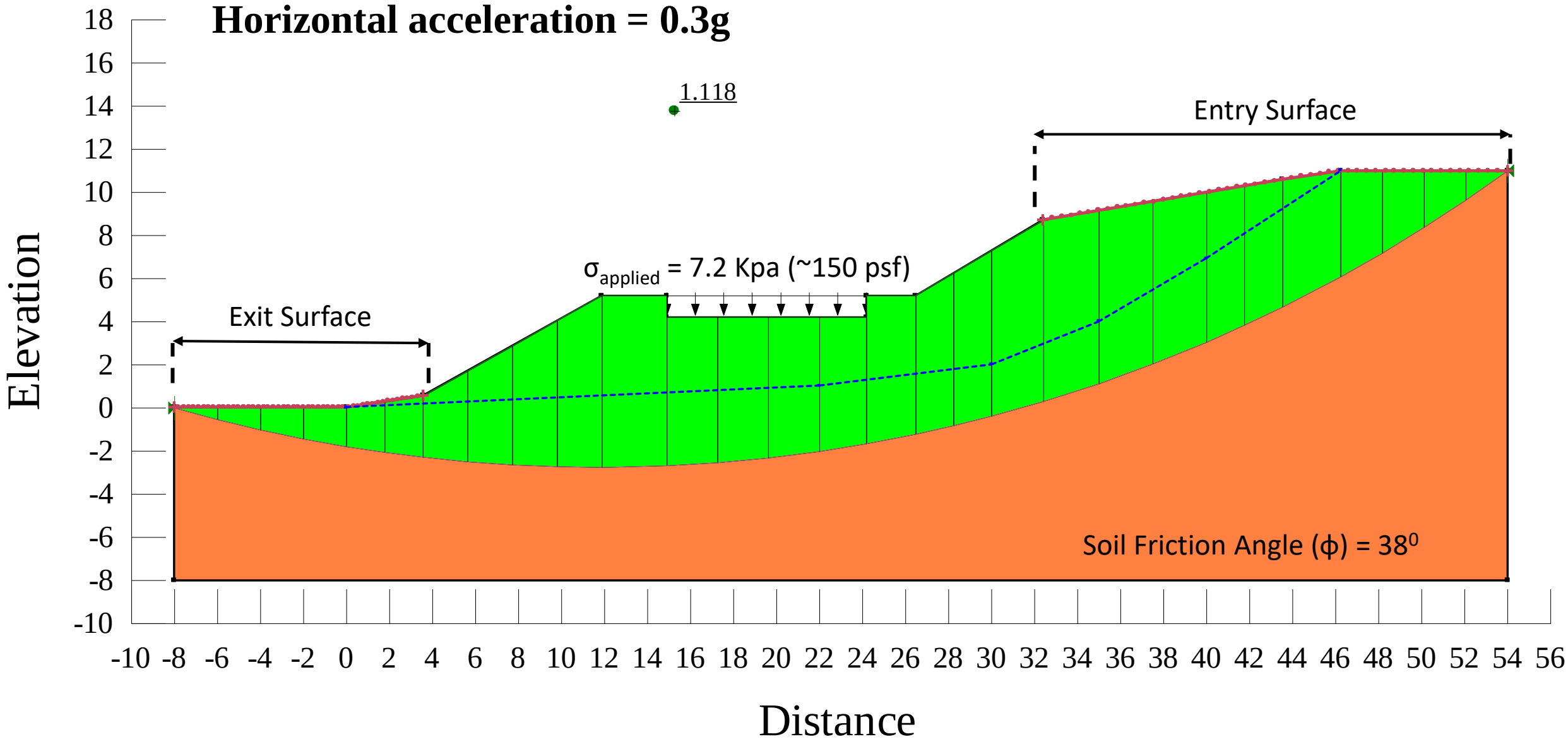


Proposed Slope – Seismic Analysis

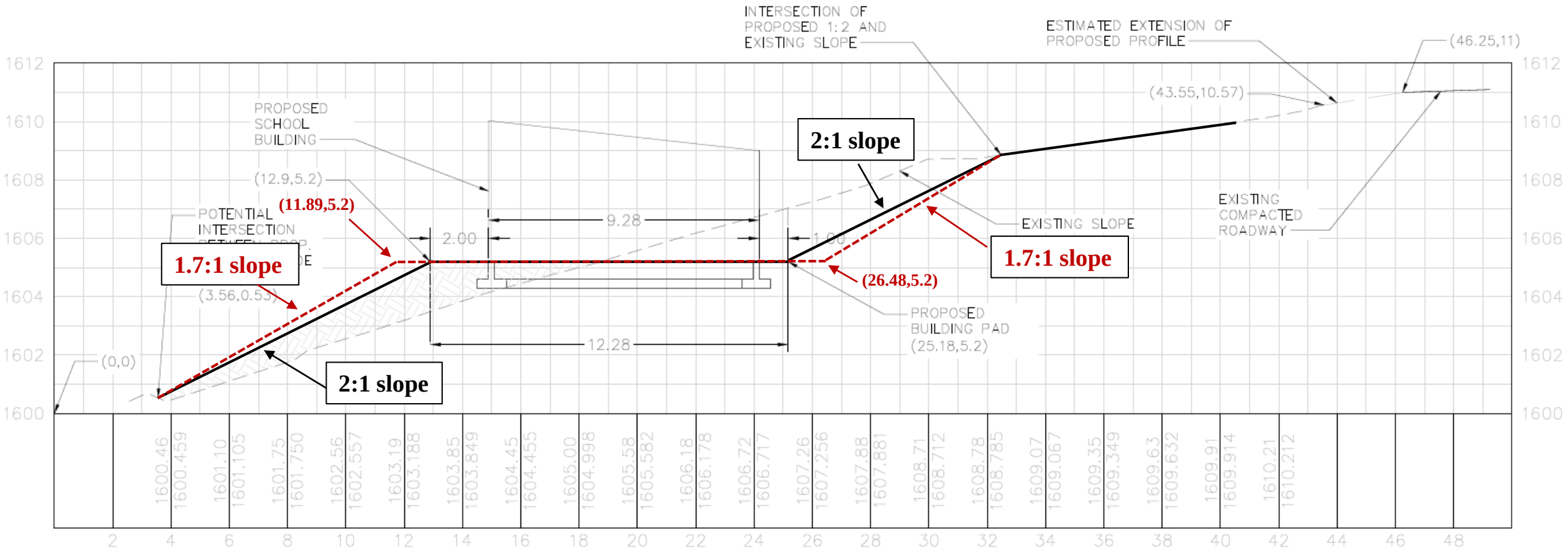


- Pseudo seismic analysis were performed by using different horizontal accelerations for slip surface #3.
- Horizontal acceleration of 0.3g was satisfied to F.S of 1.12.

