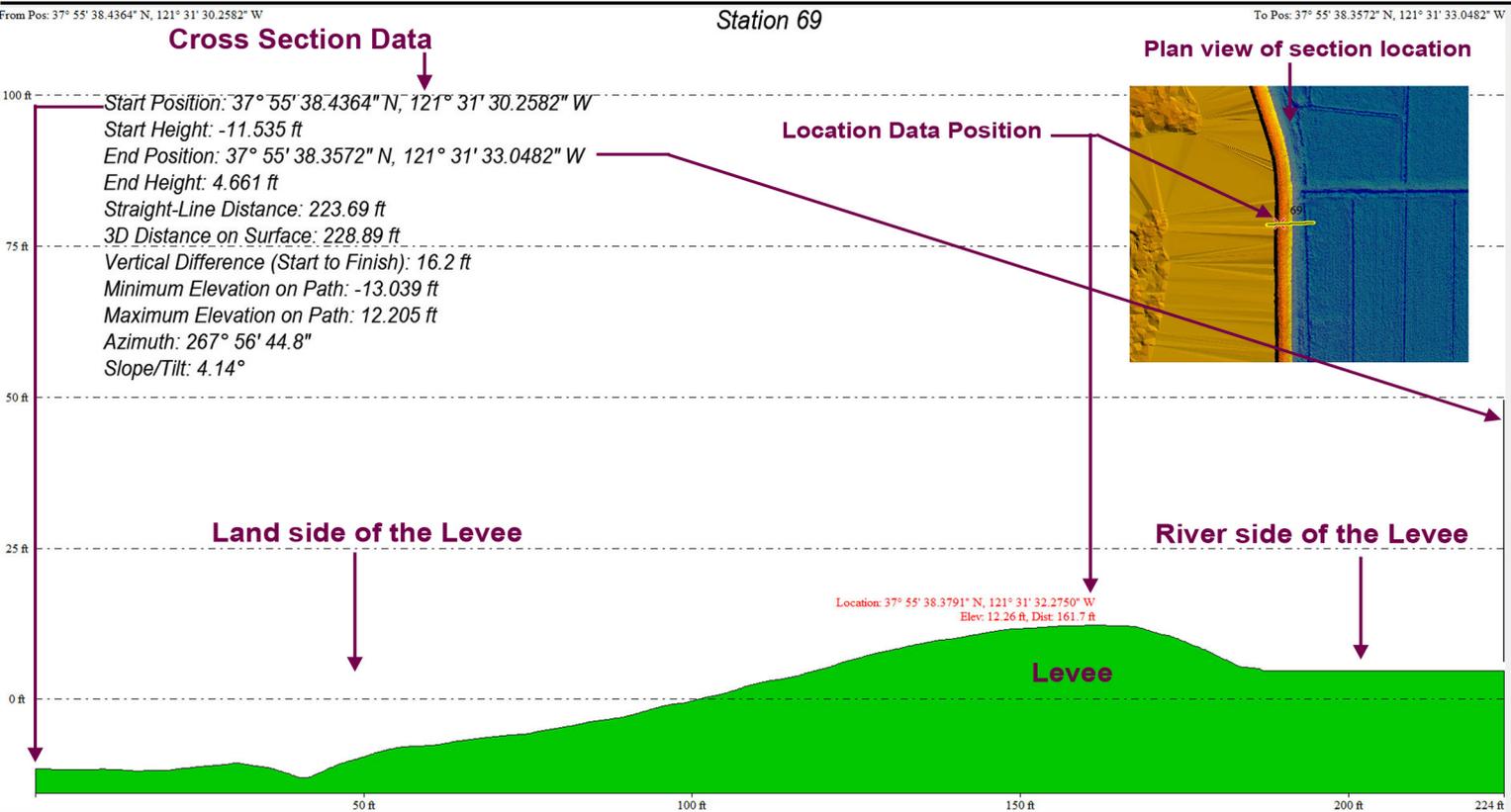


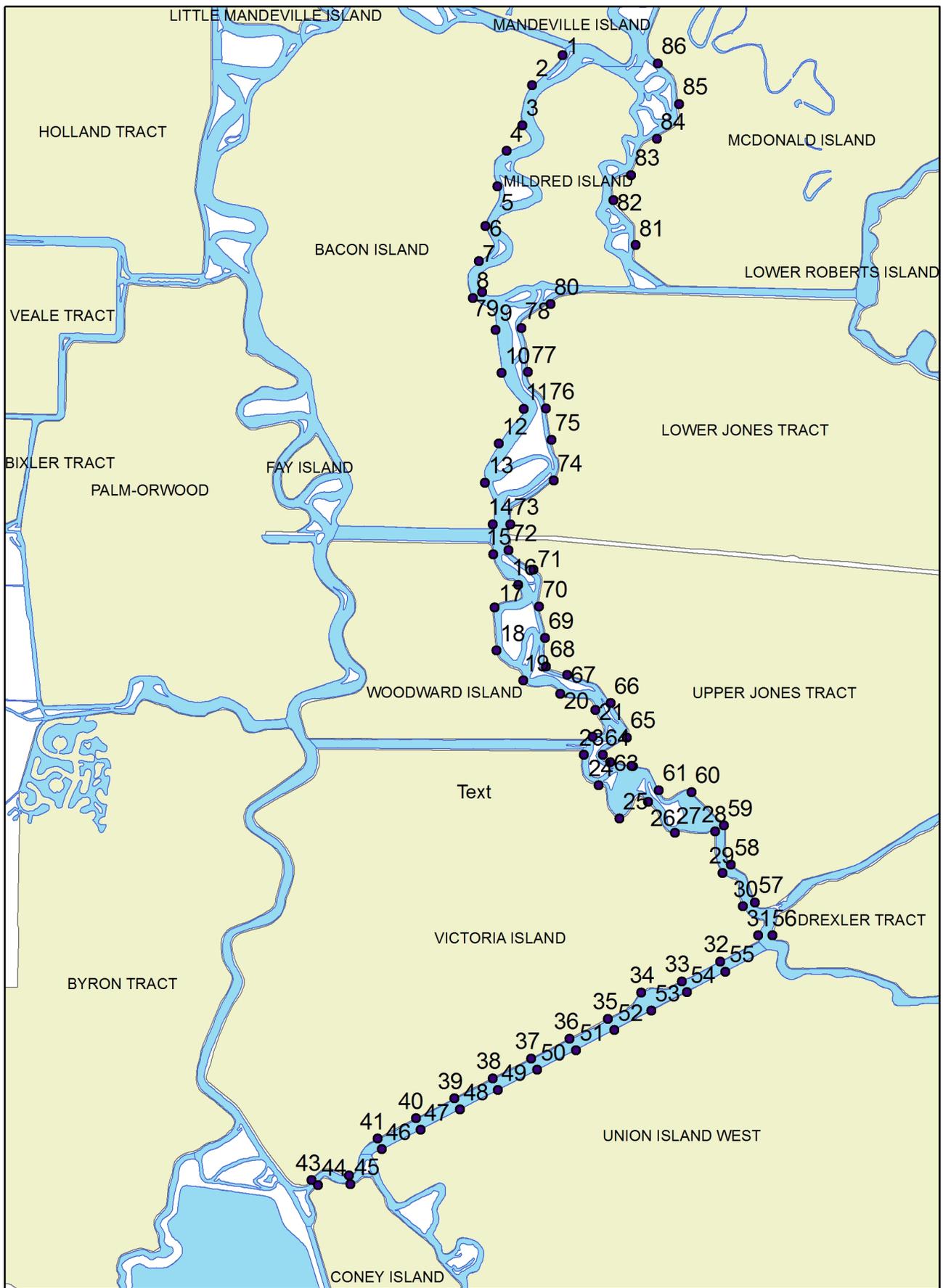
# Middle River Cross Sections of Delta Lidar Data

November 2011

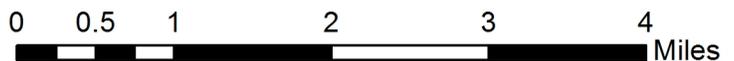
## Cross Section Descriptor



See Appendix A for a full description of the Lidar dataset



Cross Section Spacing = 2,000 ft



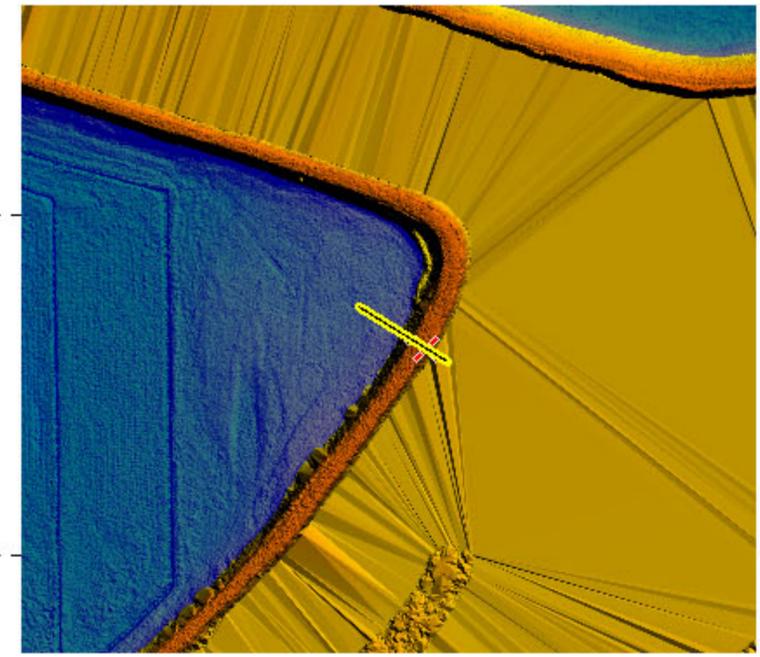
Data Source Date: 11/06/2007

Data Source: The work was conducted under contract issued by California Department of Water Resources to URS Corporation. The prime LIDAR creation subcontractor was EarthData International.

Vertical accuracy: 95% at 0.6' (<18.5cm) and 90% at 0.5' (15cm)

Horizontal accuracy: 1.0' (30cm), 1 sigma.

Start Position: 38° 00' 5.2107" N, 121° 31' 28.6719" W  
Start Height: -4.566 ft  
End Position: 38° 00' 3.9616" N, 121° 31' 26.2425" W  
End Height: 4.226 ft  
Straight-Line Distance: 231.89 ft  
3D Distance on Surface: 236.04 ft  
Vertical Difference (Start to Finish): 8.8 ft  
Minimum Elevation on Path: -4.566 ft  
Maximum Elevation on Path: 11.881 ft  
Azimuth: 123° 00' 53.1"  
Slope/Tilt: 2.17°



100 ft

75 ft

50 ft

25 ft

0 ft

50 ft

100 ft

150 ft

200 ft

232 ft

Location: 38° 00' 4.2454" N, 121° 31' 26.7944" W  
Elev: 11.94 ft, Dist: 179.22 ft



Start Position: 37° 59' 52.1124" N, 121° 31' 47.0282" W

Start Height: -14.212 ft

End Position: 37° 59' 49.8265" N, 121° 31' 43.8979" W

End Height: 4.106 ft

Straight-Line Distance: 340.97 ft

3D Distance on Surface: 348.42 ft

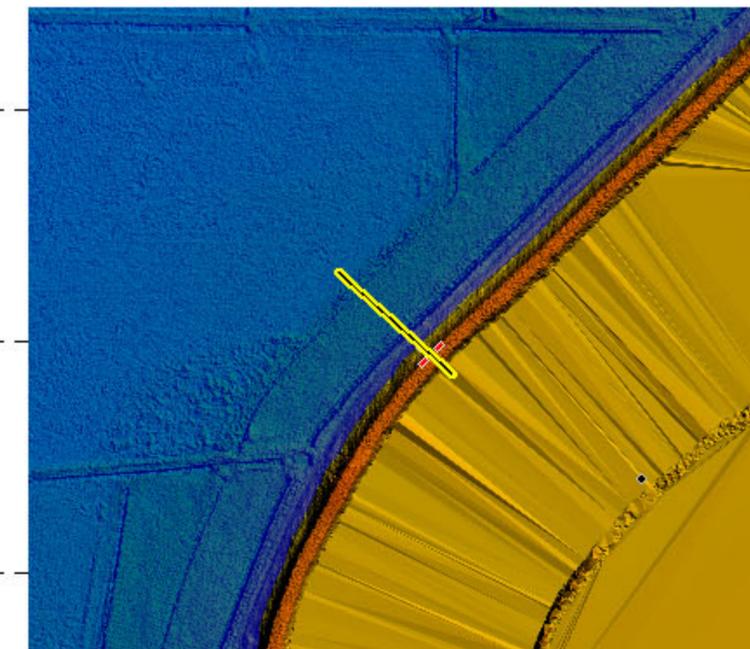
Vertical Difference (Start to Finish): 18.3 ft

Minimum Elevation on Path: -14.212 ft

Maximum Elevation on Path: 11.099 ft

Azimuth: 132° 42' 0.2"

Slope/Tilt: 3.08°



175 ft  
150 ft  
125 ft  
100 ft  
75 ft  
50 ft  
25 ft  
0 ft

Location: 37° 59' 50.2505" N, 121° 31' 44.4785" W  
Elev: 10.79 ft, Dist: 277.72 ft

50 ft

100 ft

150 ft

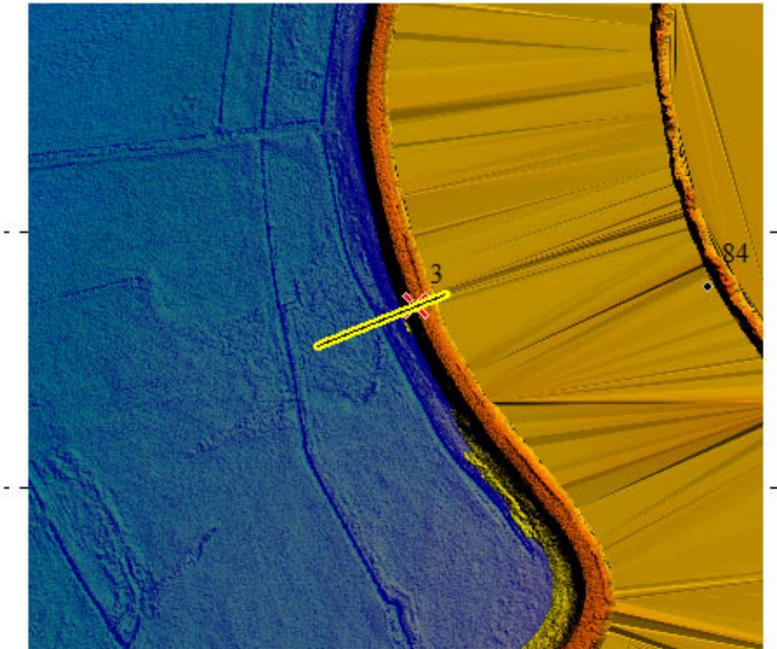
200 ft

250 ft

300 ft

341 ft

Start Position: 37° 59' 31.3144" N, 121° 31' 52.6403" W  
Start Height: -8.529 ft  
End Position: 37° 59' 32.4120" N, 121° 31' 49.0576" W  
End Height: 4.174 ft  
Straight-Line Distance: 307.55 ft  
3D Distance on Surface: 316 ft  
Vertical Difference (Start to Finish): 12.7 ft  
Minimum Elevation on Path: -12.122 ft  
Maximum Elevation on Path: 11.796 ft  
Azimuth: 68° 50' 10.7"  
Slope/Tilt: 2.37°



150 ft  
125 ft  
100 ft  
75 ft  
50 ft  
25 ft  
0 ft

Location: 37° 59' 32.1588" N, 121° 31' 49.8839" W  
Elev: 11.33 ft, Dist: 236.61 ft

50 ft 100 ft 150 ft 200 ft 250 ft 308 ft

*Start Position: 37° 59' 22.0770" N, 121° 32' 0.0420" W*

*Start Height: -8.935 ft*

*End Position: 37° 59' 19.7705" N, 121° 31' 58.3076" W*

*End Height: 4.523 ft*

*Straight-Line Distance: 271.5 ft*

*3D Distance on Surface: 276.41 ft*

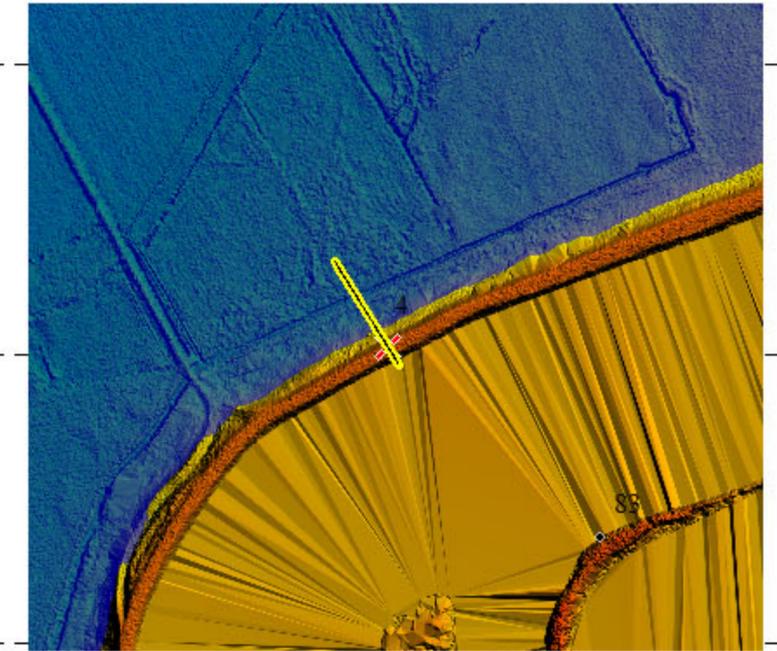
*Vertical Difference (Start to Finish): 13.5 ft*

*Minimum Elevation on Path: -10.562 ft*

*Maximum Elevation on Path: 11.576 ft*

*Azimuth: 149° 14' 31.6"*

*Slope/Tilt: 2.84°*



125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

*Location: 37° 59' 20.1391" N, 121° 31' 58.5848" W  
Elev: 11.23 ft, Dist: 228.11 ft*

50 ft

100 ft

150 ft

200 ft

250 ft

272 ft

*Start Position: 37° 59' 3.4541" N, 121° 32' 6.0420" W*

*Start Height: -10.368 ft*

*End Position: 37° 59' 4.2914" N, 121° 32' 2.9461" W*

*End Height: 4.609 ft*

*Straight-Line Distance: 261.93 ft*

*3D Distance on Surface: 268.78 ft*

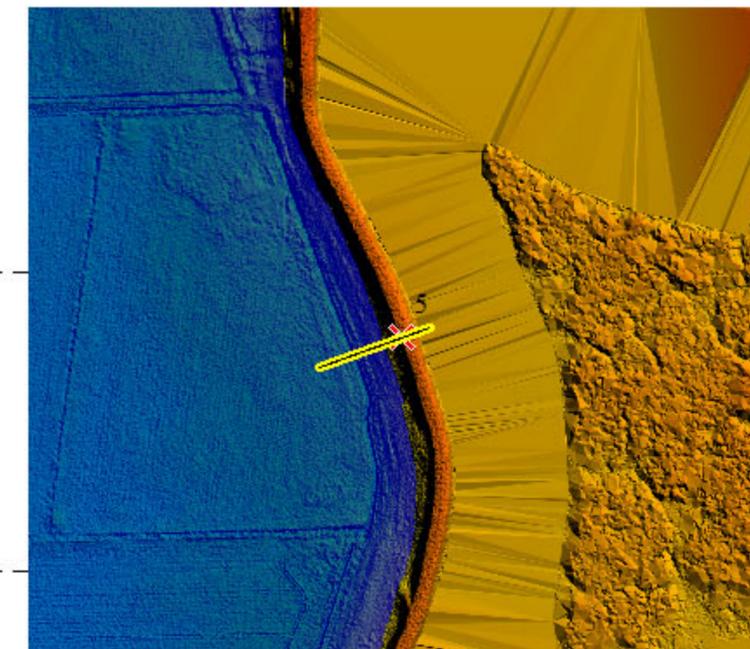
*Vertical Difference (Start to Finish): 15.0 ft*

*Minimum Elevation on Path: -13.248 ft*

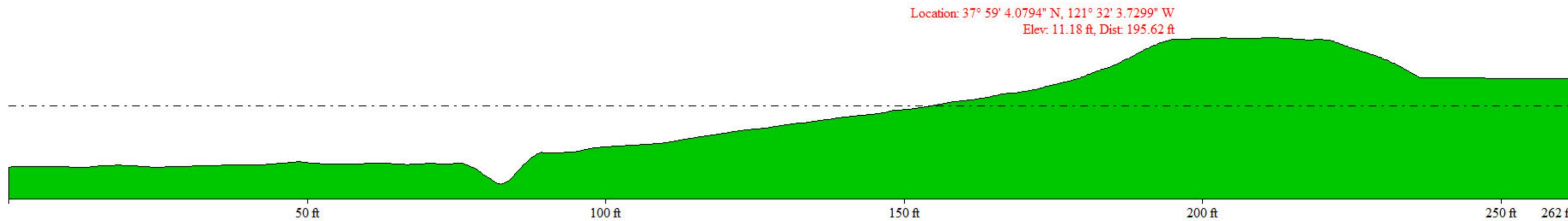
*Maximum Elevation on Path: 11.458 ft*

*Azimuth: 71° 08' 4.5"*

*Slope/Tilt: 3.27°*



125 ft  
100 ft  
75 ft  
50 ft  
25 ft  
0 ft



Location: 37° 59' 4.0794" N, 121° 32' 3.7299" W  
Elev: 11.18 ft, Dist: 195.62 ft