Seismic Analysis – Slip Surface #3 w/ GW

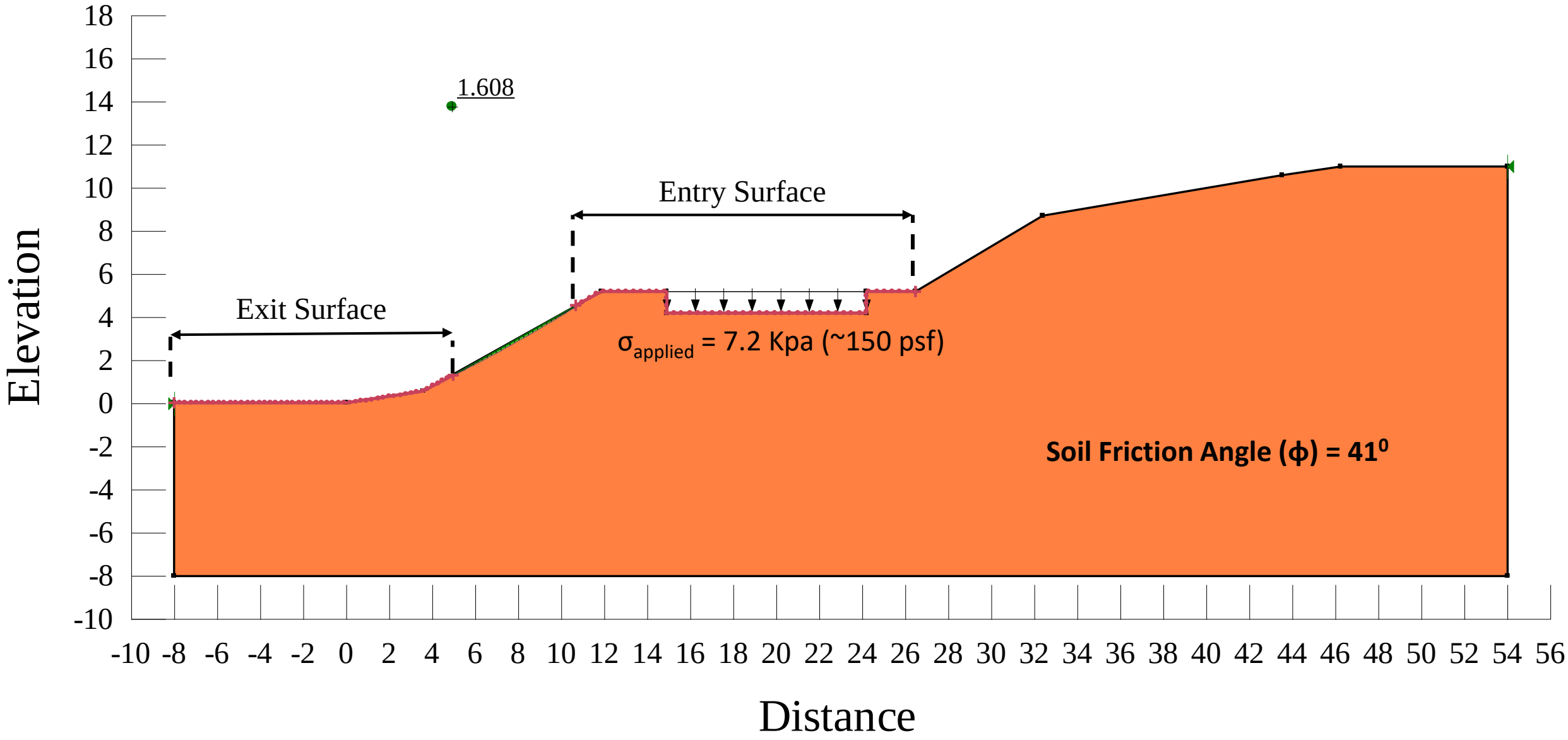


Proposed New Slope: 1.7:1

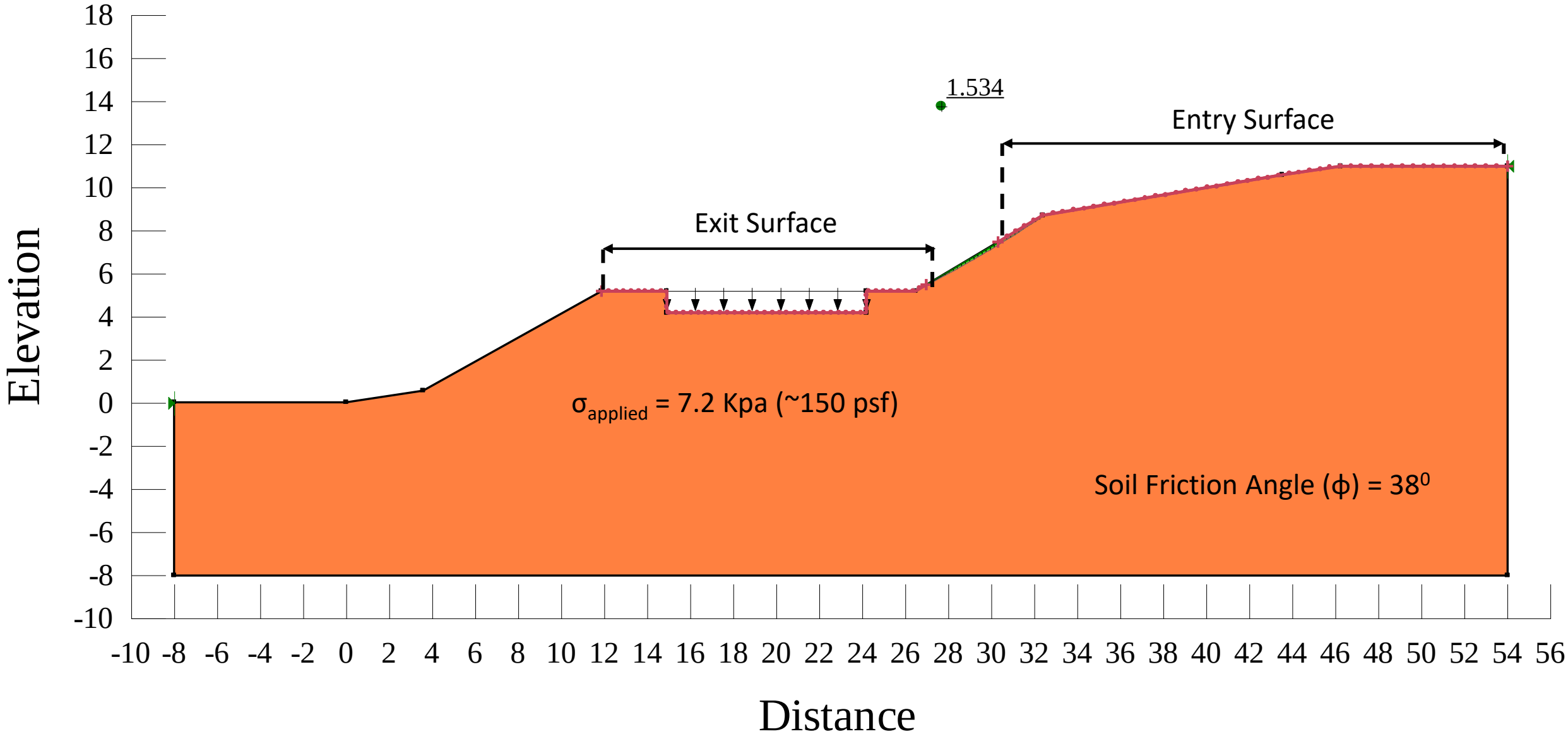