# Station 6

Start Position: 37° 58' 46.0614" N, 121° 32' 12.9790" W

Start Height: -14.56 ft

End Position: 37° 58' 45.8648" N, 121° 32' 9.4227" W

End Height: 4.658 ft

Straight-Line Distance: 285.43 ft

3D Distance on Surface: 291.14 ft

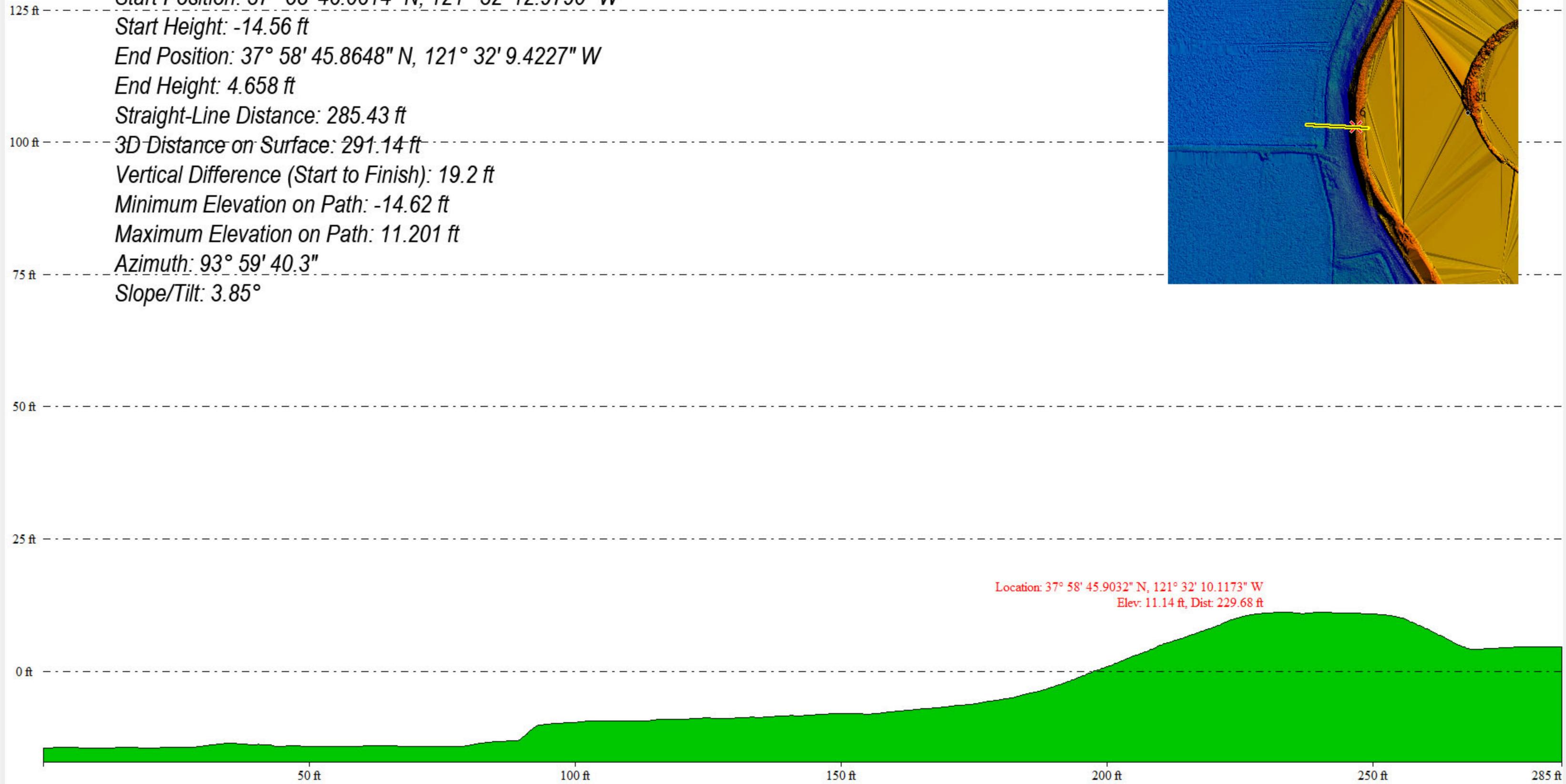
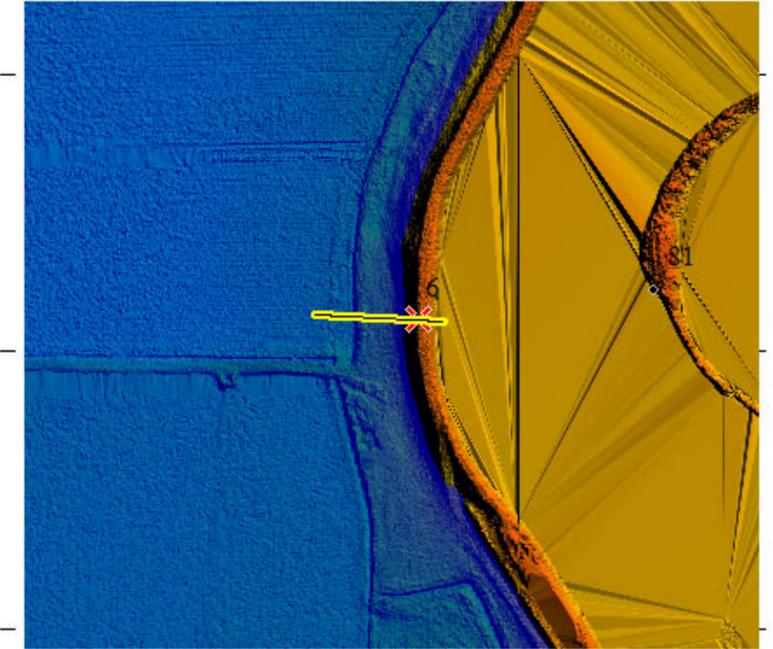
Vertical Difference (Start to Finish): 19.2 ft

Minimum Elevation on Path: -14.62 ft

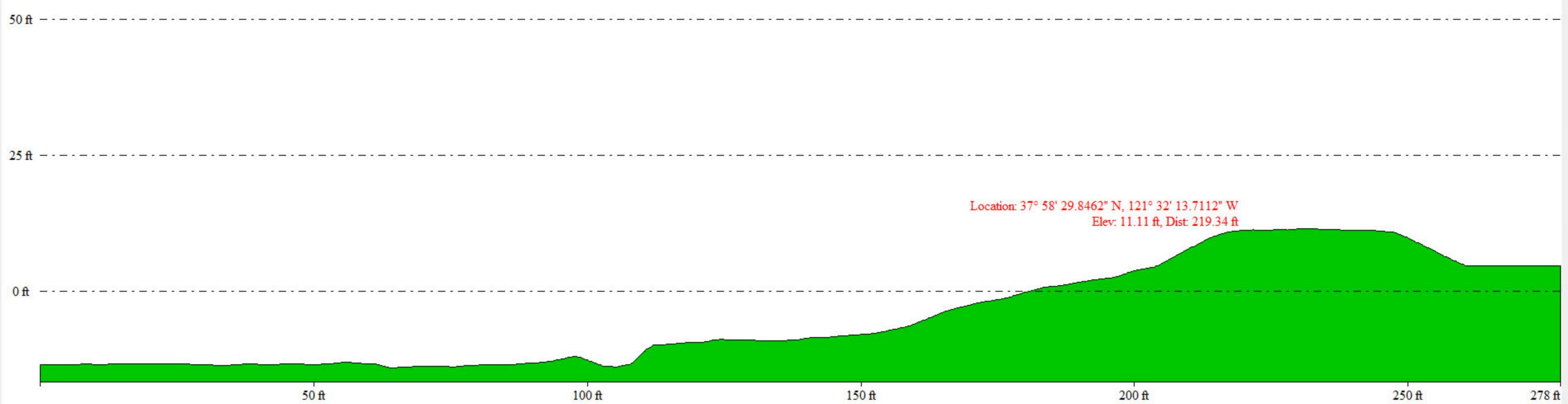
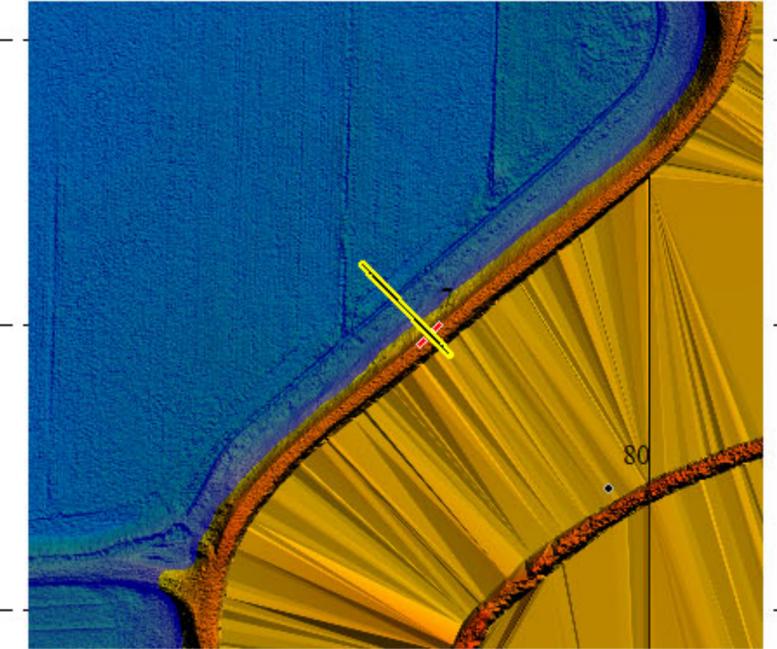
Maximum Elevation on Path: 11.201 ft

Azimuth: 93° 59' 40.3"

Slope/Tilt: 3.85°

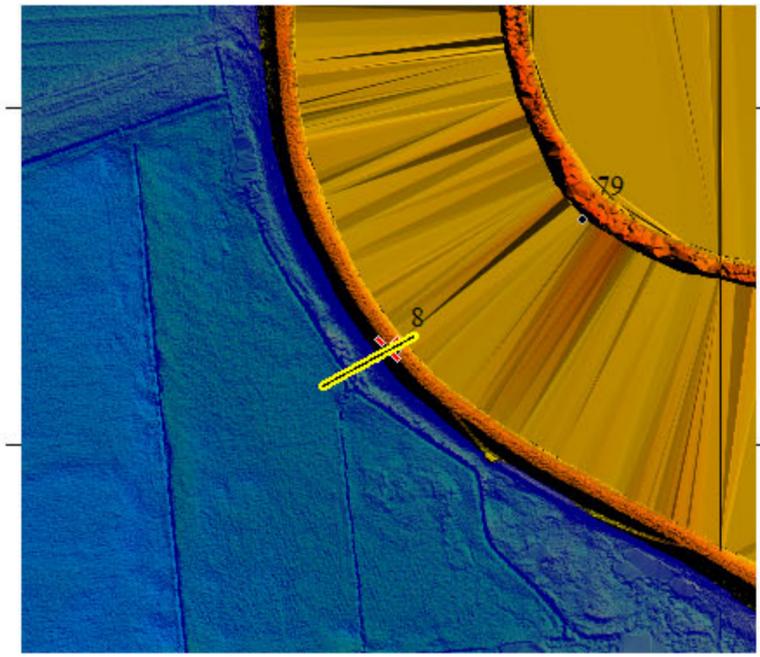


125 ft ----- *Start Position: 37°-58' 31.4327" N, 121° 32' 15.5786" W*  
*Start Height: -13.393 ft*  
*End Position: 37° 58' 29.4230" N, 121° 32' 13.2131" W*  
*End Height: 4.739 ft*  
*Straight-Line Distance: 277.85 ft*  
*3D Distance on Surface: 284.53 ft*  
*Vertical Difference (Start to Finish): 18.1 ft*  
*Minimum Elevation on Path: -14.06 ft*  
*Maximum Elevation on Path: 11.596 ft*  
75 ft ----- *Azimuth: 137°-01' 23.6"*  
*Slope/Tilt: 3.73°*



# Station 8

Start Position: 37° 58' 12.2068" N, 121° 32' 19.0387" W  
 Start Height: -12.109 ft  
 End Position: 37° 58' 13.2792" N, 121° 32' 16.4679" W  
 End Height: 4.569 ft  
 Straight-Line Distance: 232.69 ft  
 3D Distance on Surface: 239.5 ft  
 Vertical Difference (Start to Finish): 16.7 ft  
 Minimum Elevation on Path: -12.172 ft  
 Maximum Elevation on Path: 11.282 ft  
 Azimuth: 62° 12' 47.1"  
 Slope/Tilt: 4.10°



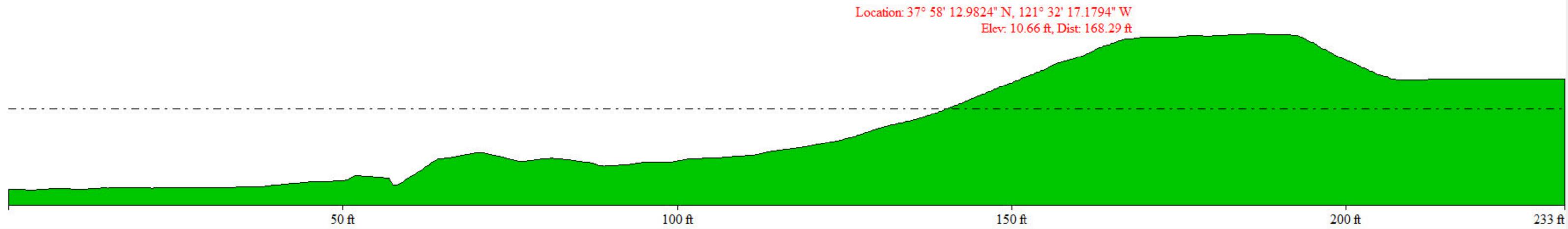
100 ft

75 ft

50 ft

25 ft

0 ft



*Start Position: 37° 57' 58.2616" N, 121° 32' 6.1835" W*

*Start Height: -0.692 ft*

*End Position: 37° 57' 58.5230" N, 121° 32' 2.7149" W*

*End Height: 4.711 ft*

*Straight-Line Distance: 279.02 ft*

*3D Distance on Surface: 281.97 ft*

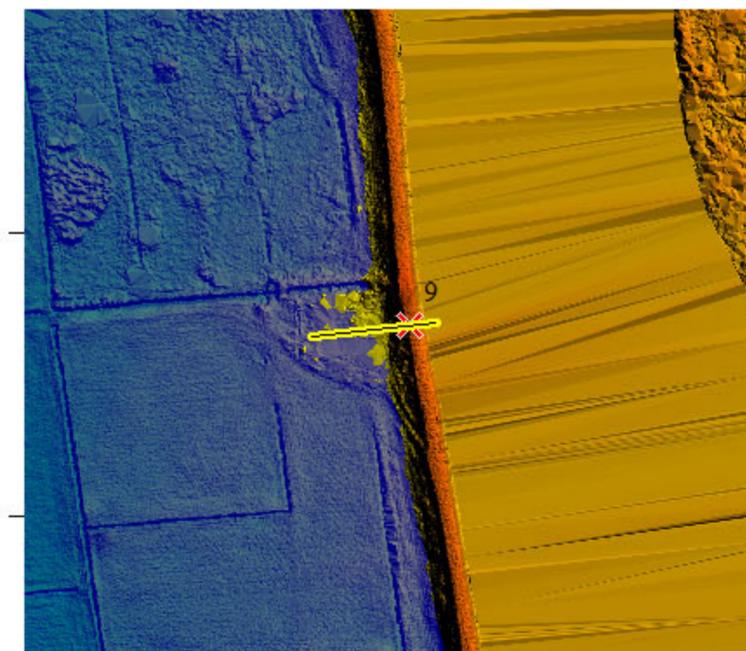
*Vertical Difference (Start to Finish): 5.4 ft*

*Minimum Elevation on Path: -0.921 ft*

*Maximum Elevation on Path: 11.972 ft*

*Azimuth: 84° 33' 40.2"*

*Slope/Tilt: 1.11°*



150 ft

125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 57' 58.4681" N, 121° 32' 3.4440" W  
Elev: 11.84 ft, Dist: 220.37 ft

50 ft

100 ft

150 ft

200 ft

250 ft

279 ft

*Start Position: 37° 57' 38.8329" N, 121° 32' 2.5293" W*

*Start Height: -9.92 ft*

*End Position: 37° 57' 38.9783" N, 121° 31' 58.9190" W*

*End Height: 5.161 ft*

*Straight-Line Distance: 289.51 ft*

*3D Distance on Surface: 297.6 ft*

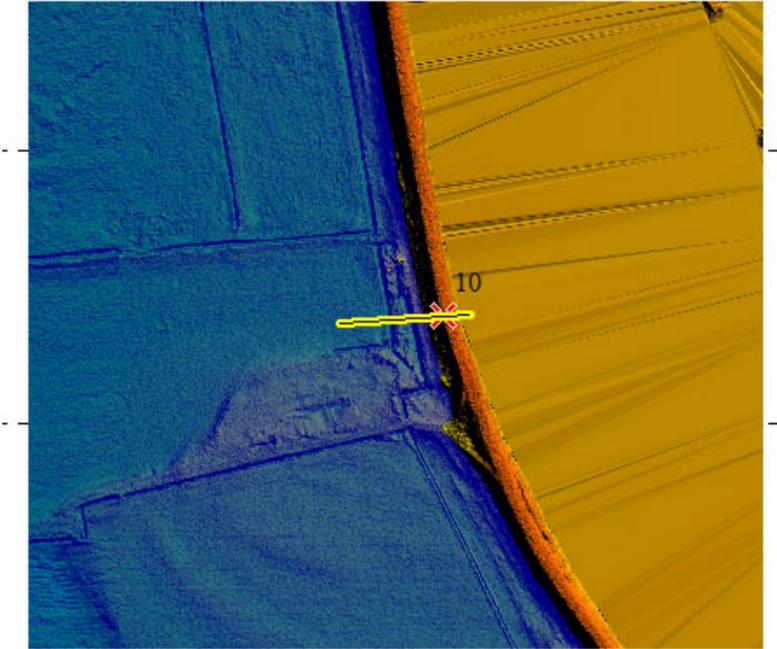
*Vertical Difference (Start to Finish): -15.1 ft*

*Minimum Elevation on Path: -11.292 ft*

*Maximum Elevation on Path: 11.677 ft*

*Azimuth: 87° 05' 16.1"*

*Slope/Tilt: 2.98°*



150 ft

125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 57' 38.9496" N, 121° 31' 59.6308" W  
 Elev: 11.69 ft, Dist: 232.43 ft

50 ft

100 ft

150 ft

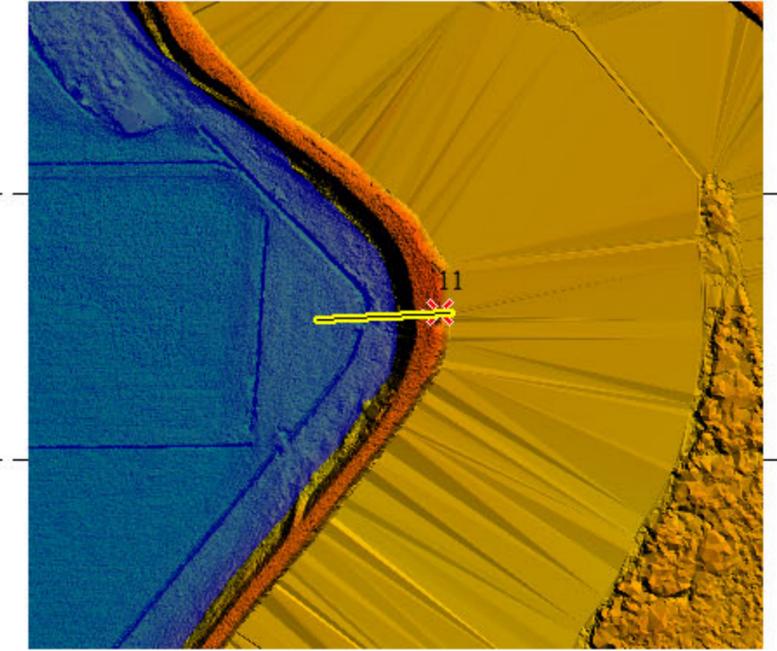
200 ft

250 ft

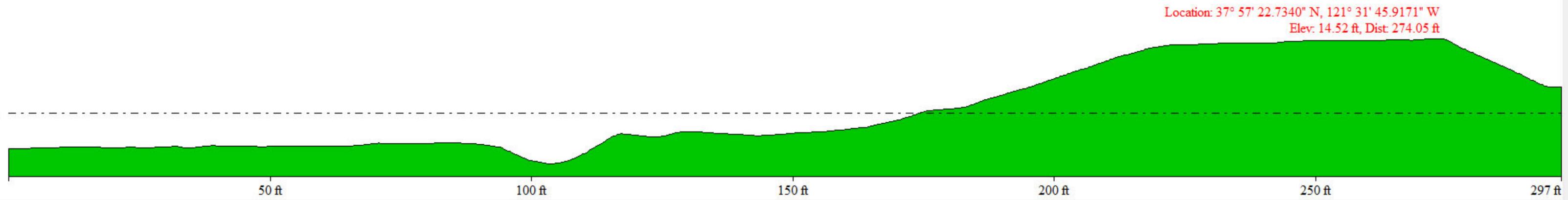
290 ft



Start Position: 37° 57' 22.6362" N, 121° 31' 49.3366" W  
Start Height: -6.763 ft  
End Position: 37° 57' 22.7422" N, 121° 31' 45.6311" W  
End Height: 5.159 ft  
Straight-Line Distance: 296.97 ft  
3D Distance on Surface: 303.74 ft  
Vertical Difference (Start to Finish): 11.9 ft  
Minimum Elevation on Path: -9.73 ft  
Maximum Elevation on Path: 14.387 ft  
Azimuth: 87° 55' 49.1"  
Slope/Tilt: 2.30°



150 ft  
125 ft  
100 ft  
75 ft  
50 ft  
25 ft  
0 ft



Start Position: 37° 57' 7.6137" N, 121° 32' 3.1018" W

Start Height: -11.737 ft

End Position: 37° 57' 6.4671" N, 121° 31' 59.7100" W

End Height: 3.565 ft

Straight-Line Distance: 295.39 ft

3D Distance on Surface: 301.13 ft

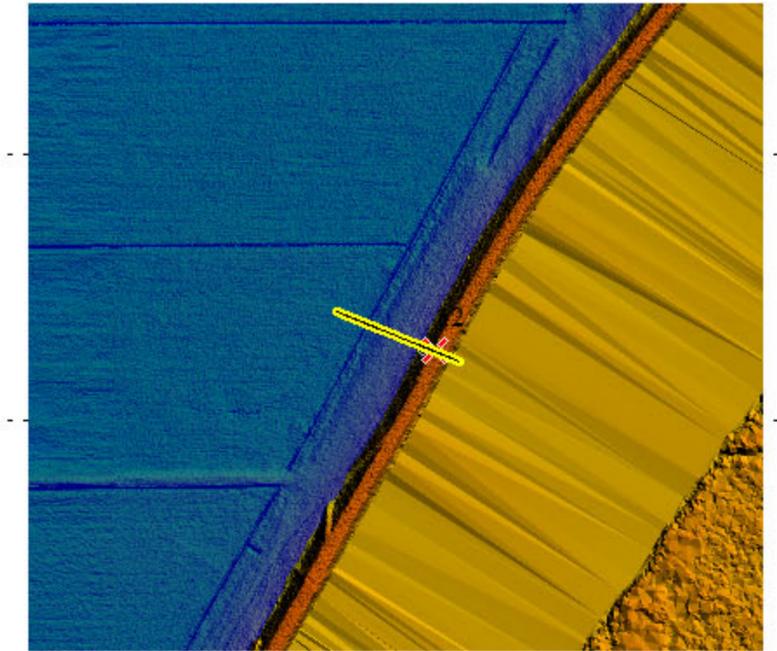
Vertical Difference (Start to Finish): 15.3 ft

Minimum Elevation on Path: -13.48 ft

Maximum Elevation on Path: 11.307 ft

Azimuth: 113° 07' 9.1"

Slope/Tilt: 2.97°



Location: 37° 57' 6.6975" N, 121° 32' 0.3917" W  
Elev: 10.97 ft, Dist: 236.02 ft