$$F.S = \frac{\tan\varphi}{\tan\alpha} \rightarrow \boldsymbol{F.S = 1.5 = \frac{\tan\varphi}{(\frac{1}{1.7})}} \qquad \boldsymbol{\varphi = 41.5^0 \approx 42^0}$$

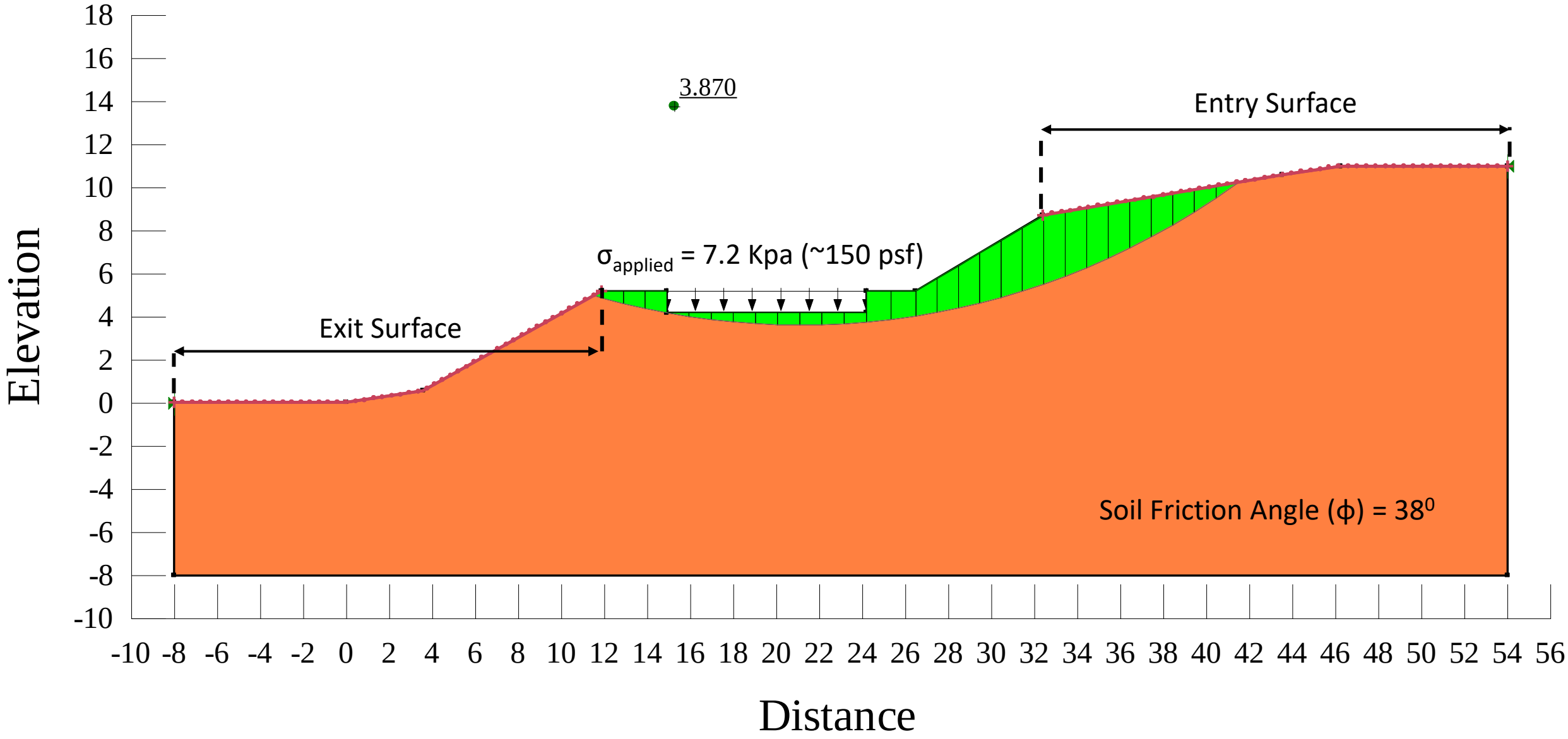
Proposed Slope (1.7:1) – GeoSlope Analysis – Slip Surface #1 - $\phi = 41^0$