150 ft  
125 ft  
100 ft  
75 ft  
50 ft  
25 ft  
0 ft

50 ft

100 ft

150 ft

200 ft

250 ft

295 ft

Start Position: 37° 56' 48.2906" N, 121° 32' 10.9876" W

Start Height: -10.513 ft

End Position: 37° 56' 49.1885" N, 121° 32' 6.6418" W

End Height: 9.493 ft

Straight-Line Distance: 359.77 ft

3D Distance on Surface: 367.8 ft

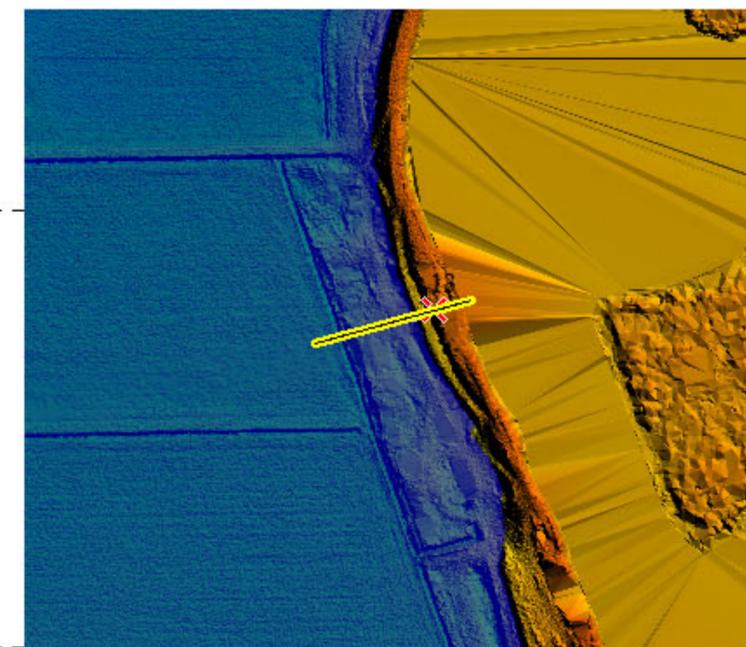
Vertical Difference (Start to Finish): 20.0 ft

Minimum Elevation on Path: -13.357 ft

Maximum Elevation on Path: 10.516 ft

Azimuth: 75° 22' 33.7"

Slope/Tilt: 3.18°



150 ft

100 ft

50 ft

0 ft

Location: 37° 56' 48.9800" N, 121° 32' 7.6513" W  
Elev: 9.94 ft, Dist: 276.2 ft

50 ft

100 ft

150 ft

200 ft

250 ft

300 ft

360 ft

*Start Position: 37° 56' 29.9112" N, 121° 32' 5.9667" W*

*Start Height: -9.109 ft*

*End Position: 37° 56' 29.9055" N, 121° 32' 2.4565" W*

*End Height: 4.319 ft*

*Straight-Line Distance: 281.19 ft*

*3D Distance on Surface: 287.3 ft*

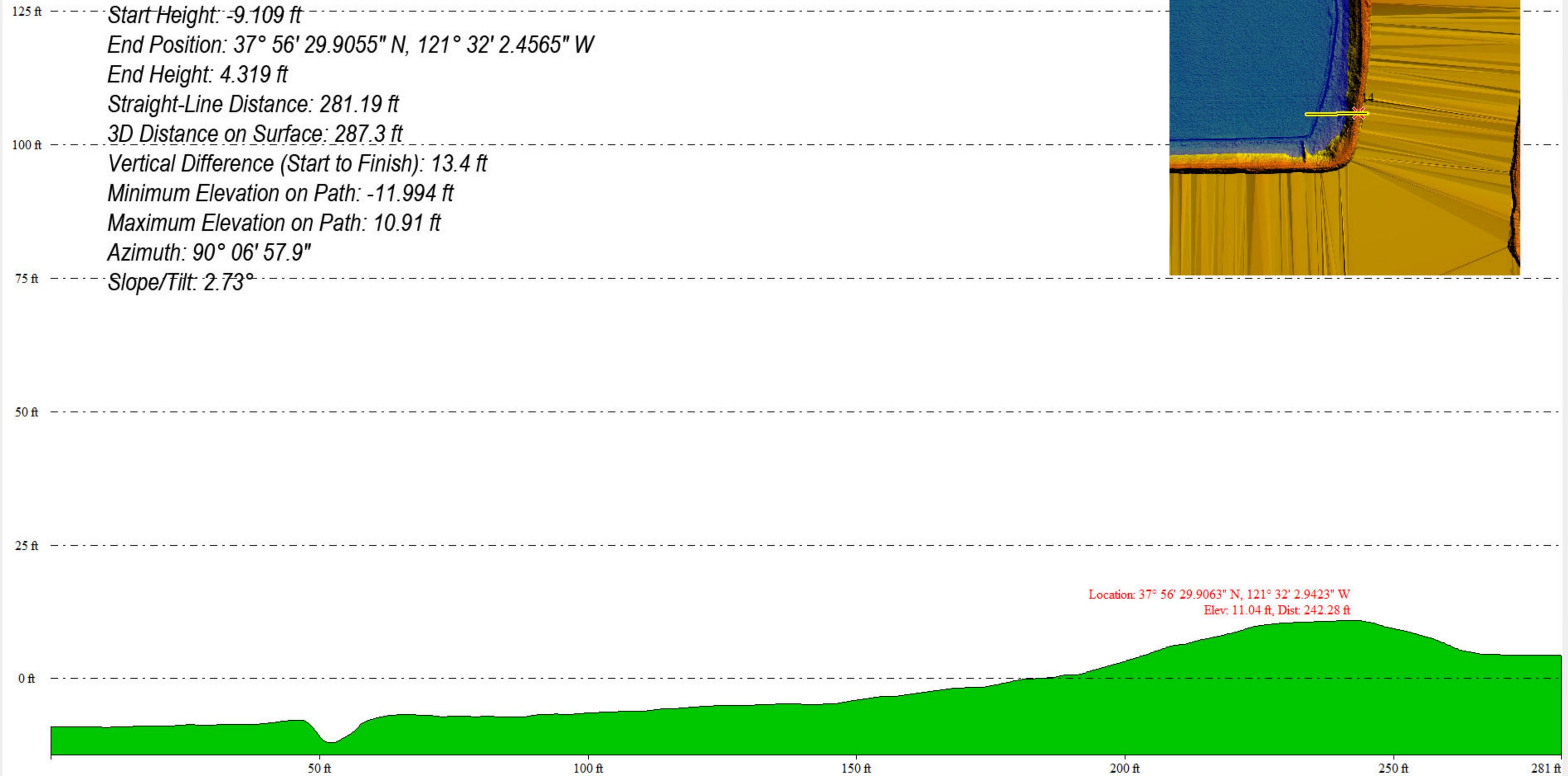
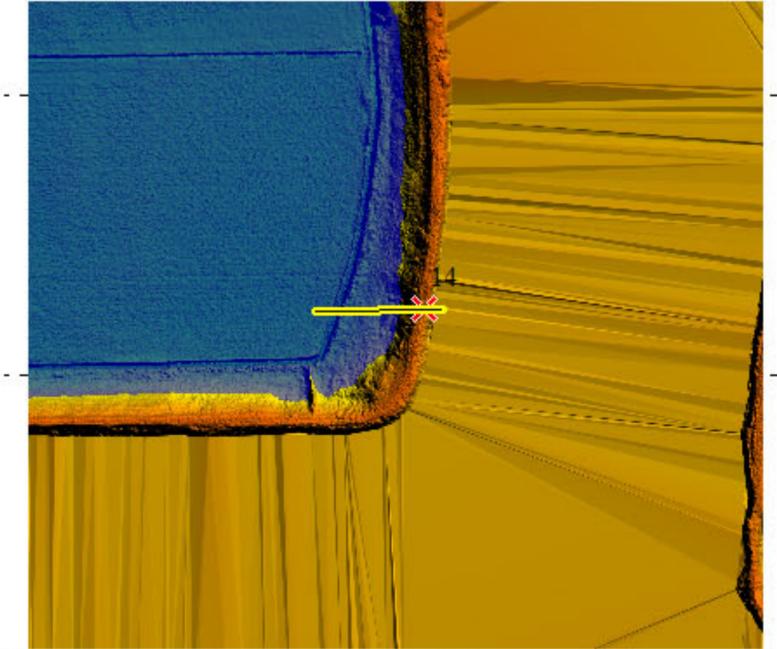
*Vertical Difference (Start to Finish): 13.4 ft*

*Minimum Elevation on Path: -11.994 ft*

*Maximum Elevation on Path: 10.91 ft*

*Azimuth: 90° 06' 57.9"*

*Slope/Tilt: 2.73°*



# Station 15

Start Position: 37° 56' 15.1460" N, 121° 32' 6.7887" W

Start Height: -11.47 ft

End Position: 37° 56' 16.5262" N, 121° 32' 1.4241" W

End Height: 4.636 ft

Straight-Line Distance: 451.88 ft

3D Distance on Surface: 462.16 ft

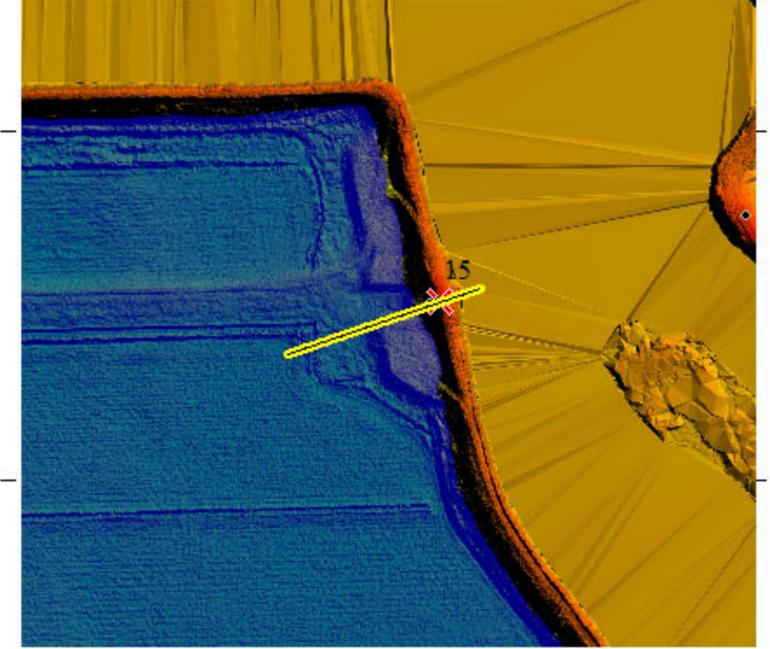
Vertical Difference (Start to Finish): 16.1 ft

Minimum Elevation on Path: -12.915 ft

Maximum Elevation on Path: 18.445 ft

Azimuth: 72° 00' 8.8"

Slope/Tilt: 2.04°



200 ft

150 ft

100 ft

50 ft

0 ft

Location: 37° 56' 16.2378" N, 121° 32' 2.5450" W  
Elev: 18.46 ft, Dist: 357.46 ft

50 ft

100 ft

150 ft

200 ft

250 ft

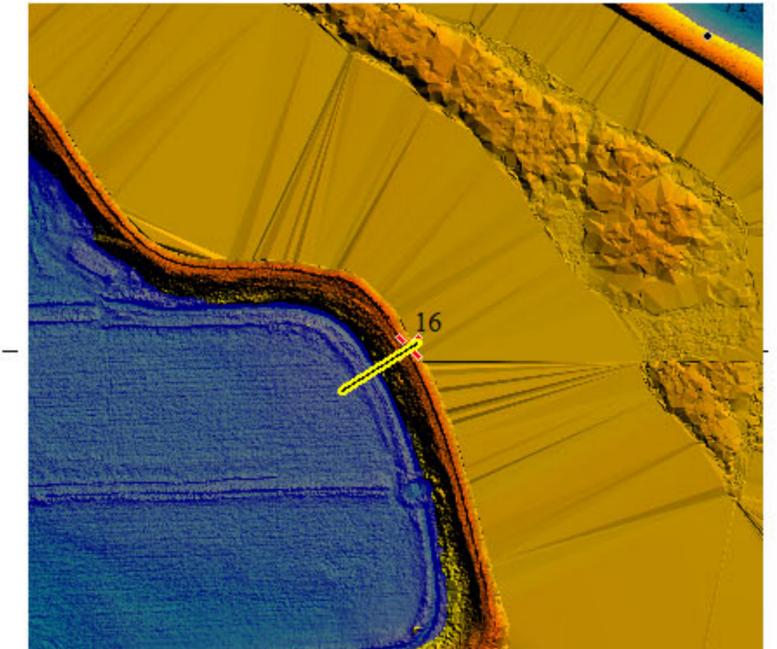
300 ft

350 ft

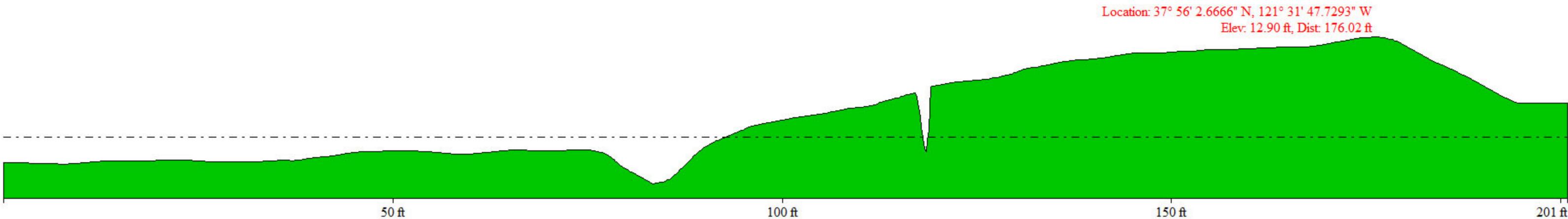
400 ft

452 ft

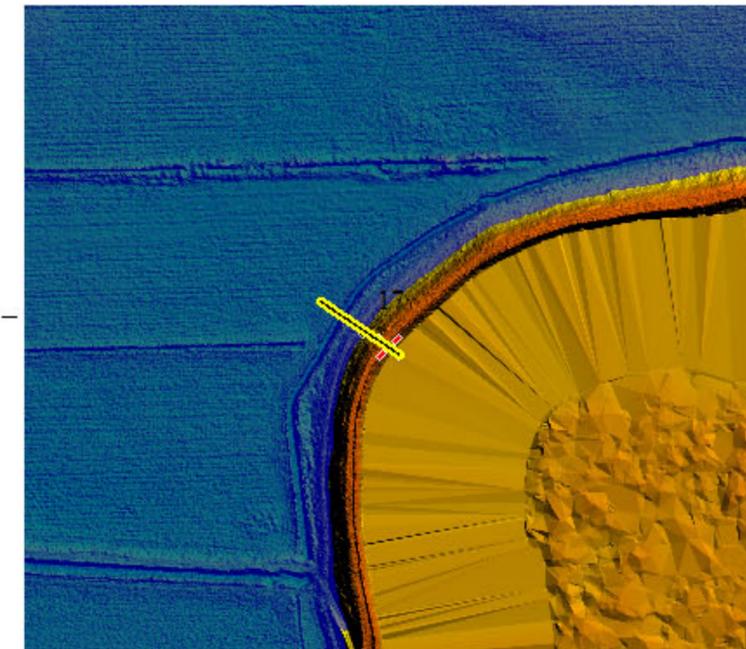
Start Position: 37° 56' 1.7556" N, 121° 31' 49.6013" W  
Start Height: -3.301 ft  
End Position: 37° 56' 2.7952" N, 121° 31' 47.4651" W  
End Height: 4.438 ft  
Straight-Line Distance: 200.87 ft  
3D Distance on Surface: 221.91 ft  
Vertical Difference (Start to Finish): 7.7 ft  
Minimum Elevation on Path: -5.985 ft  
Maximum Elevation on Path: 13.002 ft  
Azimuth: 58° 25' 56.4"  
Slope/Tilt: 2.21°



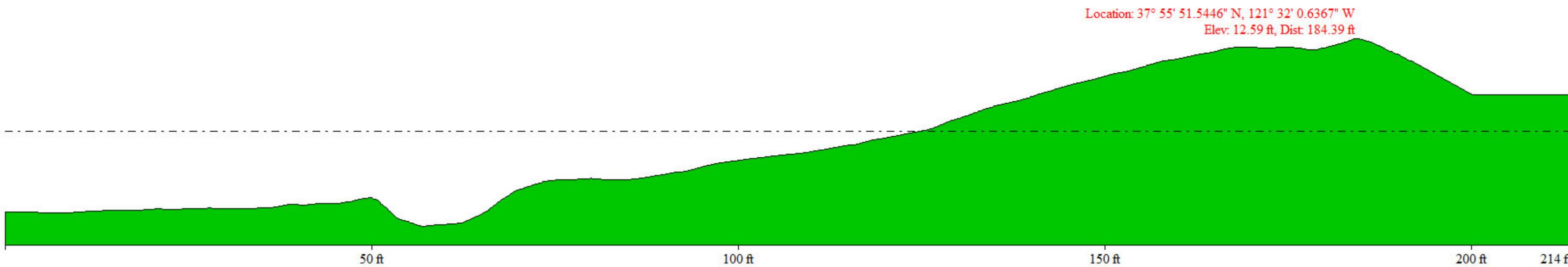
100 ft  
75 ft  
50 ft  
25 ft  
0 ft



Start Position: 37° 55' 52.5870" N, 121° 32' 2.5247" W  
Start Height: -11.114 ft  
End Position: 37° 55' 51.3792" N, 121° 32' 0.3371" W  
End Height: 4.992 ft  
Straight-Line Distance: 213.65 ft  
3D Distance on Surface: 220.8 ft  
Vertical Difference (Start to Finish): 16.1 ft  
Minimum Elevation on Path: -13.039 ft  
Maximum Elevation on Path: 12.727 ft  
Azimuth: 124° 52' 40.1"  
Slope/Tilt: 4.31°



100 ft  
75 ft  
50 ft  
25 ft  
0 ft



Start Position: 37° 55' 32.4054" N, 121° 32' 2.6371" W

Start Height: -10.713 ft

End Position: 37° 55' 32.3242" N, 121° 31' 59.1773" W

End Height: 5.051 ft

Straight-Line Distance: 277.34 ft

3D Distance on Surface: 282.58 ft

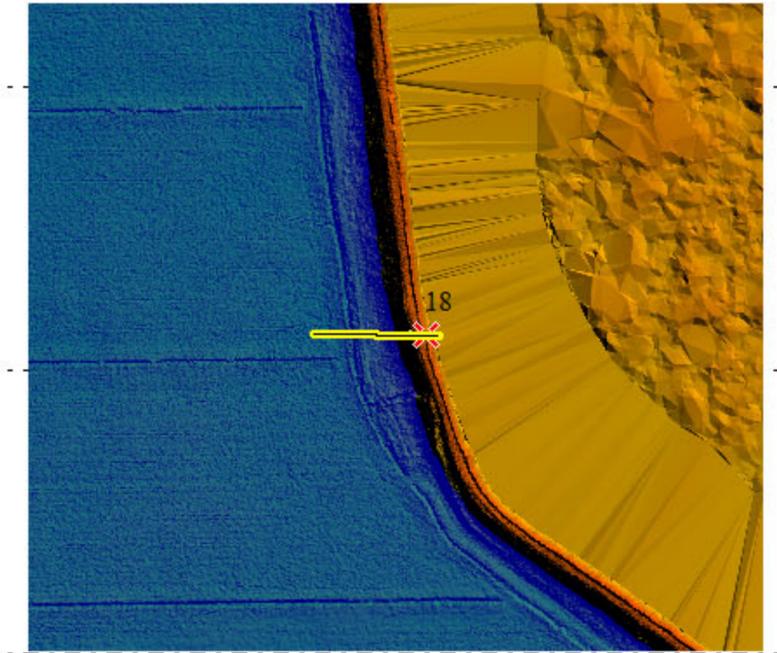
Vertical Difference (Start to Finish): 15.8 ft

Minimum Elevation on Path: -10.831 ft

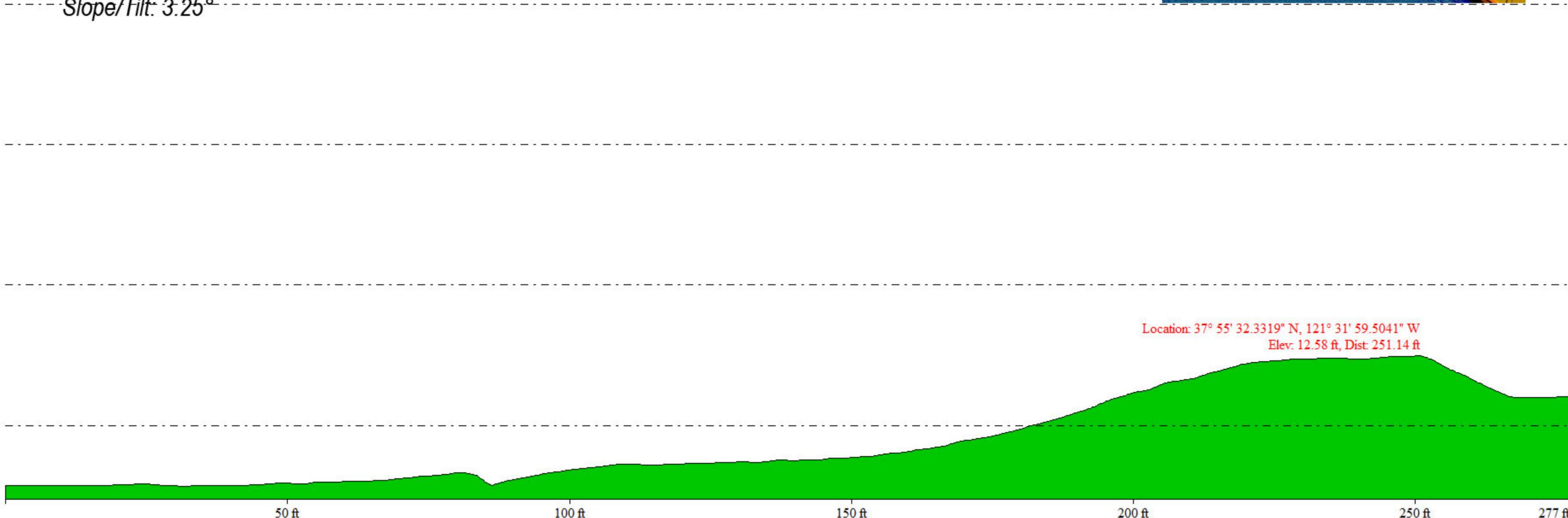
Maximum Elevation on Path: 12.407 ft

Azimuth: 91° 41' 48.7"

Slope/Tilt: 3.25°



125 ft  
100 ft  
75 ft  
50 ft  
25 ft  
0 ft



Start Position: 37° 55' 18.2969" N, 121° 31' 45.8995" W

Start Height: -7.481 ft

End Position: 37° 55' 18.9534" N, 121° 31' 43.5790" W

End Height: 4.787 ft

Straight-Line Distance: 197.45 ft

3D Distance on Surface: 202.58 ft

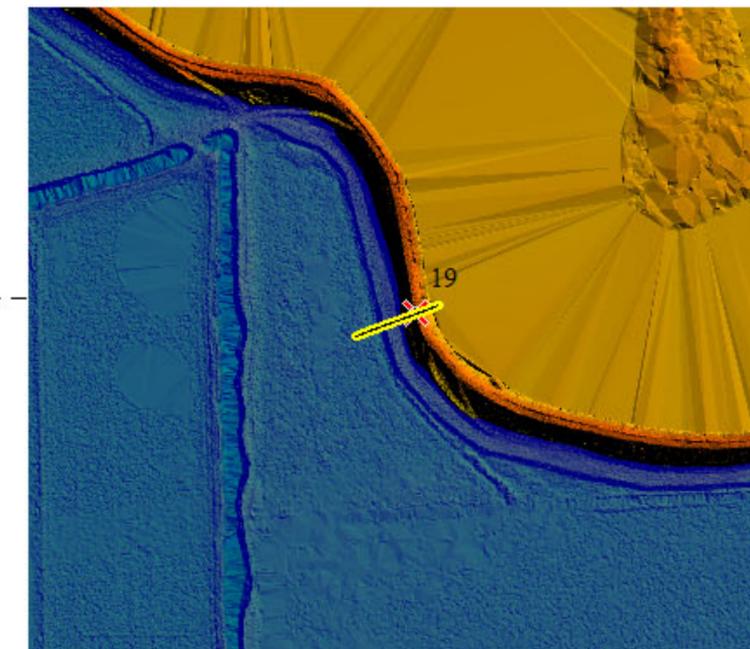
Vertical Difference (Start to Finish): 12.3 ft