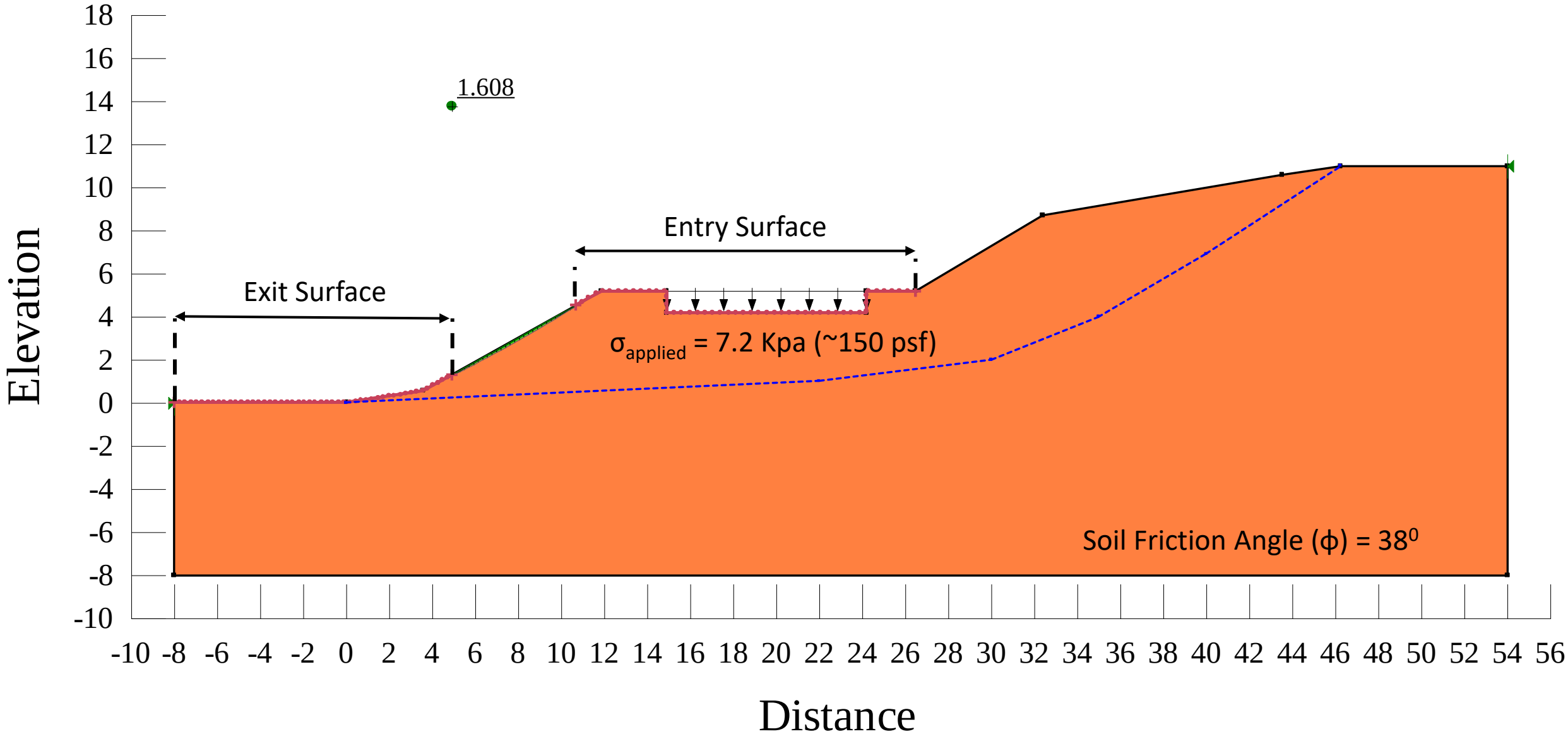
Proposed Slope (1.7:1) – GeoSlope Analysis – Slip Surface #2 - $\phi = 41^0$