Minimum Elevation on Path: -8.286 ft

Maximum Elevation on Path: 11.645 ft

Azimuth: 70° 20' 52.4"

Slope/Tilt: 3.56°



100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 55' 18.7734" N, 121° 31' 44.2153" W  
Elev: 11.66 ft, Dist: 143.3 ft

25 ft

50 ft

75 ft

100 ft

125 ft

150 ft

175 ft

197 ft

Start Position: 37° 55' 11.9340" N, 121° 31' 24.3461" W

Start Height: -8.11 ft

End Position: 37° 55' 13.5077" N, 121° 31' 22.2956" W

End Height: 4.832 ft

Straight-Line Distance: 228.77 ft

3D Distance on Surface: 233.06 ft

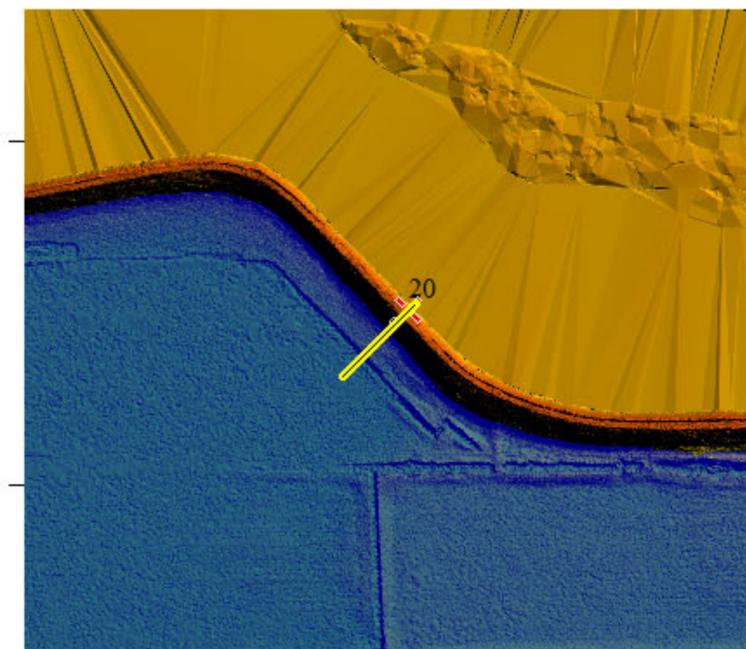
Vertical Difference (Start to Finish): 12.9 ft

Minimum Elevation on Path: -8.44 ft

Maximum Elevation on Path: 12.015 ft

Azimuth: 45° 54' 27.3"

Slope/Tilt: 3.24°



100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 55' 13.3475" N, 121° 31' 22.5043" W

Elev: 12.05 ft, Dist: 205.48 ft

50 ft

100 ft

150 ft

200 ft

229 ft

Start Position: 37° 55' 5.8523" N, 121° 31' 4.0378" W

Start Height: -5.708 ft

End Position: 37° 55' 5.7779" N, 121° 31' 1.1551" W

End Height: 5.378 ft

Straight-Line Distance: 231.12 ft

3D Distance on Surface: 236.68 ft

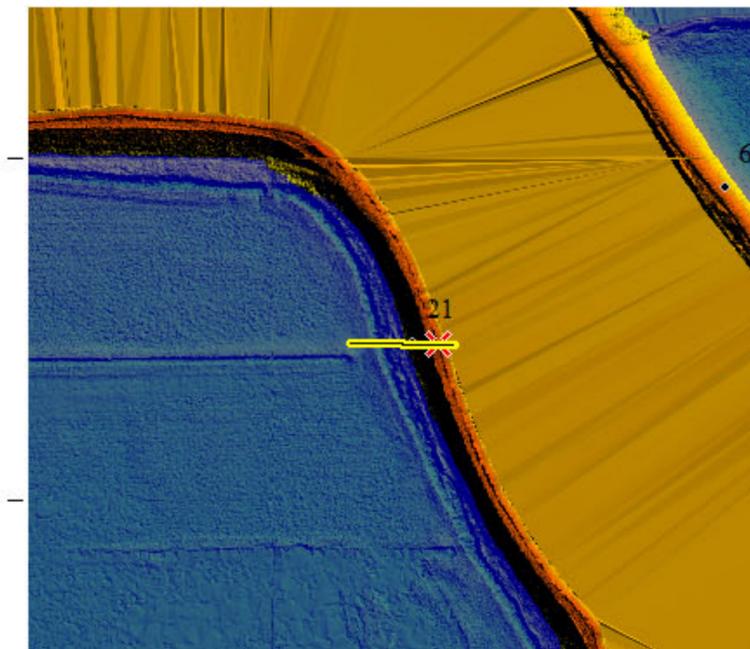
Vertical Difference (Start to Finish): 11.1 ft

Minimum Elevation on Path: -7.748 ft

Maximum Elevation on Path: 13.664 ft

Azimuth: 91° 51' 57.0"

Slope/Tilt: 2.75°



100 ft

75 ft

50 ft

25 ft

0 ft



Start Position: 37° 54' 55.3597" N, 121° 31' 5.4501" W

Start Height: -7.793 ft

End Position: 37° 54' 53.7281" N, 121° 31' 3.6943" W

End Height: 4.899 ft

Straight-Line Distance: 216.88 ft

3D Distance on Surface: 222.62 ft

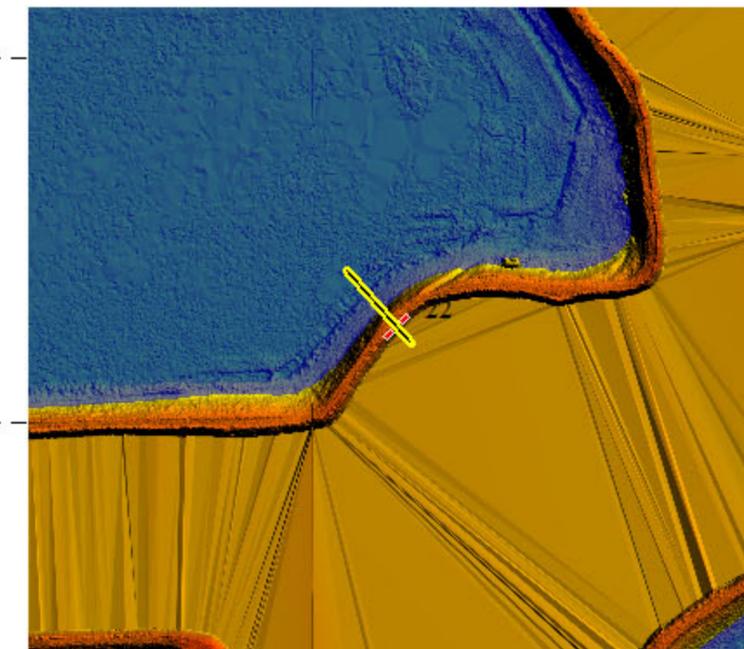
Vertical Difference (Start to Finish): -12.7 ft

Minimum Elevation on Path: -8.09 ft

Maximum Elevation on Path: 12.478 ft

Azimuth: 139° 33' 3.5"

Slope/Tilt: 3.35°



100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 54' 54.0951" N, 121° 31' 4.0893" W  
Elev: 12.29 ft, Dist: 168.09 ft

50 ft

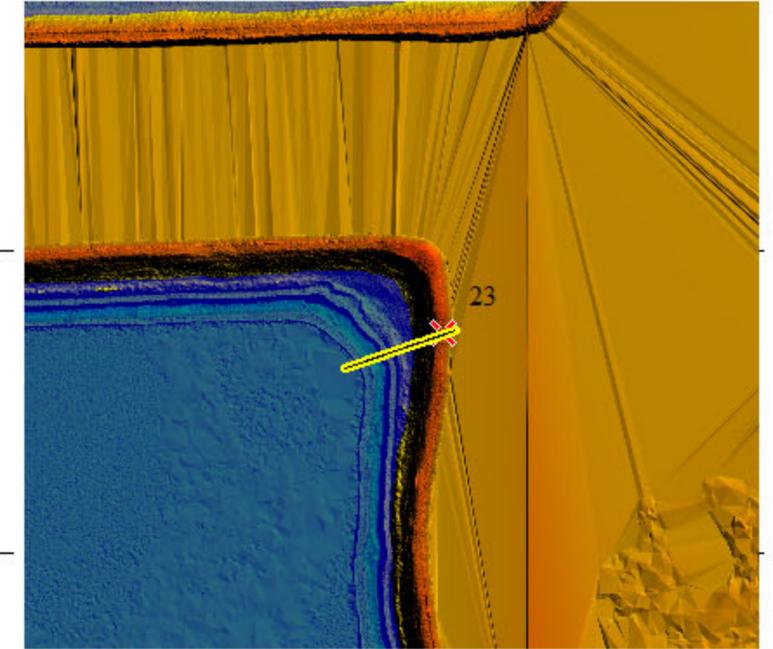
100 ft

150 ft

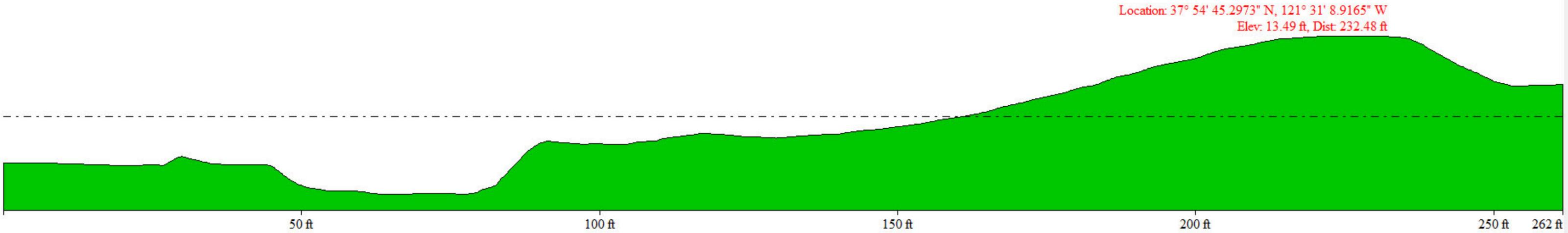
200 ft

217 ft

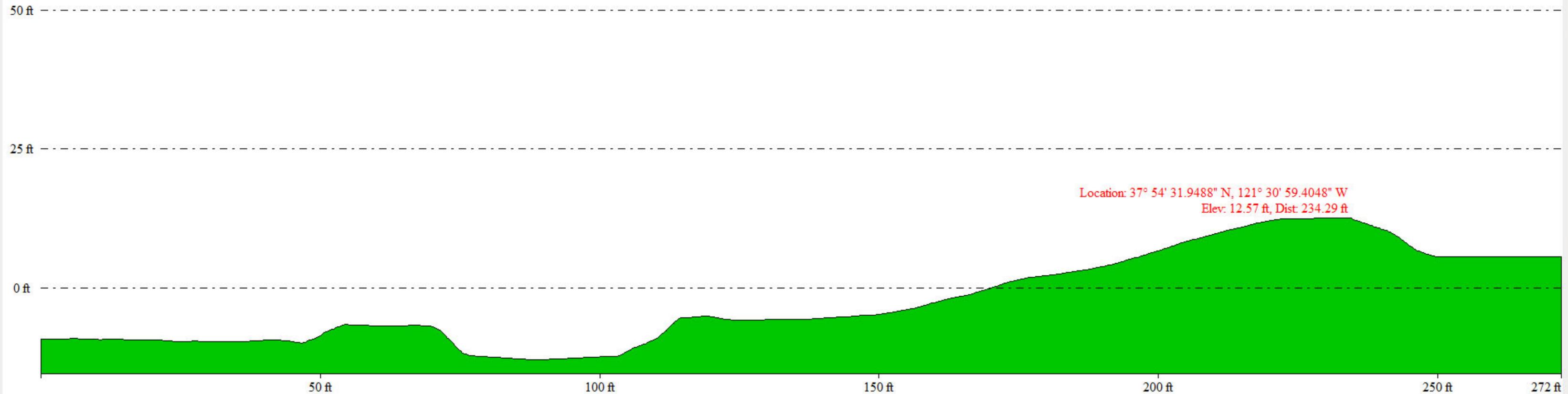
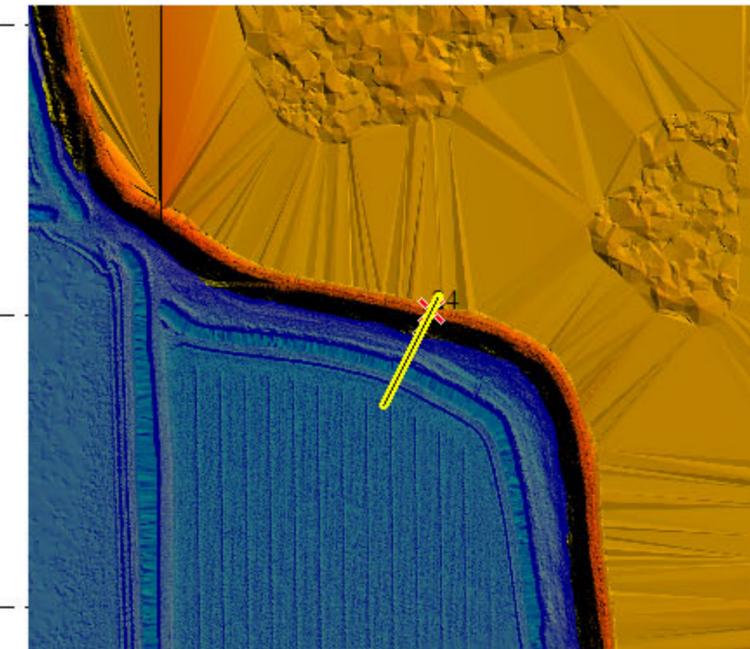
Start Position: 37° 54' 44.5849" N, 121° 31' 11.6746" W  
Start Height: -7.965 ft  
End Position: 37° 54' 45.3865" N, 121° 31' 8.5711" W  
End Height: 5.318 ft  
Straight-Line Distance: 261.6 ft  
3D Distance on Surface: 270.58 ft  
Vertical Difference (Start to Finish): 13.3 ft  
Minimum Elevation on Path: -13.23 ft  
Maximum Elevation on Path: 13.561 ft  
Azimuth: 71° 56' 37.7"  
Slope/Tilt: 2.91°



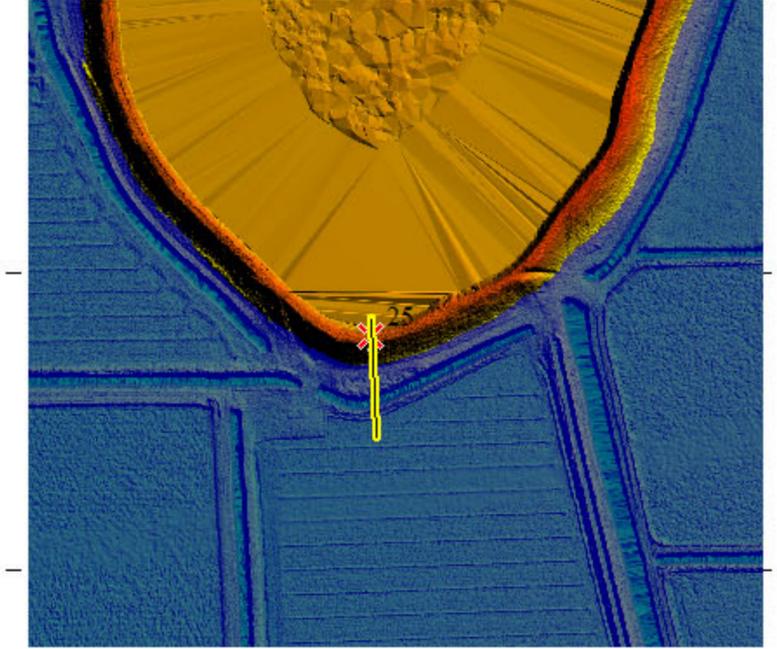
125 ft  
100 ft  
75 ft  
50 ft  
25 ft  
0 ft



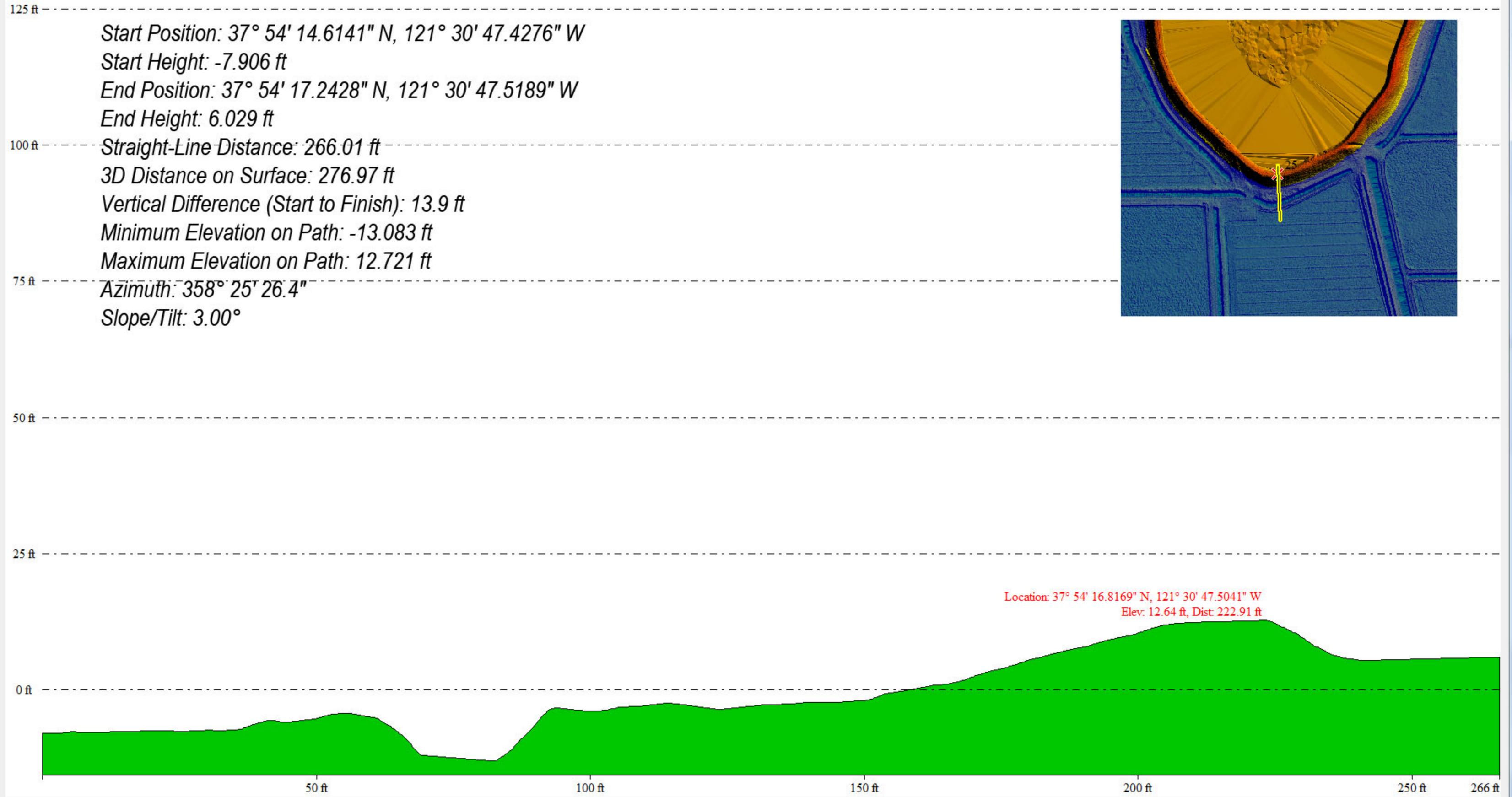
125 ft ---  
Start Position: 37° 54' 29.9006" N, 121° 31' 0.7700" W  
Start Height: -9.198 ft  
End Position: 37° 54' 32.2798" N, 121° 30' 59.1842" W  
End Height: 5.577 ft  
100 ft ---  
Straight-Line Distance: 272.15 ft  
3D Distance on Surface: 280.99 ft  
Vertical Difference (Start to Finish): 14.8 ft  
Minimum Elevation on Path: -12.941 ft  
Maximum Elevation on Path: 12.61 ft  
75 ft ---  
Azimuth: 27° 50' 20.5"  
Slope/Tilt: 3.11°



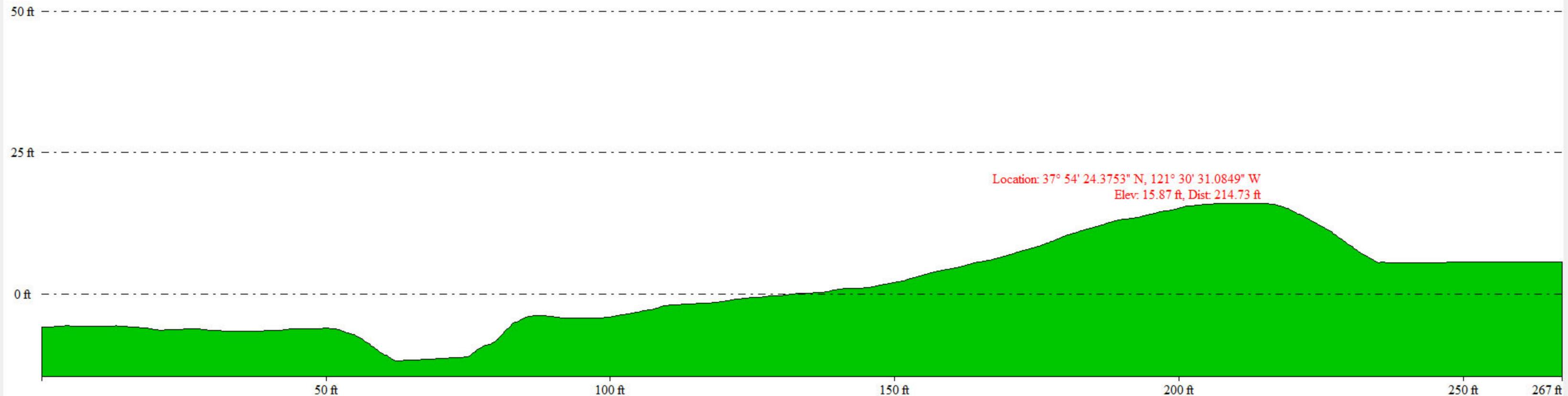
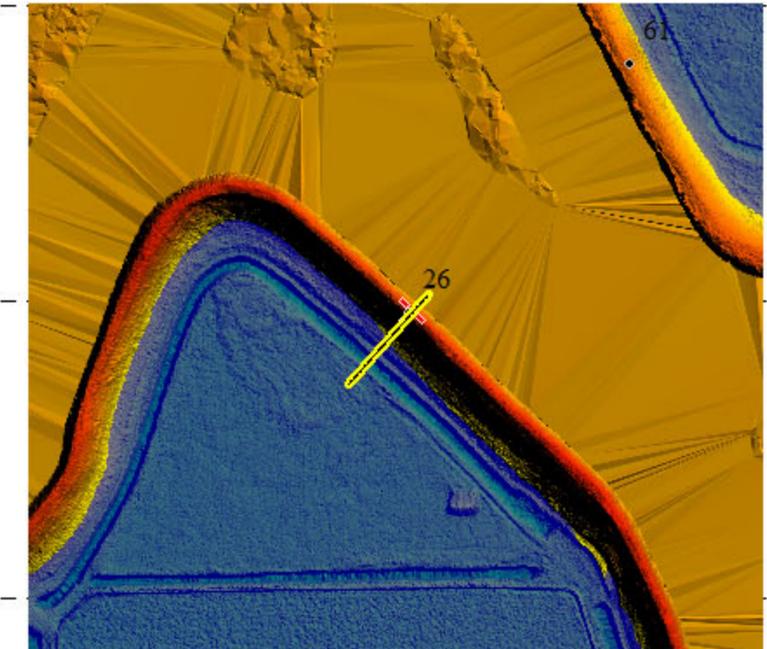
Start Position: 37° 54' 14.6141" N, 121° 30' 47.4276" W  
Start Height: -7.906 ft  
End Position: 37° 54' 17.2428" N, 121° 30' 47.5189" W  
End Height: 6.029 ft  
Straight-Line Distance: 266.01 ft  
3D Distance on Surface: 276.97 ft  
Vertical Difference (Start to Finish): 13.9 ft  
Minimum Elevation on Path: -13.083 ft  
Maximum Elevation on Path: 12.721 ft  
Azimuth: 358° 25' 26.4"  
Slope/Tilt: 3.00°



Location: 37° 54' 16.8169" N, 121° 30' 47.5041" W  
Elev: 12.64 ft, Dist: 222.91 ft



125 ft -----  
Start Position: 37° 54' 22.8080" N, 121° 30' 32.8920" W  
Start Height: -5.872 ft  
End Position: 37° 54' 24.7597" N, 121° 30' 30.6417" W  
End Height: 5.64 ft  
100 ft -----  
Straight-Line Distance: 267.4 ft  
3D Distance on Surface: 276.67 ft  
Vertical Difference (Start to Finish): 11.5 ft  
Minimum Elevation on Path: -11.826 ft  
Maximum Elevation on Path: 16.085 ft  
75 ft -----  
Azimuth: 42° 24' 45.2"  
Slope/Tilt: 2.47°



125 ft

*Start Position: 37° 54' 8.7269" N, 121° 30' 15.5863" W*

*Start Height: -6.813 ft*

*End Position: 37° 54' 11.1997" N, 121° 30' 15.3920" W*

*End Height: 4.749 ft*

*Straight-Line Distance: 250.62 ft*

*3D Distance on Surface: 260.98 ft*

*Vertical Difference (Start to Finish): 11.6 ft*

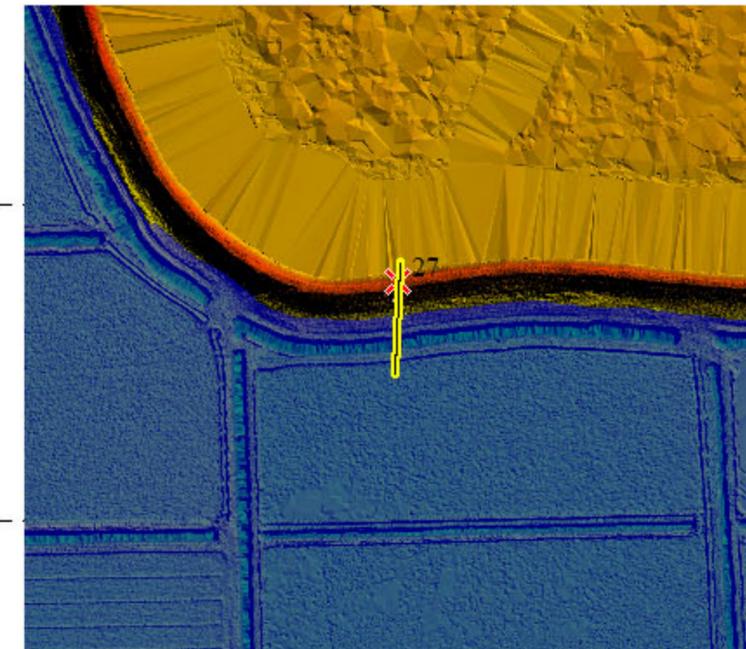
*Minimum Elevation on Path: -12.062 ft*

*Maximum Elevation on Path: 14.379 ft*

*Azimuth: 3° 33' 41.4"*

*Slope/Tilt: 2.64°*

100 ft



75 ft

50 ft

25 ft

0 ft

Location: 37° 54' 10.7545" N, 121° 30' 15.4270" W  
Elev. 14.42 ft, Dist. 205.5 ft

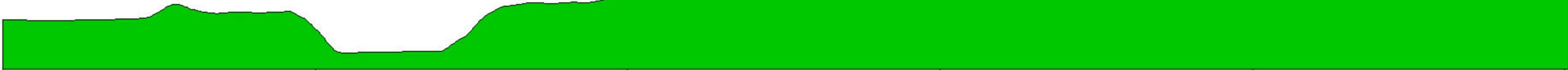
50 ft

100 ft

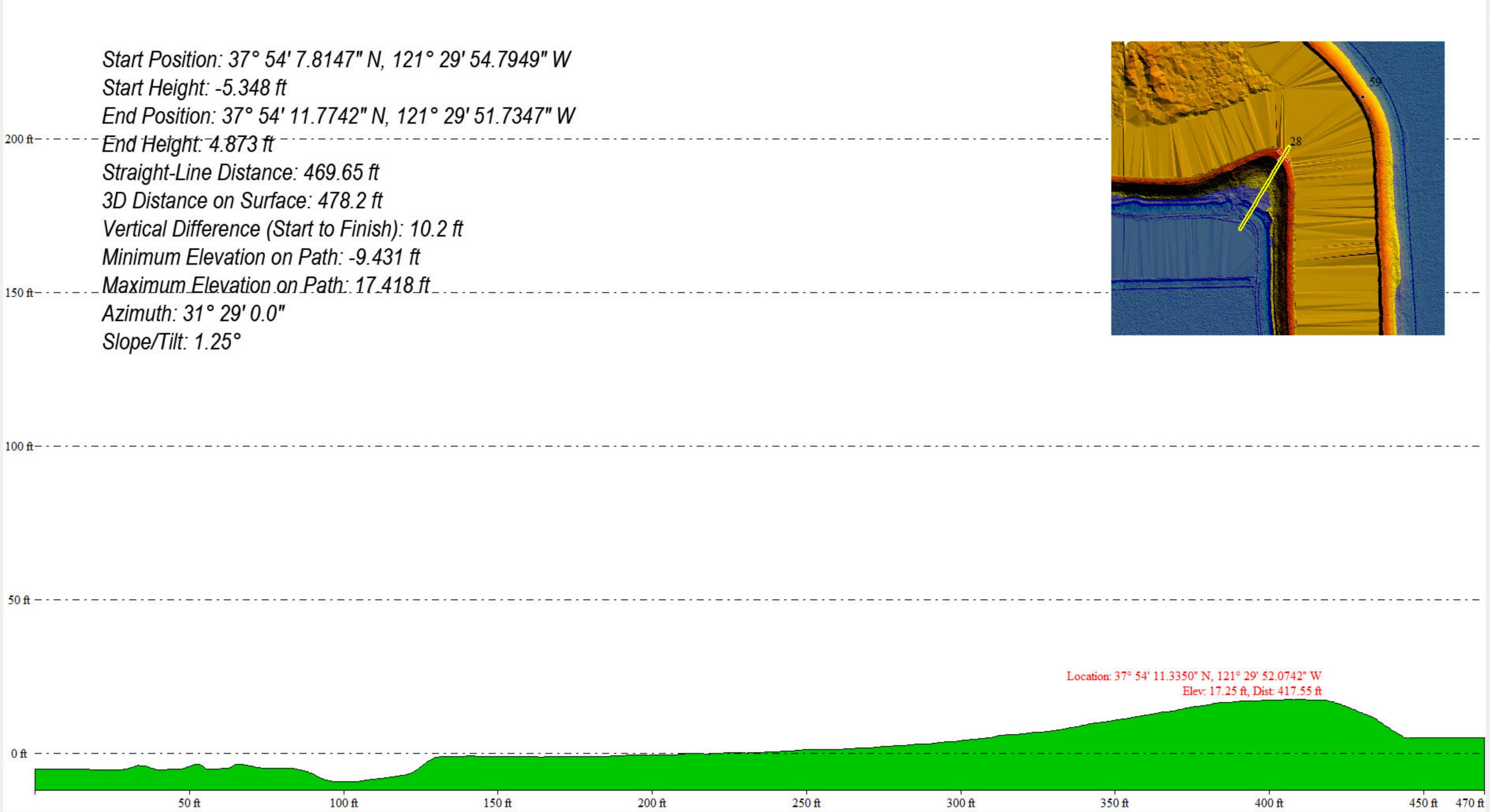
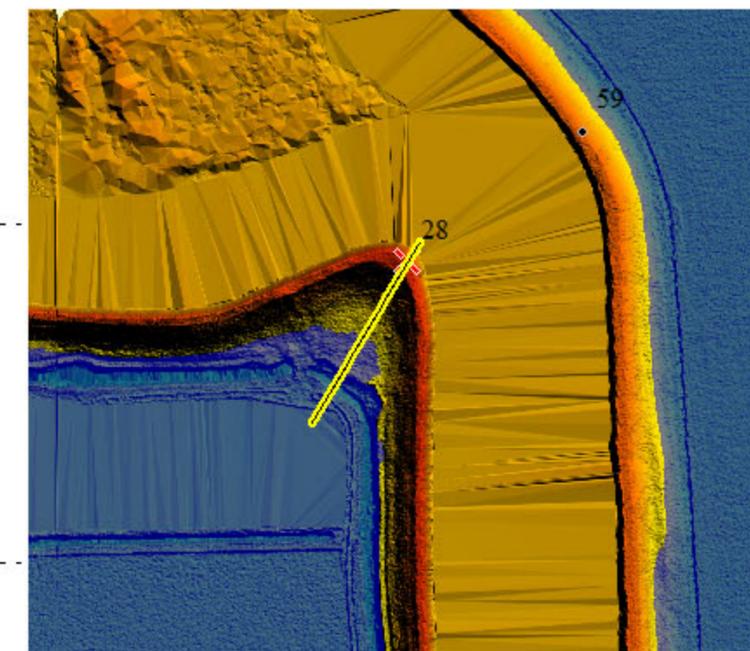
150 ft

200 ft

251 ft



Start Position: 37° 54' 7.8147" N, 121° 29' 54.7949" W  
Start Height: -5.348 ft  
End Position: 37° 54' 11.7742" N, 121° 29' 51.7347" W  
End Height: 4.873 ft  
Straight-Line Distance: 469.65 ft  
3D Distance on Surface: 478.2 ft  
Vertical Difference (Start to Finish): 10.2 ft  
Minimum Elevation on Path: -9.431 ft  
Maximum Elevation on Path: 17.418 ft  
Azimuth: 31° 29' 0.0"  
Slope/Tilt: 1.25°



Start Position: 37° 53' 50.1130" N, 121° 29' 49.2917" W

Start Height: -7.055 ft

End Position: 37° 53' 52.8639" N, 121° 29' 47.0251" W

End Height: 4.302 ft

Straight-Line Distance: 332.33 ft

3D Distance on Surface: 338.99 ft

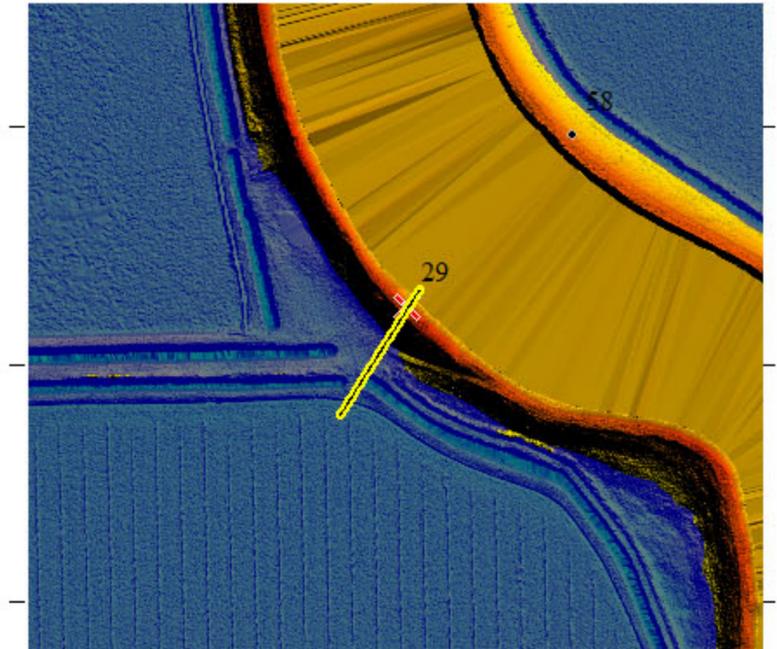
Vertical Difference (Start to Finish): 11.4 ft

Minimum Elevation on Path: -8.493 ft

Maximum Elevation on Path: 15.686 ft

Azimuth: 33°-08' 23.6"

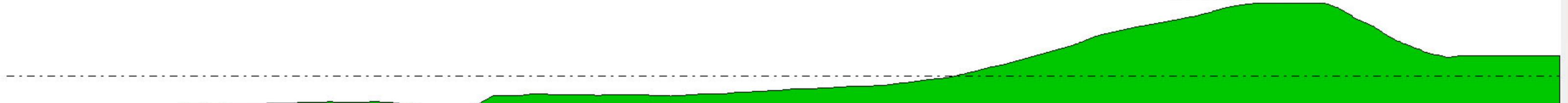
Slope/Tilt: 1.96°



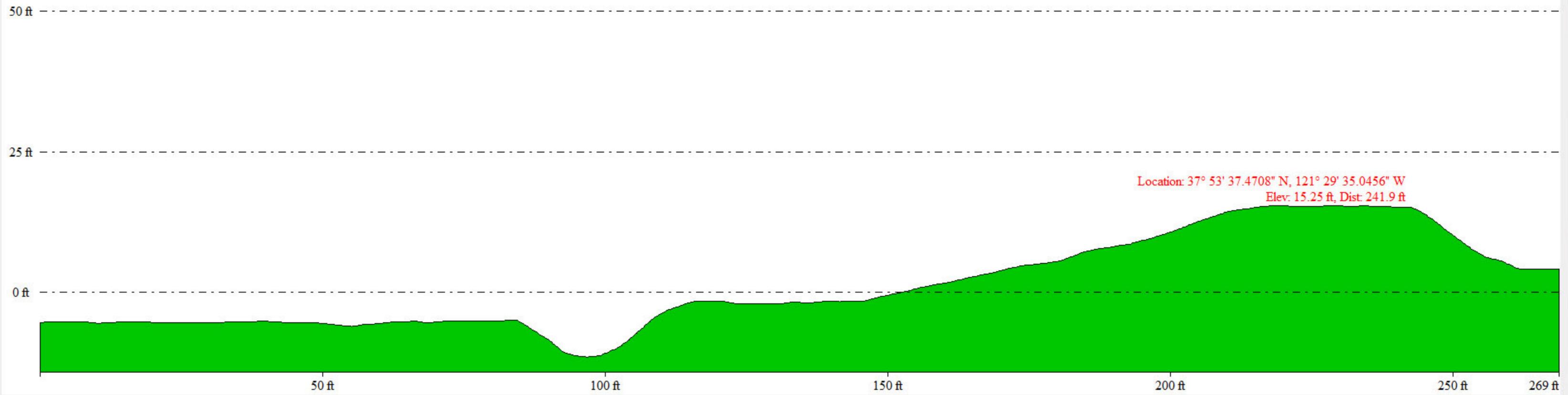
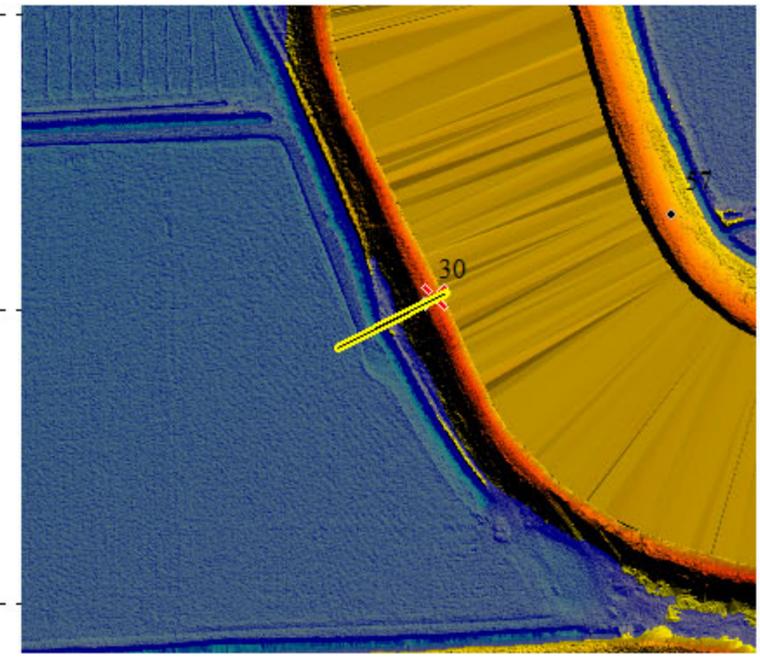
175 ft  
150 ft  
125 ft  
100 ft  
75 ft  
50 ft  
25 ft  
0 ft

50 ft 100 ft 150 ft 200 ft 250 ft 300 ft 332 ft

Location: 37° 53' 52.4408" N, 121° 29' 47.3738" W  
Elev: 15.83 ft, Dist: 281.21 ft



125 ft ---  
Start Position: 37° 53' 36.4085" N, 121° 29' 37.7492" W  
Start Height: -5.353 ft  
End Position: 37° 53' 37.5887" N, 121° 29' 34.7457" W  
End Height: 4.094 ft  
Straight-Line Distance: 268.72 ft  
100 ft ---  
3D Distance on Surface: 279.08 ft  
Vertical Difference (Start to Finish): 9.4 ft  
Minimum Elevation on Path: -11.519 ft  
Maximum Elevation on Path: 15.421 ft  
75 ft ---  
Azimuth: 63° 37' 32.4"  
Slope/Tilt: 2.01°



*Start Position: 37° 53' 24.4152" N, 121° 29' 29.0079" W*

*Start Height: -4.709 ft*

*End Position: 37° 53' 24.1431" N, 121° 29' 25.6018" W*

*End Height: 4.091 ft*

*Straight-Line Distance: 274.43 ft*

*3D Distance on Surface: 283.53 ft*

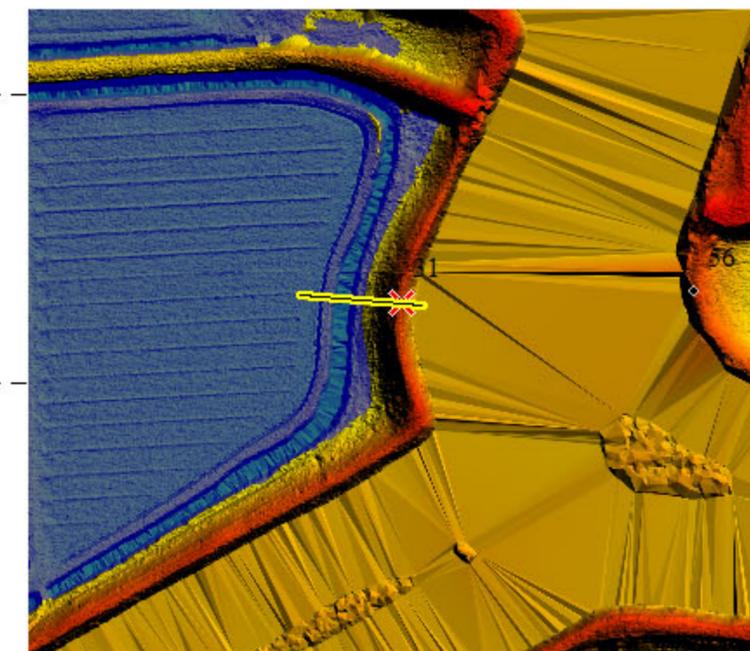
*Vertical Difference (Start to Finish): 8.8 ft*

*Minimum Elevation on Path: -9.106 ft*

*Maximum Elevation on Path: 14.94 ft*

*Azimuth: 95° 45' 25.4"*

*Slope/Tilt: 1.84°*



125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 53' 24.1890" N, 121° 29' 26.1760" W  
Elev: 14.78 ft, Dist: 228.17 ft

50 ft

100 ft

150 ft

200 ft

250 ft

274 ft

Start Position: 37° 53' 14.1283" N, 121° 29' 49.4468" W

Start Height: -4.286 ft

End Position: 37° 53' 11.5530" N, 121° 29' 47.5772" W

End Height: 4.443 ft

Straight-Line Distance: 300.54 ft

3D Distance on Surface: 313.3 ft

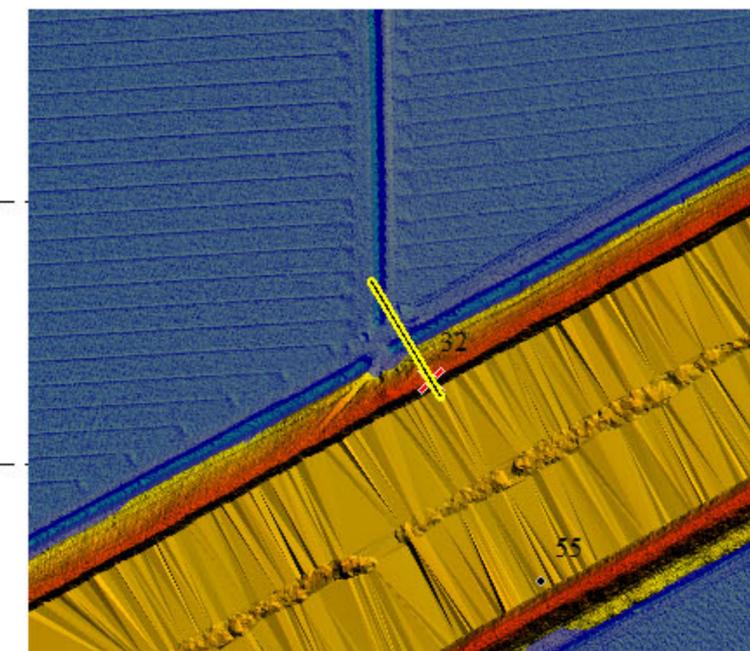
Vertical Difference (Start to Finish): 8.7 ft

Minimum Elevation on Path: -11.235 ft

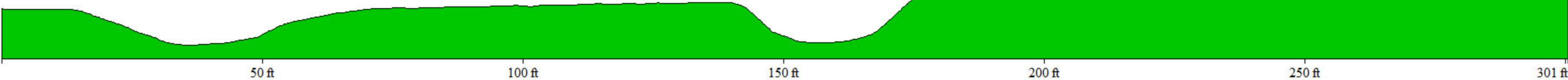
Maximum Elevation on Path: 15.267 ft

Azimuth: 150° 05' 6.9"