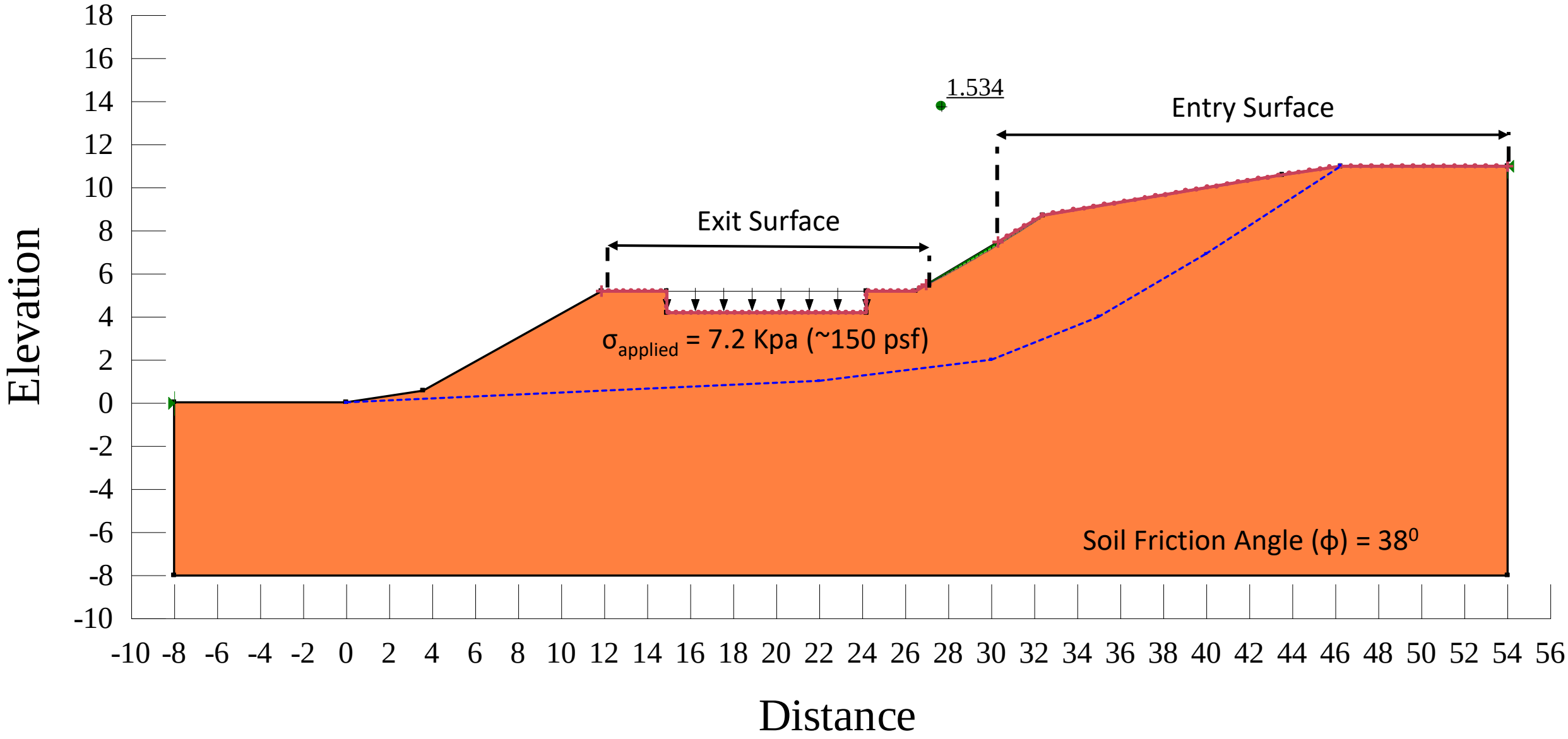
Proposed Slope (1.7:1) – GeoSlope Analysis – Slip Surface #3 - $\phi = 41^0$