Slope/Tilt: 1.66°

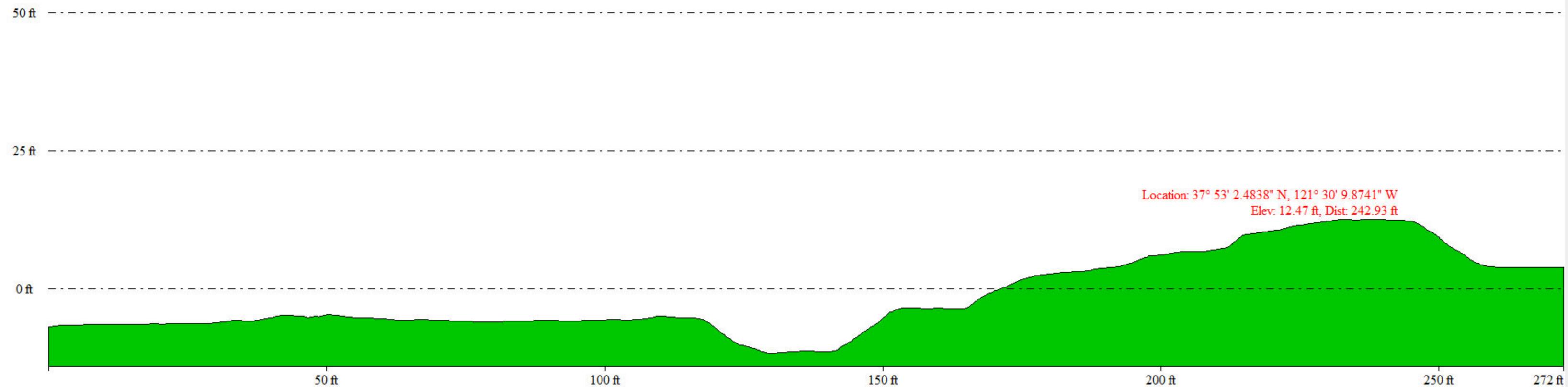
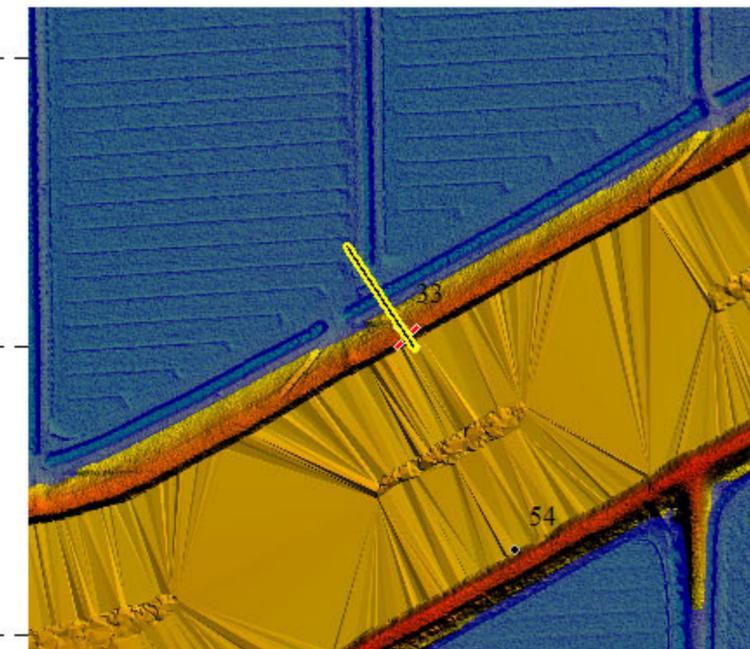


150 ft  
125 ft  
100 ft  
75 ft  
50 ft  
25 ft  
0 ft



Location: 37° 53' 11.9042" N, 121° 29' 47.8322" W  
Elev: 15.14 ft, Dist: 259.55 ft

125 ft ----- *Start Position: 37° 53' 4.5083" N, 121° 30' 11.5043" W*  
*Start Height: -6.842 ft*  
*End Position: 37° 53' 2.2382" N, 121° 30' 9.6764" W*  
*End Height: 3.943 ft*  
*Straight-Line Distance: 272.4 ft*  
100 ft ----- *3D Distance on Surface: 282.46 ft*  
*Vertical Difference (Start to Finish): 10.8 ft*  
*Minimum Elevation on Path: -11.591 ft*  
*Maximum Elevation on Path: 12.611 ft*  
75 ft ----- *Azimuth: 147° 27' 14.0"*  
*Slope/Tilt: 2.27°*



Start Position: 37° 52' 58.3226" N, 121° 30' 34.2116" W

Start Height: -6.425 ft

End Position: 37° 52' 56.7410" N, 121° 30' 32.6099" W

End Height: 3.675 ft

Straight-Line Distance: 205.15 ft

3D Distance on Surface: 215.01 ft

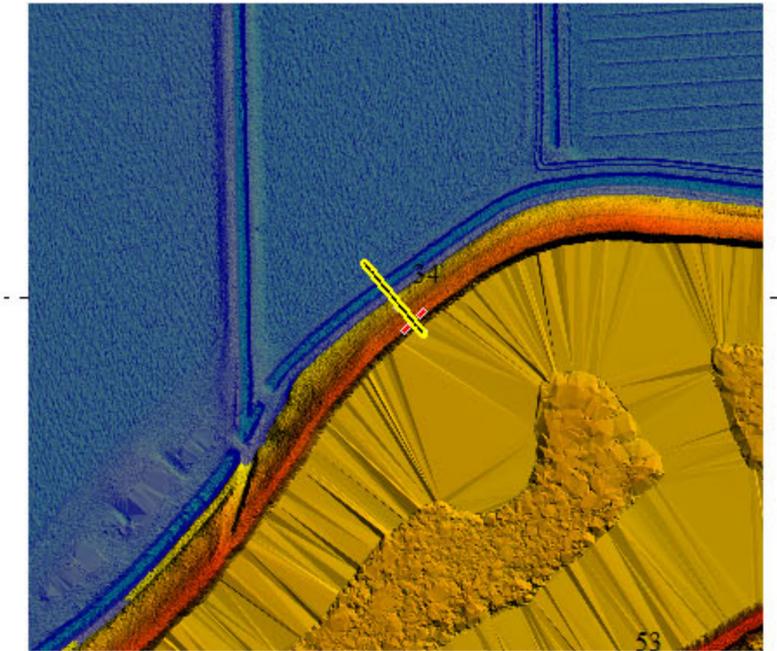
Vertical Difference (Start to Finish): 10.1 ft

Minimum Elevation on Path: -11.149 ft

Maximum Elevation on Path: 13.138 ft

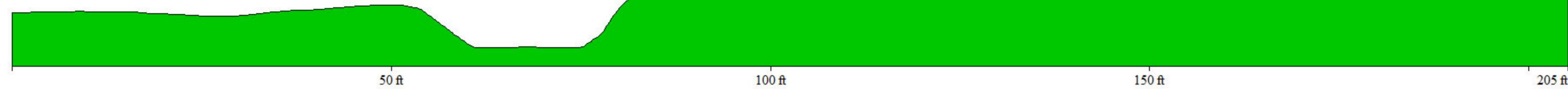
Azimuth: 141° 14' 51.1"

Slope/Tilt: 2.82°



100 ft  
75 ft  
50 ft  
25 ft  
0 ft

Location: 37° 52' 56.9920" N, 121° 30' 32.8641" W  
Elev: 13.23 ft, Dist: 172.59 ft



Start Position: 37° 52' 46.7204" N, 121° 30' 53.2792" W

Start Height: -7.591 ft

End Position: 37° 52' 44.4934" N, 121° 30' 51.8345" W

End Height: 3.737 ft

Straight-Line Distance: 253.3 ft

3D Distance on Surface: 263.3 ft

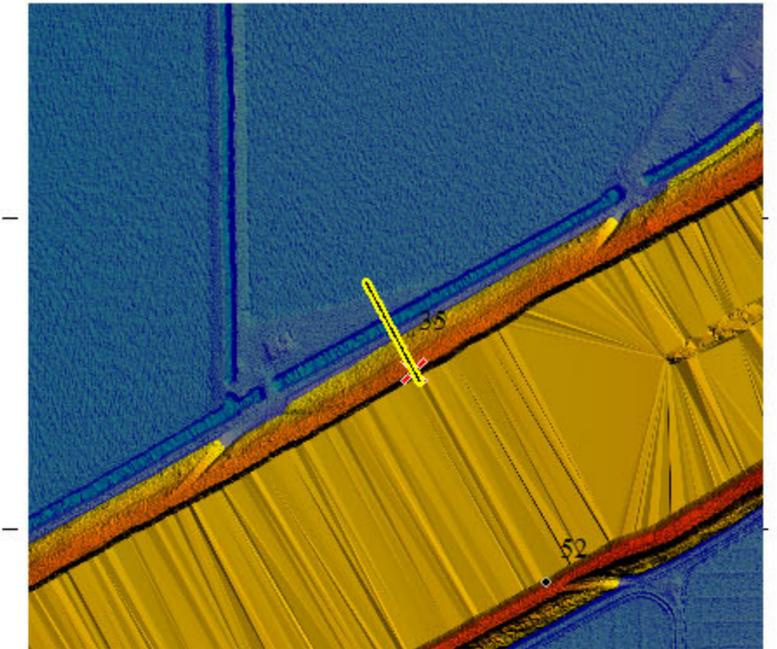
Vertical Difference (Start to Finish): 11.3 ft

Minimum Elevation on Path: -12.526 ft

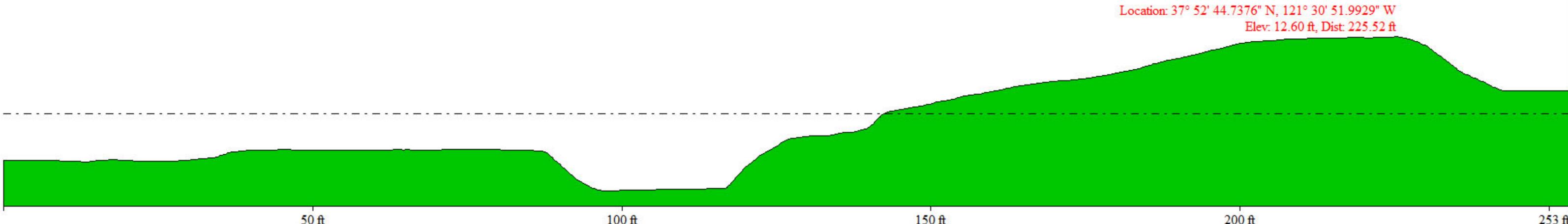
Maximum Elevation on Path: 12.555 ft

Azimuth: 152° 47' 17.9"

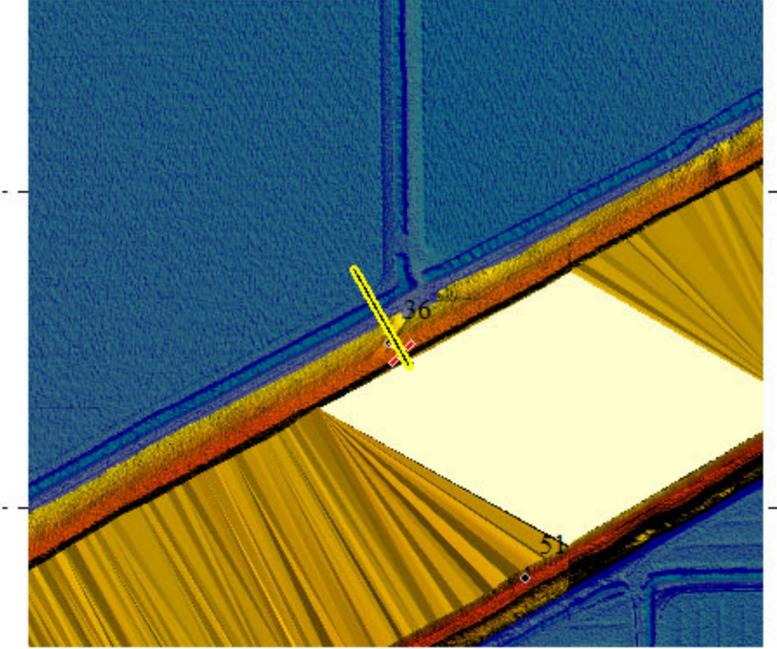
Slope/Tilt: 2.56°



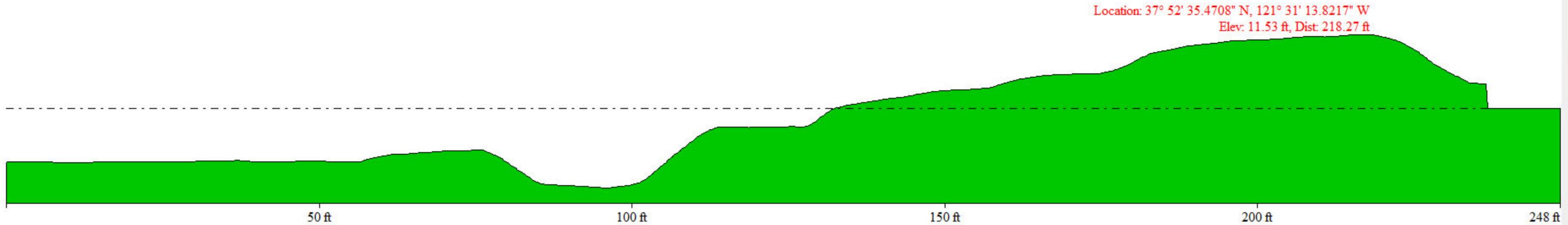
125 ft  
100 ft  
75 ft  
50 ft  
25 ft  
0 ft



Start Position: 37° 52' 37.3610" N, 121° 31' 15.1347" W  
Start Height: -8.727 ft  
End Position: 37° 52' 35.2097" N, 121° 31' 13.6403" W  
End Height: 0 ft  
Straight-Line Distance: 248.42 ft  
3D Distance on Surface: 261.24 ft  
Vertical Difference (Start to Finish): 8.7 ft  
Minimum Elevation on Path: -12.869 ft  
Maximum Elevation on Path: 11.867 ft  
Azimuth: 151° 09' 48.2"  
Slope/Tilt: 2.01°



125 ft  
100 ft  
75 ft  
50 ft  
25 ft  
0 ft



150 ft

Start Position: 37° 52' 28.3111" N, 121° 31' 37.4629" W

Start Height: -7.851 ft

End Position: 37° 52' 25.7386" N, 121° 31' 35.7847" W

End Height: 4.258 ft

Straight-Line Distance: 292.95 ft

3D Distance on Surface: 301.83 ft

Vertical Difference (Start to Finish): 12.1 ft

Minimum Elevation on Path: -12.387 ft

Maximum Elevation on Path: 12.695 ft

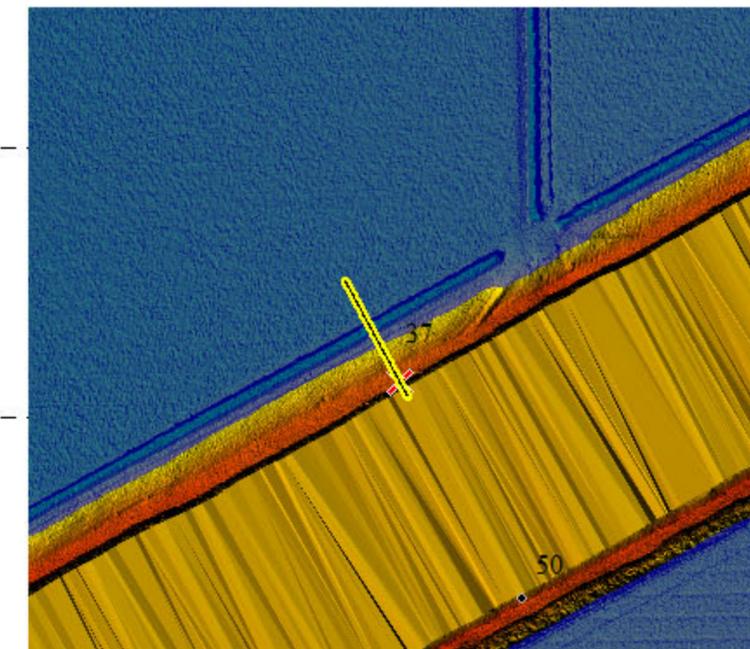
Azimuth: 152° 39' 16.8"

Slope/Tilt: 2.37°

125 ft

100 ft

75 ft



50 ft

25 ft

0 ft

Location: 37° 52' 26.0600" N, 121° 31' 35.9943" W  
Elev: 12.59 ft, Dist: 256.35 ft

50 ft

100 ft

150 ft

200 ft

250 ft

293 ft



*Start Position: 37° 52' 18.7185" N, 121° 31' 59.1279" W*

*Start Height: -5.977 ft*

*End Position: 37° 52' 16.5697" N, 121° 31' 57.8254" W*

*End Height: 4.562 ft*

*Straight-Line Distance: 241.15 ft*

*3D Distance on Surface: 253.49 ft*

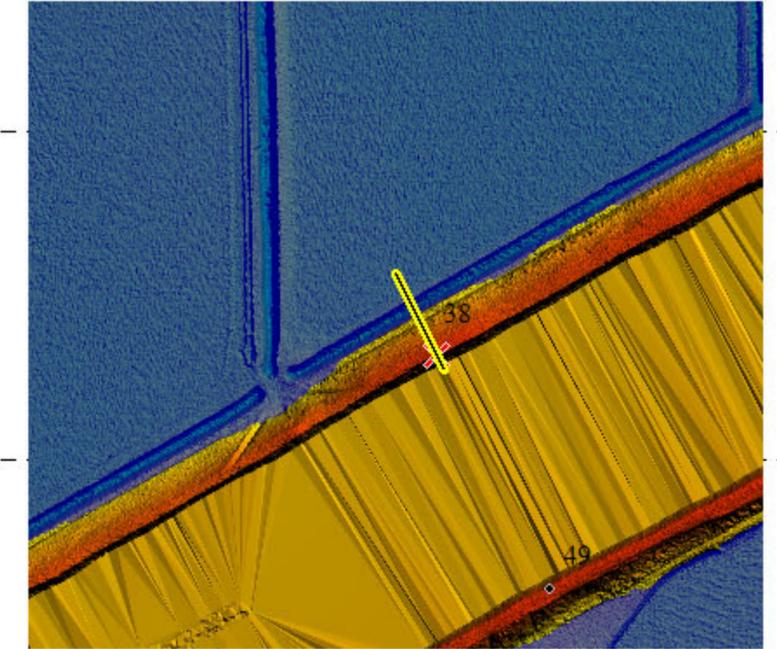
*Vertical Difference (Start to Finish): 10.5 ft*

*Minimum Elevation on Path: -13.065 ft*

*Maximum Elevation on Path: 16.616 ft*

*Azimuth: 154° 20' 8.2"*

*Slope/Tilt: 2.50°*



100 ft

75 ft

50 ft

25 ft

0 ft

*Location: 37° 52' 16.8675" N, 121° 31' 58.0059" W*  
*Elev: 16.73 ft, Dist: 207.73 ft*

50 ft

100 ft

150 ft

200 ft

241 ft

Start Position: 37° 52' 9.0553" N, 121° 32' 21.3211" W

Start Height: -6.144 ft

End Position: 37° 52' 7.1695" N, 121° 32' 19.7250" W

End Height: 4.7 ft

Straight-Line Distance: 229.71 ft

3D Distance on Surface: 240.21 ft

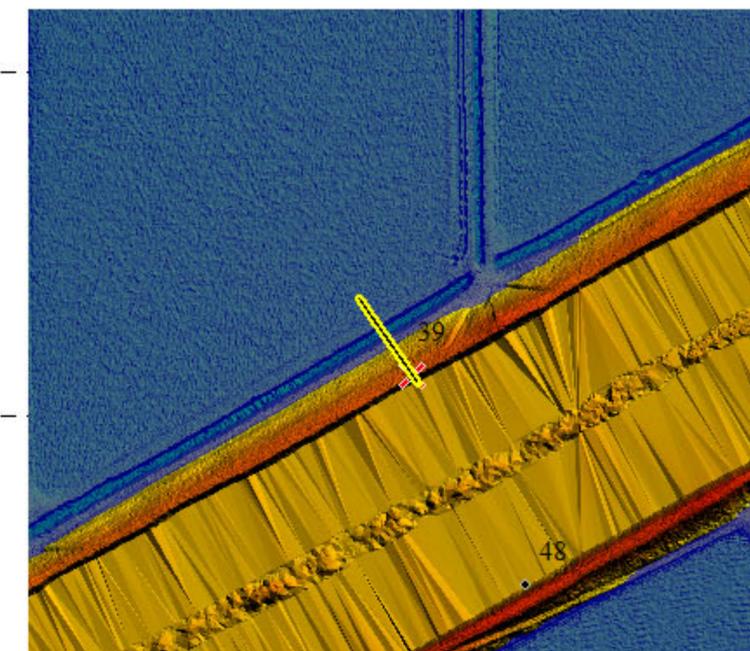
Vertical Difference (Start to Finish): -10.8 ft

Minimum Elevation on Path: -12.711 ft

Maximum Elevation on Path: 12.411 ft

Azimuth: 146° 08' 27.2"

Slope/Tilt: 2.70°



100 ft

75 ft

50 ft

25 ft

0 ft



50 ft

100 ft

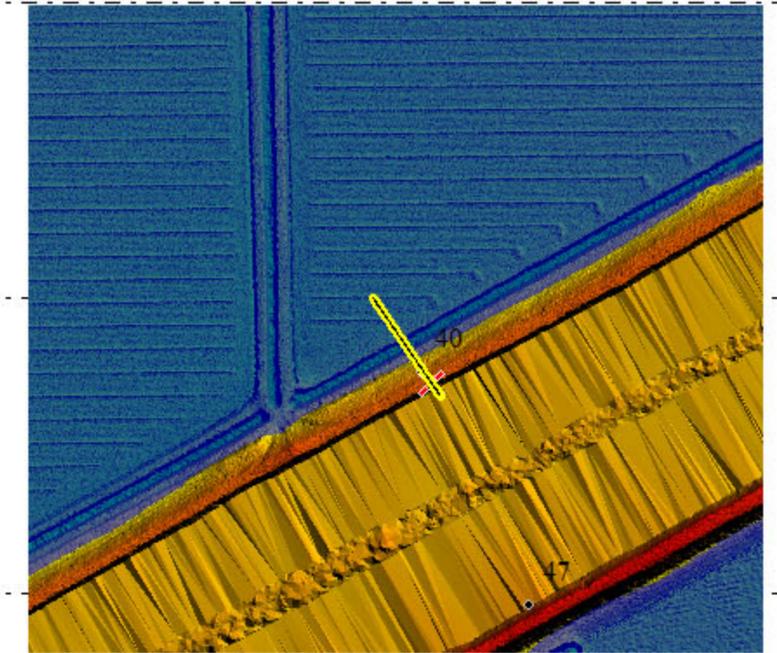
150 ft

200 ft

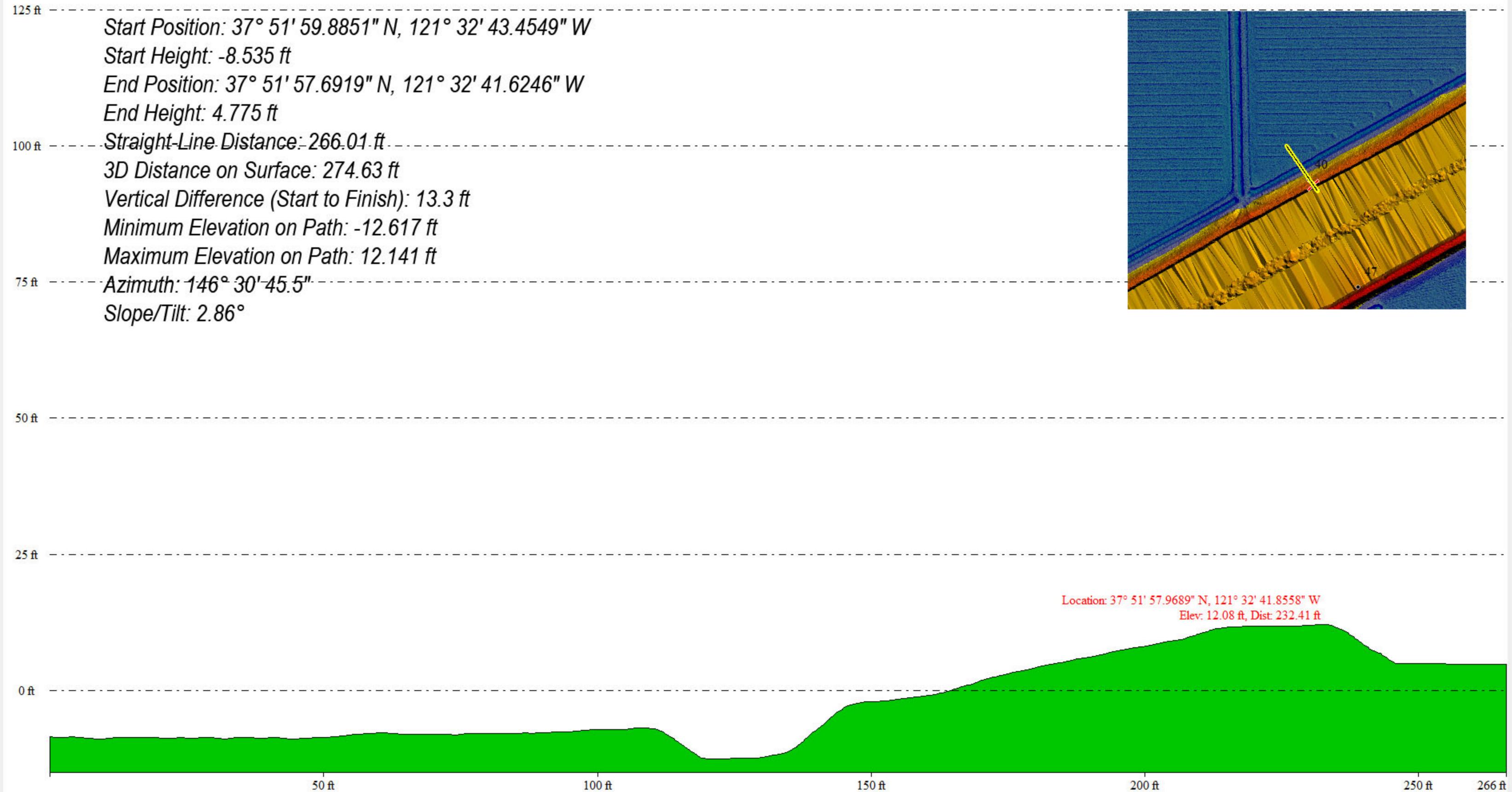
230 ft

Location: 37° 52' 7.3083" N, 121° 32' 19.8426" W  
Elev: 12.22 ft, Dist: 212.79 ft

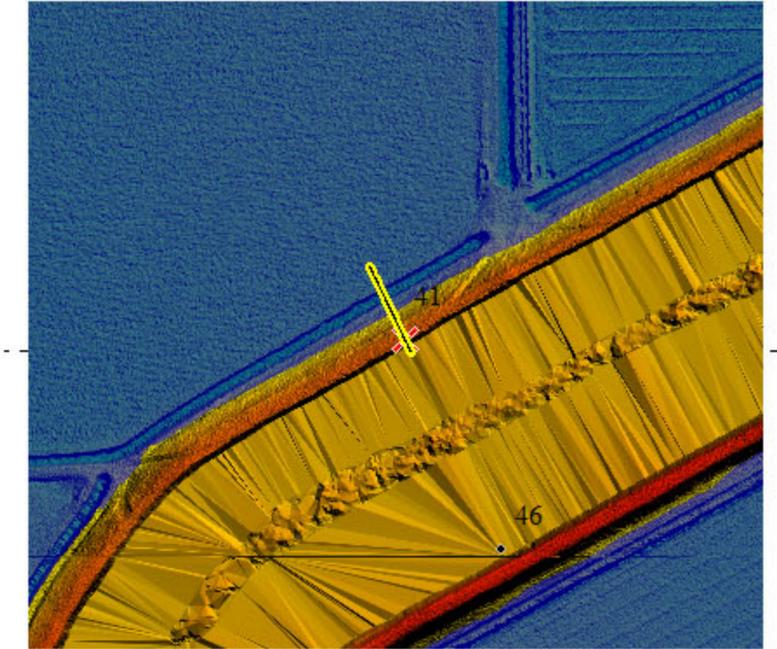
Start Position: 37° 51' 59.8851" N, 121° 32' 43.4549" W  
Start Height: -8.535 ft  
End Position: 37° 51' 57.6919" N, 121° 32' 41.6246" W  
End Height: 4.775 ft  
Straight-Line Distance: 266.01 ft  
3D Distance on Surface: 274.63 ft  
Vertical Difference (Start to Finish): 13.3 ft  
Minimum Elevation on Path: -12.617 ft  
Maximum Elevation on Path: 12.141 ft  
Azimuth: 146° 30' 45.5"  
Slope/Tilt: 2.86°



Location: 37° 51' 57.9689" N, 121° 32' 41.8558" W  
Elev: 12.08 ft, Dist: 232.41 ft

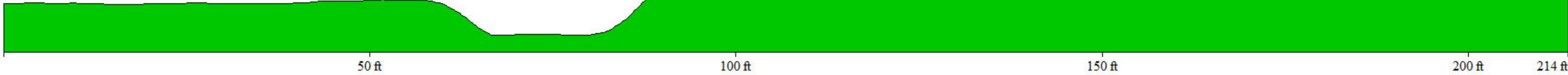


Start Position: 37° 51' 50.1719" N, 121° 33' 4.8774" W  
Start Height: -6.814 ft  
End Position: 37° 51' 48.2541" N, 121° 33' 3.7621" W  
End Height: 4.419 ft  
Straight-Line Distance: 213.61 ft  
3D Distance on Surface: 221.23 ft  
Vertical Difference (Start to Finish): 11.2 ft  
Minimum Elevation on Path: -11.161 ft  
Maximum Elevation on Path: 11.884 ft  
Azimuth: 155° 14' 53.8"  
Slope/Tilt: 3.01°

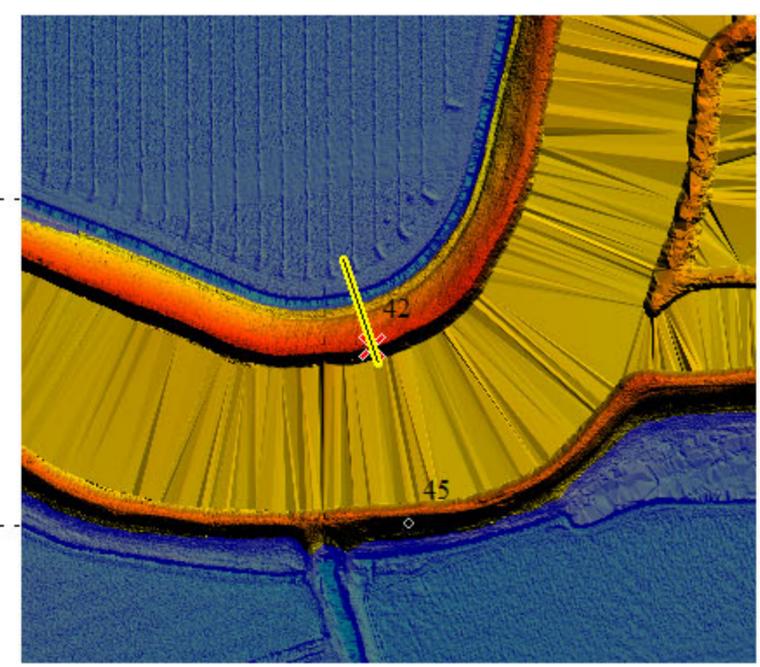


Location: 37° 51' 48.5301" N, 121° 33' 3.9225" W  
Elev: 11.76 ft, Dist: 182.88 ft

100 ft  
75 ft  
50 ft  
25 ft  
0 ft



Start Position: 37° 51' 33.4601" N, 121° 33' 20.8630" W  
Start Height: -3.972 ft  
End Position: 37° 51' 31.1640" N, 121° 33' 19.9471" W  
End Height: 3.331 ft  
Straight-Line Distance: 243.6 ft  
3D Distance on Surface: 256.63 ft  
Vertical Difference (Start to Finish): 7.3 ft  
Minimum Elevation on Path: -9.76 ft  
Maximum Elevation on Path: 17.412 ft  
Azimuth: 162° 27' 5.4"  
Slope/Tilt: 1.72°



100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 51' 31.4986" N, 121° 33' 20.0806" W  
Elev: 17.46 ft, Dist: 208.1 ft

50 ft

100 ft

150 ft

200 ft

244 ft

Start Position: 37° 51' 30.2320" N, 121° 33' 43.3567" W

Start Height: -7.221 ft

End Position: 37° 51' 28.8689" N, 121° 33' 40.8855" W

End Height: 2.479 ft

Straight-Line Distance: 241.42 ft

3D Distance on Surface: 251.64 ft

Vertical Difference (Start to Finish): 9.7 ft

Minimum Elevation on Path: -11.931 ft

Maximum Elevation on Path: 14.548 ft

Azimuth: 124° 49' 34.3"

Slope/Tilt: 2.30°



100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 51' 29.1879" N, 121° 33' 41.4639" W  
Elev: 14.66 ft, Dist: 184.92 ft

50 ft

100 ft

150 ft

200 ft

241 ft

Start Position: 37° 51' 26.1844" N, 121° 33' 36.2307" W

Start Height: -3.609 ft

End Position: 37° 51' 27.4297" N, 121° 33' 38.4159" W

End Height: 4.639 ft

Straight-Line Distance: 215.83 ft

3D Distance on Surface: 224.21 ft

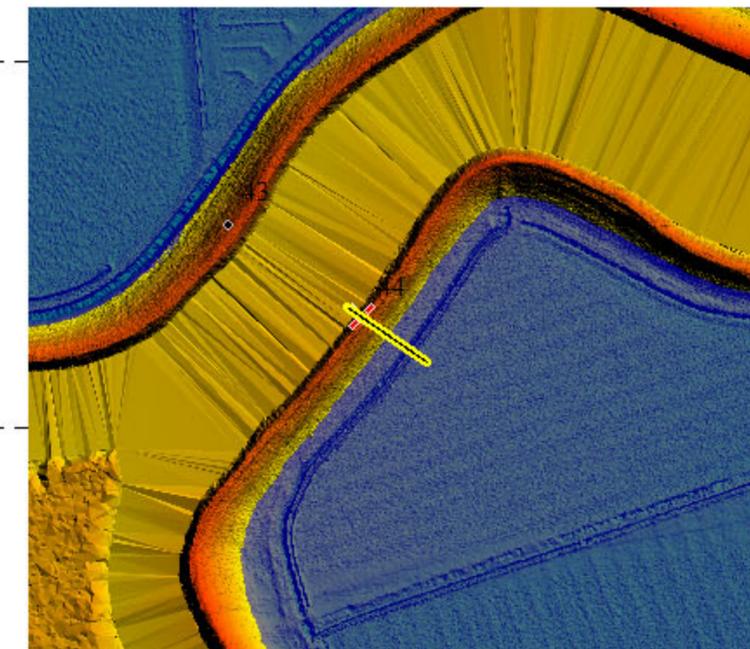
Vertical Difference (Start to Finish): 8.2 ft

Minimum Elevation on Path: -7.294 ft

Maximum Elevation on Path: 13.246 ft

Azimuth: 305° 42' 29.9"

Slope/Tilt: 2.19°



Location: 37° 51' 27.1782" N, 121° 33' 37.9745" W  
Elev: 13.22 ft, Dist: 172.24 ft

100 ft

75 ft

50 ft

25 ft

0 ft

50 ft

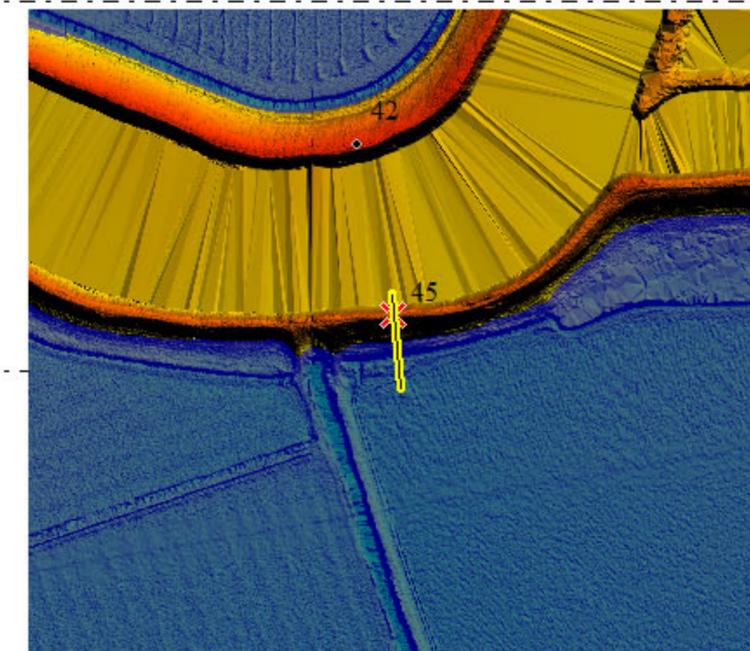
100 ft

150 ft

200 ft

216 ft

Start Position: 37° 51' 26.2409" N, 121° 33' 19.0826" W  
Start Height: -7.306 ft  
End Position: 37° 51' 28.3378" N, 121° 33' 19.2818" W  
End Height: 3.265 ft  
Straight-Line Distance: 212.71 ft  
3D Distance on Surface: 220.23 ft  
Vertical Difference (Start to Finish): 10.6 ft  
Minimum Elevation on Path: -10.088 ft  
Maximum Elevation on Path: 12.526 ft  
Azimuth: 355° 41' 32.3"  
Slope/Tilt: 2.85°



100 ft  
75 ft  
50 ft  
25 ft  
0 ft

Location: 37° 51' 27.8461" N, 121° 33' 19.2351" W  
Elev: 12.53 ft, Dist: 162.83 ft

50 ft

100 ft

150 ft

200 ft

213 ft

# Station 46

Start Position: 37° 51' 42.2336" N, 121° 33' 0.3735" W

Start Height: -5.932 ft

End Position: 37° 51' 43.8918" N, 121° 33' 1.3280" W

End Height: 4.642 ft

Straight-Line Distance: 184.37 ft

3D Distance on Surface: 219.51 ft

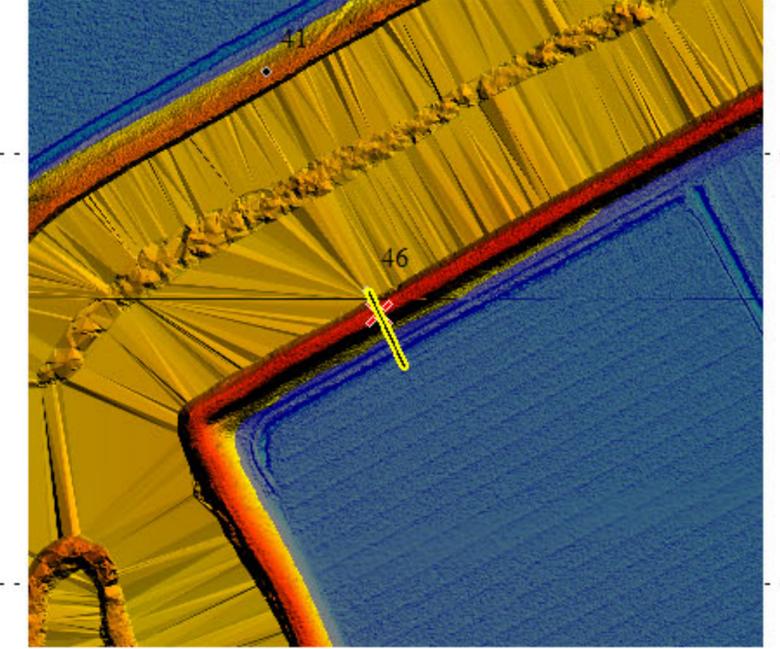
Vertical Difference (Start to Finish): 10.6 ft

Minimum Elevation on Path: -8.967 ft

Maximum Elevation on Path: 18.9 ft

Azimuth: 335° 28' 12.3"

Slope/Tilt: 3.28°



75 ft

50 ft

25 ft

0 ft

Location: 37° 51' 43.3878" N, 121° 33' 1.0379" W  
Elev: 19.02 ft, Dist: 128.33 ft

25 ft

50 ft

75 ft

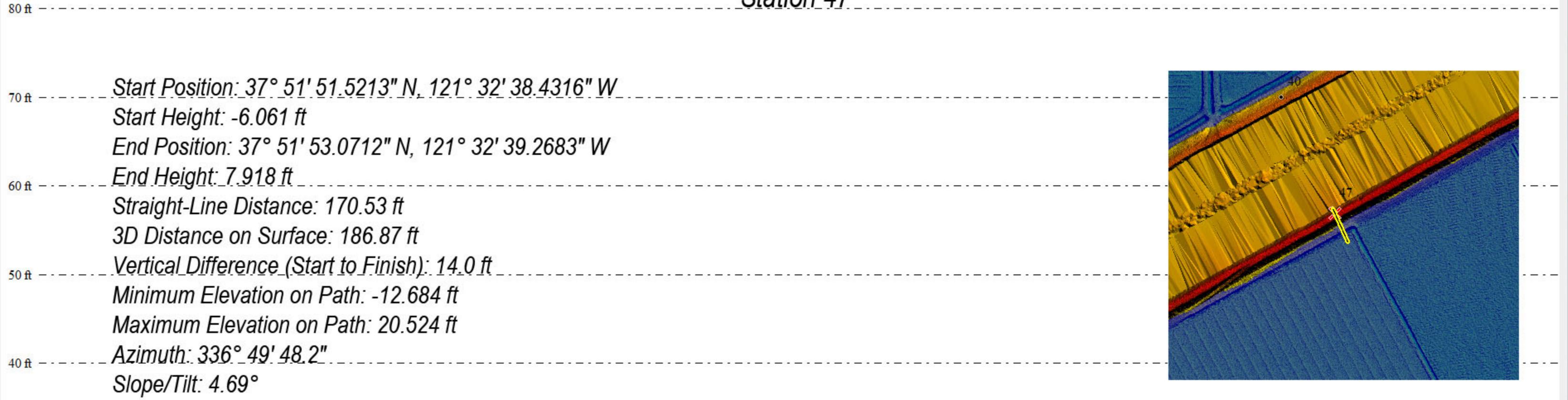
100 ft

125 ft

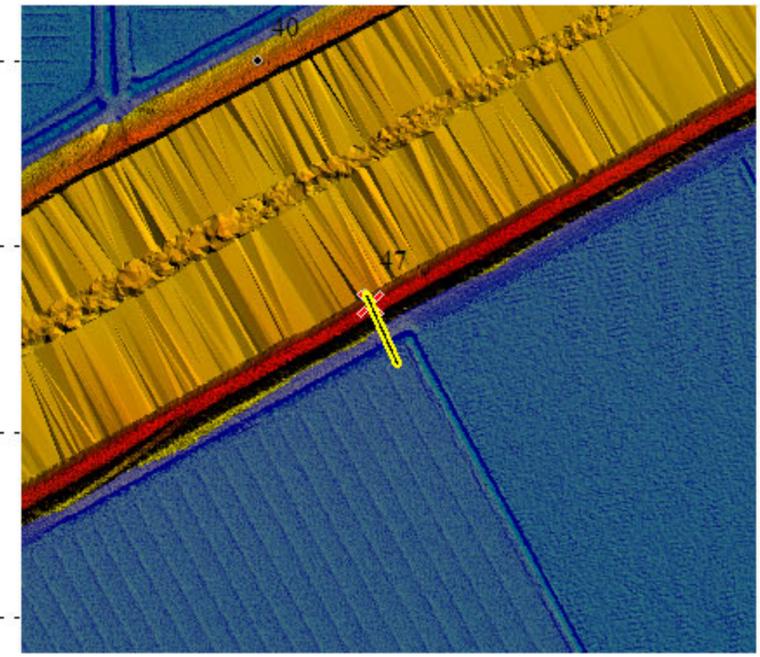
150 ft

175 ft

184 ft



*Start Position: 37° 51' 51.5213" N, 121° 32' 38.4316" W*  
*Start Height: -6.061 ft*  
*End Position: 37° 51' 53.0712" N, 121° 32' 39.2683" W*  
*End Height: 7.918 ft*  
*Straight-Line Distance: 170.53 ft*  
*3D Distance on Surface: 186.87 ft*  
*Vertical Difference (Start to Finish): 14.0 ft*  
*Minimum Elevation on Path: -12.684 ft*  
*Maximum Elevation on Path: 20.524 ft*  
*Azimuth: 336° 49' 48.2"*  
*Slope/Tilt: 4.69°*