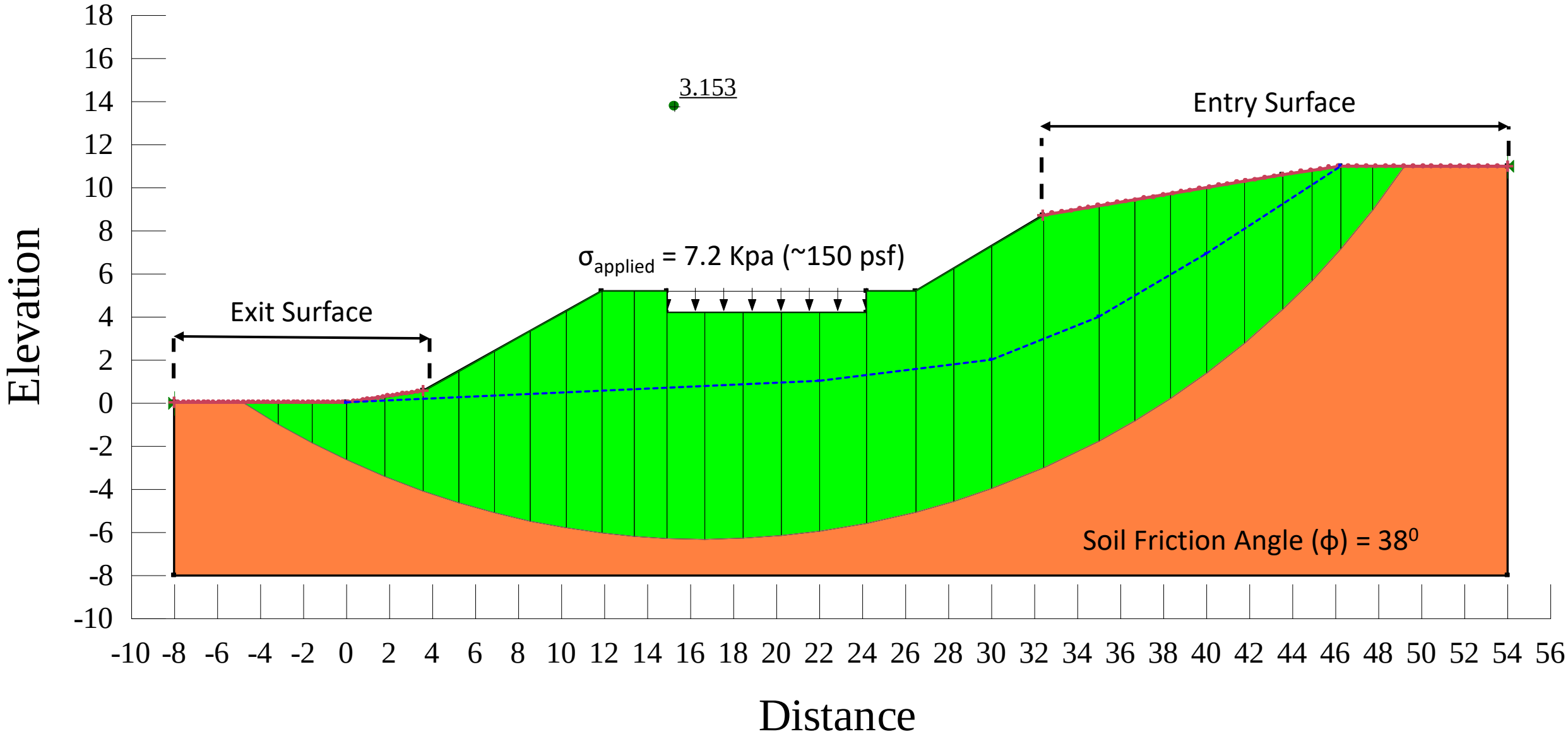
Proposed Slope (1.7:1) – GeoSlope Analysis – Slip Surface #1 w/ GW - $\phi = 41^0$



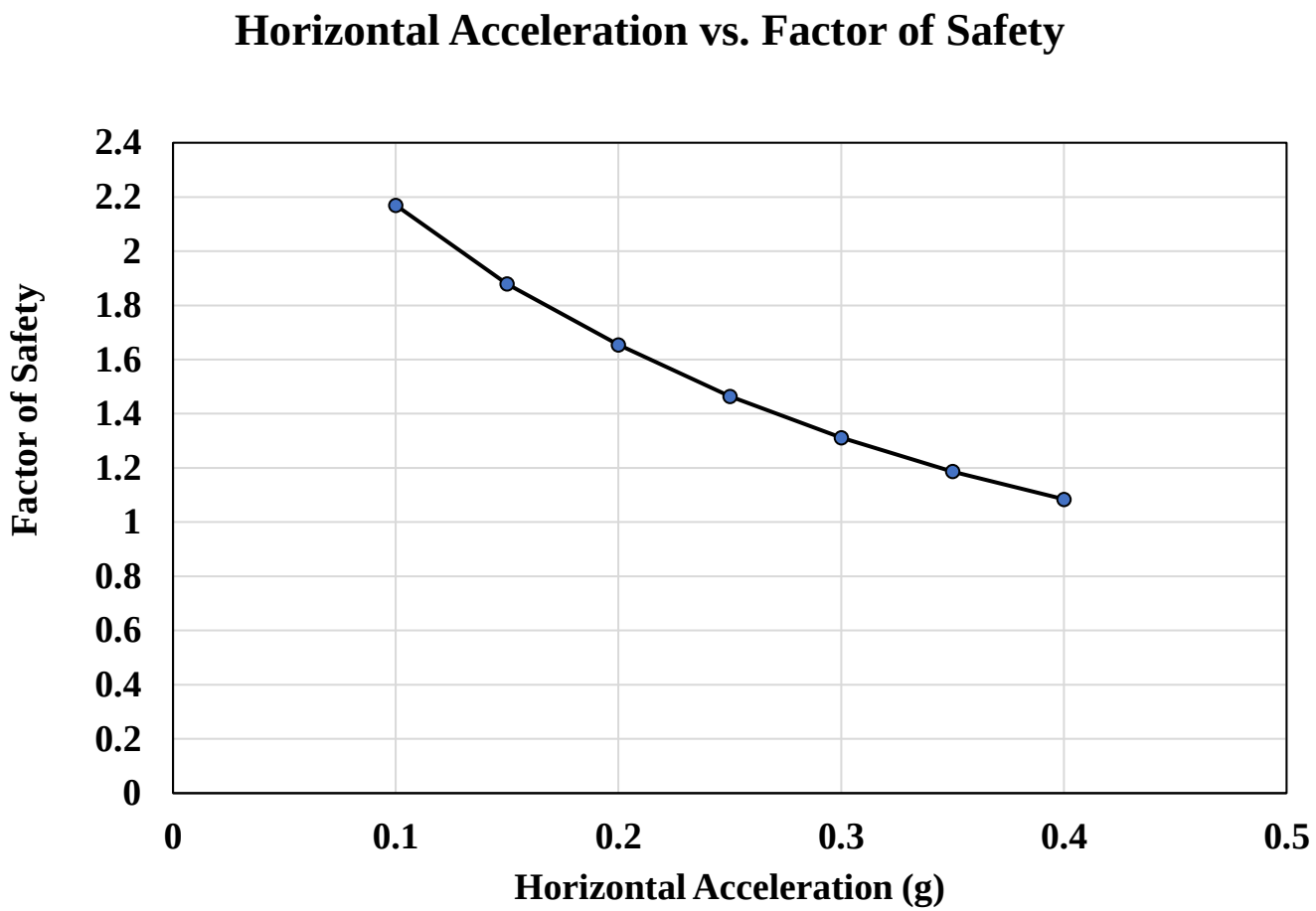
Proposed Slope (1.7:1) – GeoSlope Analysis – Slip Surface #2 w/ GW - $\phi = 41^0$



Proposed Slope (1.7:1) – GeoSlope Analysis – Slip Surface #3 w/ GW - $\phi = 41^0$



Proposed Slope – Seismic Analysis - $\phi = 41^0$



- Pseudo seismic analysis were performed by using different horizontal accelerations for slip surface #3.
- Horizontal acceleration of 0.4g was satisfied to F.S of 1.1.

Seismic Analysis – Slip Surface #3 w/ GW - $\phi = 41^0$