Start Position: 37° 52' 1.2194" N, 121° 32' 15.9035" W

Start Height: -6.462 ft

End Position: 37° 52' 2.6657" N, 121° 32' 16.8252" W

End Height: 3.877 ft

Straight-Line Distance: 163.91 ft

3D Distance on Surface: 174 ft

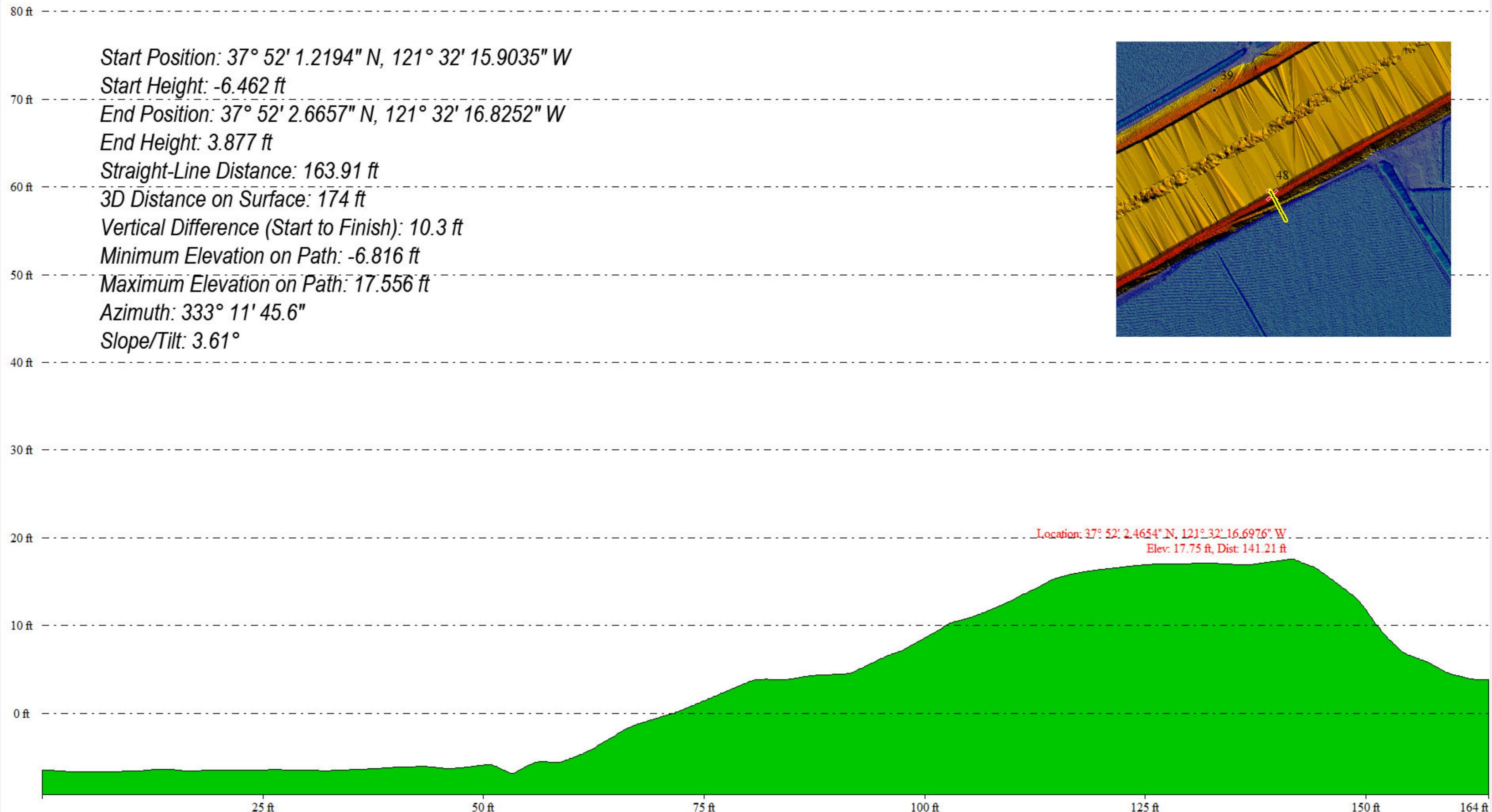
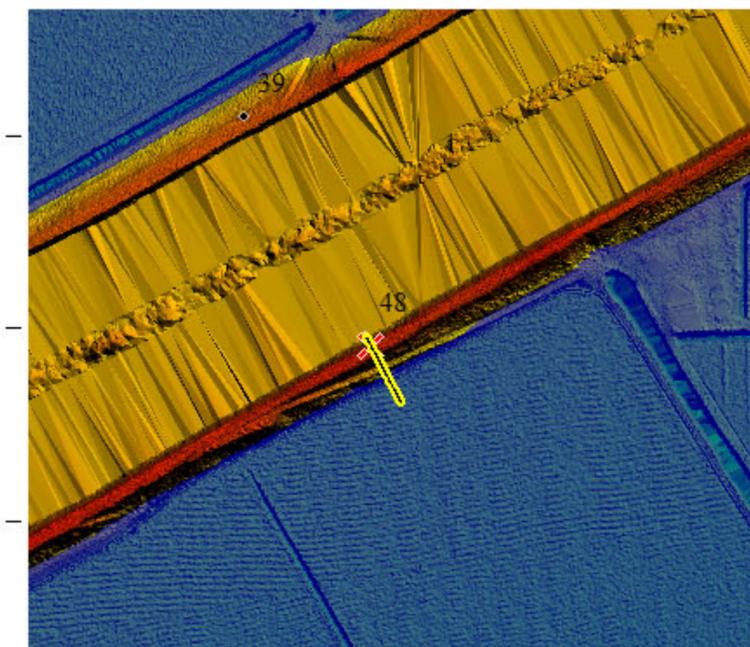
Vertical Difference (Start to Finish): 10.3 ft

Minimum Elevation on Path: -6.816 ft

Maximum Elevation on Path: 17.556 ft

Azimuth: 333° 11' 45.6"

Slope/Tilt: 3.61°



Start Position: 37° 52' 9.8877" N, 121° 31' 53.3462" W

Start Height: -4.743 ft

End Position: 37° 52' 12.0830" N, 121° 31' 55.3203" W

End Height: 4.097 ft

Straight-Line Distance: 272.7 ft

3D Distance on Surface: 280.37 ft

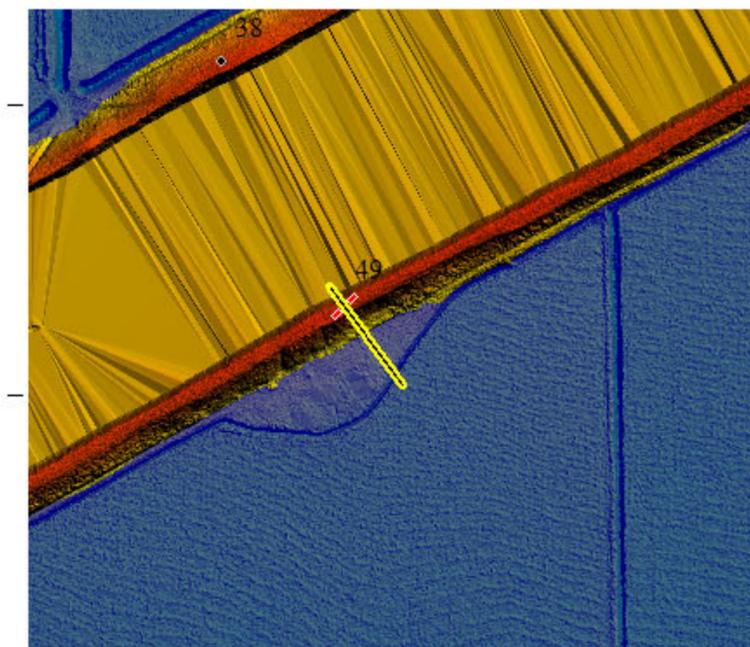
Vertical Difference (Start to Finish): 8.8 ft

Minimum Elevation on Path: -7.312 ft

Maximum Elevation on Path: 16.773 ft

Azimuth: 324° 31' 2.1"

Slope/Tilt: 1.86°



125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 52' 11.6360" N, 121° 31' 54.9183" W  
Elev: 16.85 ft, Dist: 217.17 ft

50 ft

100 ft

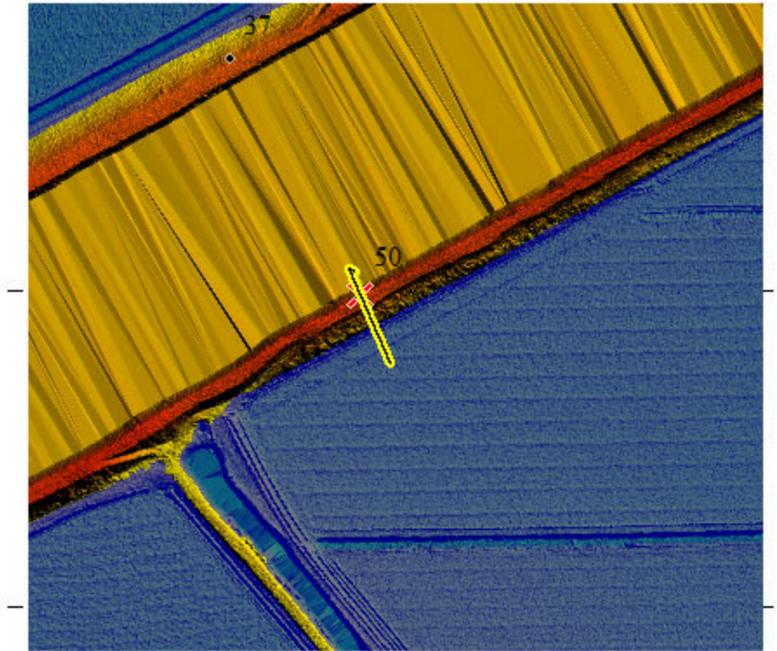
150 ft

200 ft

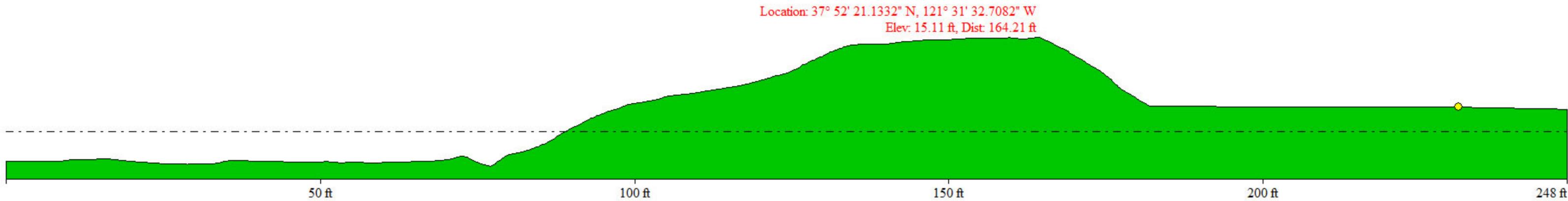
250 ft

273 ft

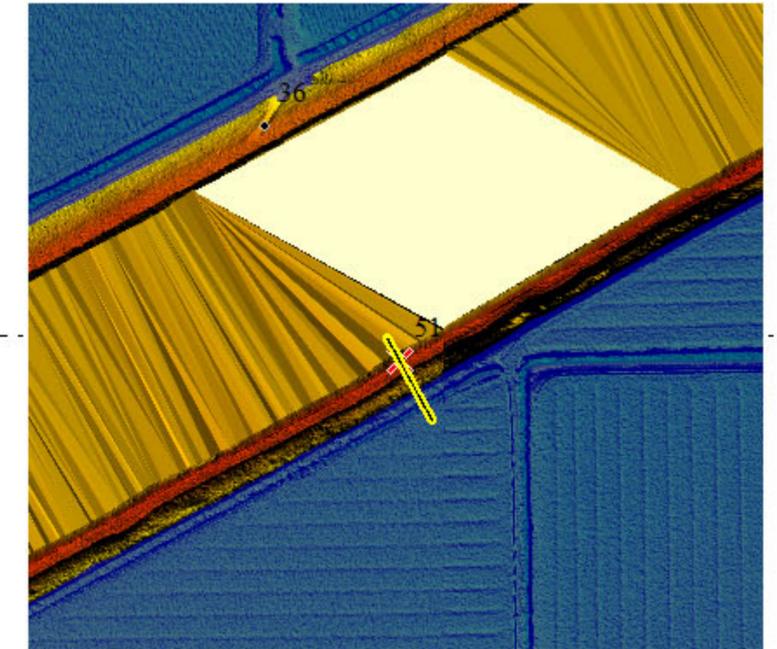
Start Position: 37° 52' 19.6353" N, 121° 31' 31.9189" W  
Start Height: -4.758 ft  
End Position: 37° 52' 21.6651" N, 121° 31' 32.8393" W  
End Height: 3.595 ft  
Straight-Line Distance: 218.18 ft  
3D Distance on Surface: 256.03 ft  
Vertical Difference (Start to Finish): 8.4 ft  
Minimum Elevation on Path: -5.527 ft  
Maximum Elevation on Path: 15.071 ft  
Azimuth: 340° 13' 51.2"  
Slope/Tilt: 2.19°



125 ft  
100 ft  
75 ft  
50 ft  
25 ft  
0 ft

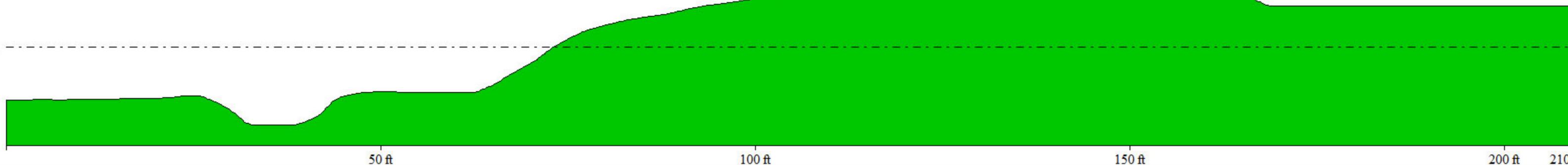


Start Position: 37° 52' 29.1811" N, 121° 31' 9.6774" W  
Start Height: -7.096 ft  
End Position: 37° 52' 31.0242" N, 121° 31' 10.8896" W  
End Height: 5.576 ft  
Straight-Line Distance: 210.25 ft  
3D Distance on Surface: 220.5 ft  
Vertical Difference (Start to Finish): 12.7 ft  
Minimum Elevation on Path: -10.396 ft  
Maximum Elevation on Path: 17.082 ft  
Azimuth: 332° 27' 58.4"  
Slope/Tilt: 3.45°



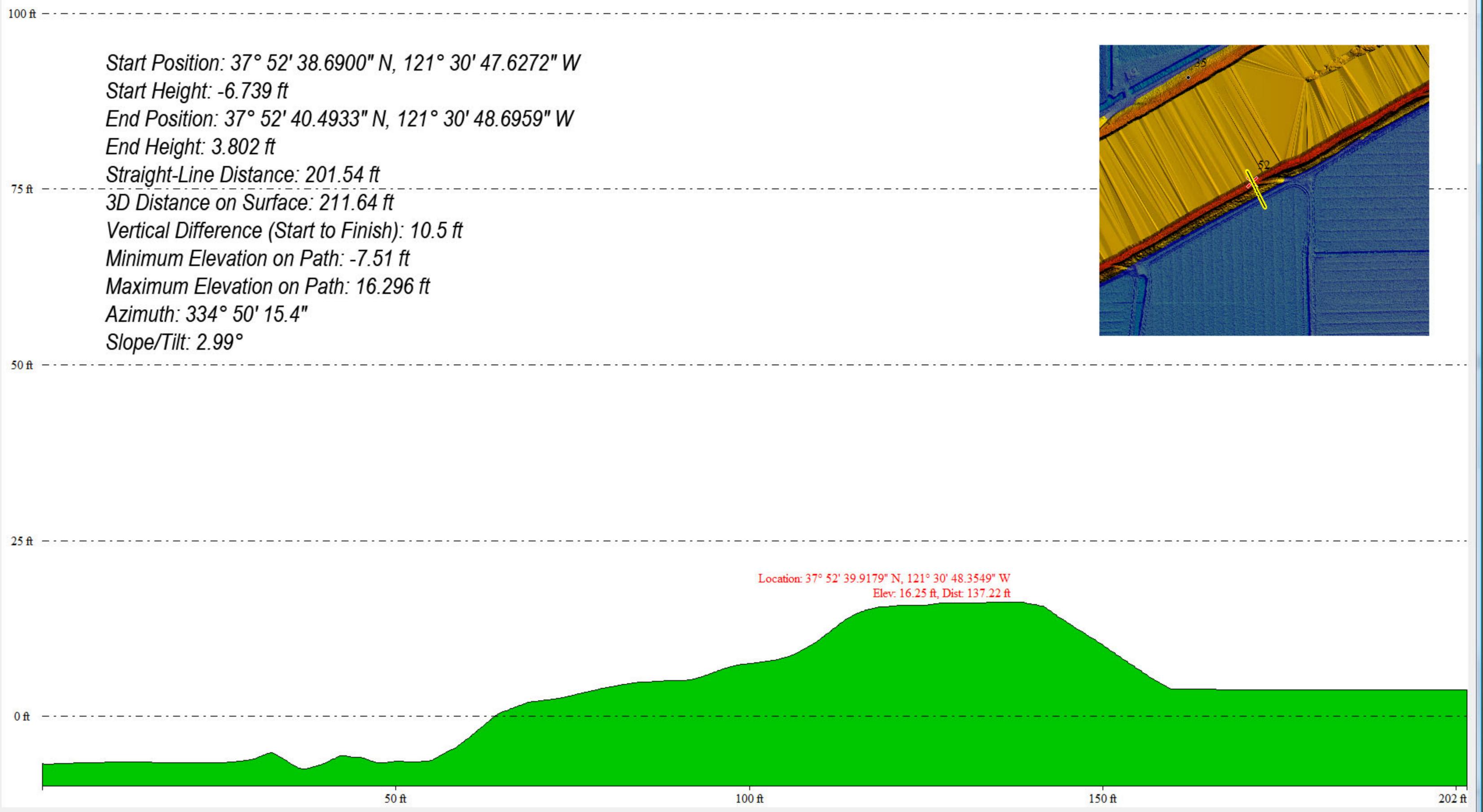
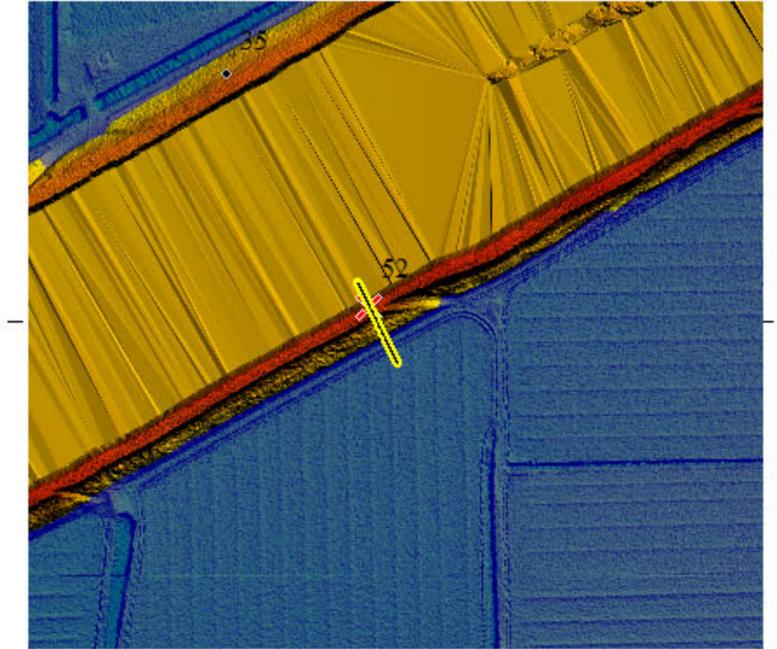
100 ft  
75 ft  
50 ft  
25 ft  
0 ft

Location: 37° 52' 30.4762" N, 121° 31' 10.5292" W  
Elev: 17.14 ft, Dist: 147.74 ft



# Station 52

Start Position: 37° 52' 38.6900" N, 121° 30' 47.6272" W  
Start Height: -6.739 ft  
End Position: 37° 52' 40.4933" N, 121° 30' 48.6959" W  
End Height: 3.802 ft  
Straight-Line Distance: 201.54 ft  
3D Distance on Surface: 211.64 ft  
Vertical Difference (Start to Finish): 10.5 ft  
Minimum Elevation on Path: -7.51 ft  
Maximum Elevation on Path: 16.296 ft  
Azimuth: 334° 50' 15.4"  
Slope/Tilt: 2.99°



*Start Position: 37° 52' 47.4449" N, 121° 30' 26.2632" W*

*Start Height: -5.572 ft*

*End Position: 37° 52' 49.1473" N, 121° 30' 27.2679" W*

*End Height: 3.851 ft*

*Straight-Line Distance: 190.11 ft*

*3D Distance on Surface: 202.08 ft*

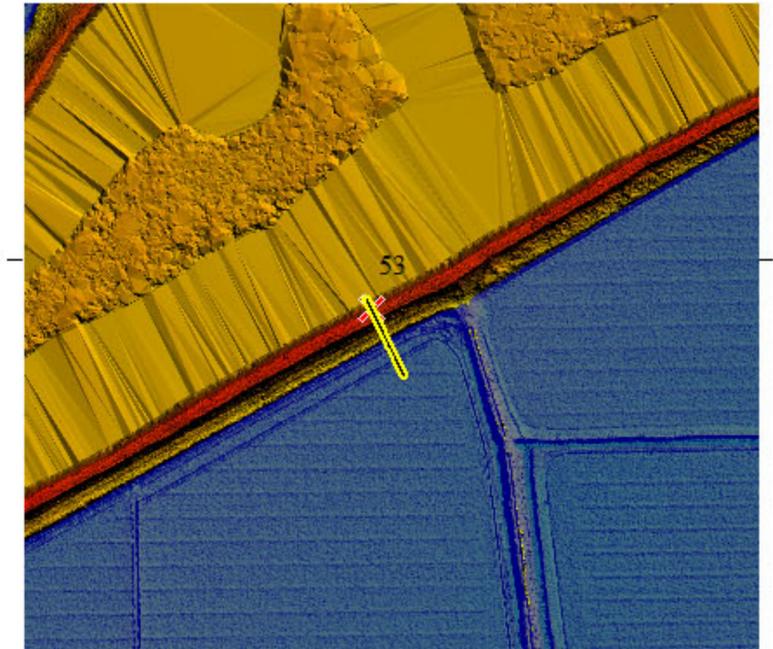
*Vertical Difference (Start to Finish): 9.4 ft*

*Minimum Elevation on Path: -6.66 ft*

*Maximum Elevation on Path: 17.211 ft*

*Azimuth: 334° 56' 0.3"*

*Slope/Tilt: 2.84°*



75 ft

50 ft

25 ft

0 ft

*Location: 37° 52' 48.8883" N, 121° 30' 27.1150" W*  
*Elev: 17.07 ft, Dist: 161.19 ft*

25 ft

50 ft

75 ft

100 ft

125 ft

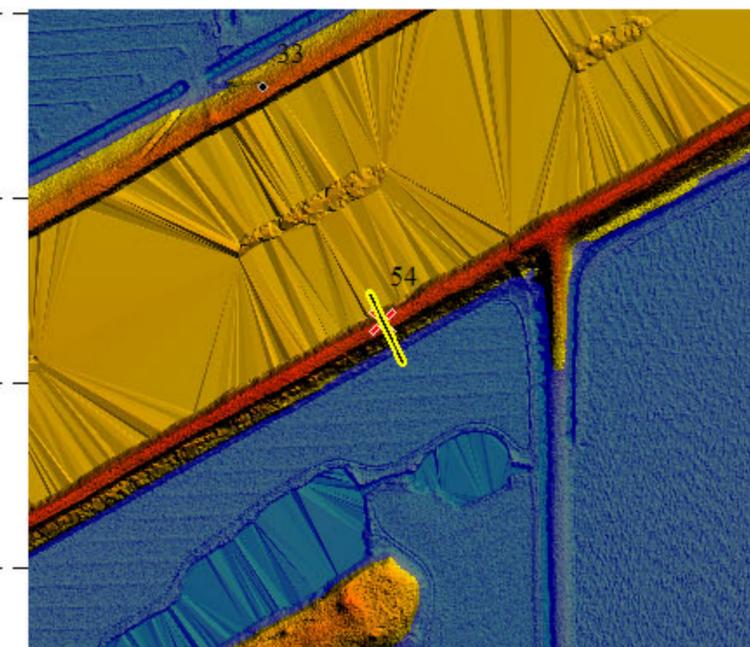
150 ft

175 ft

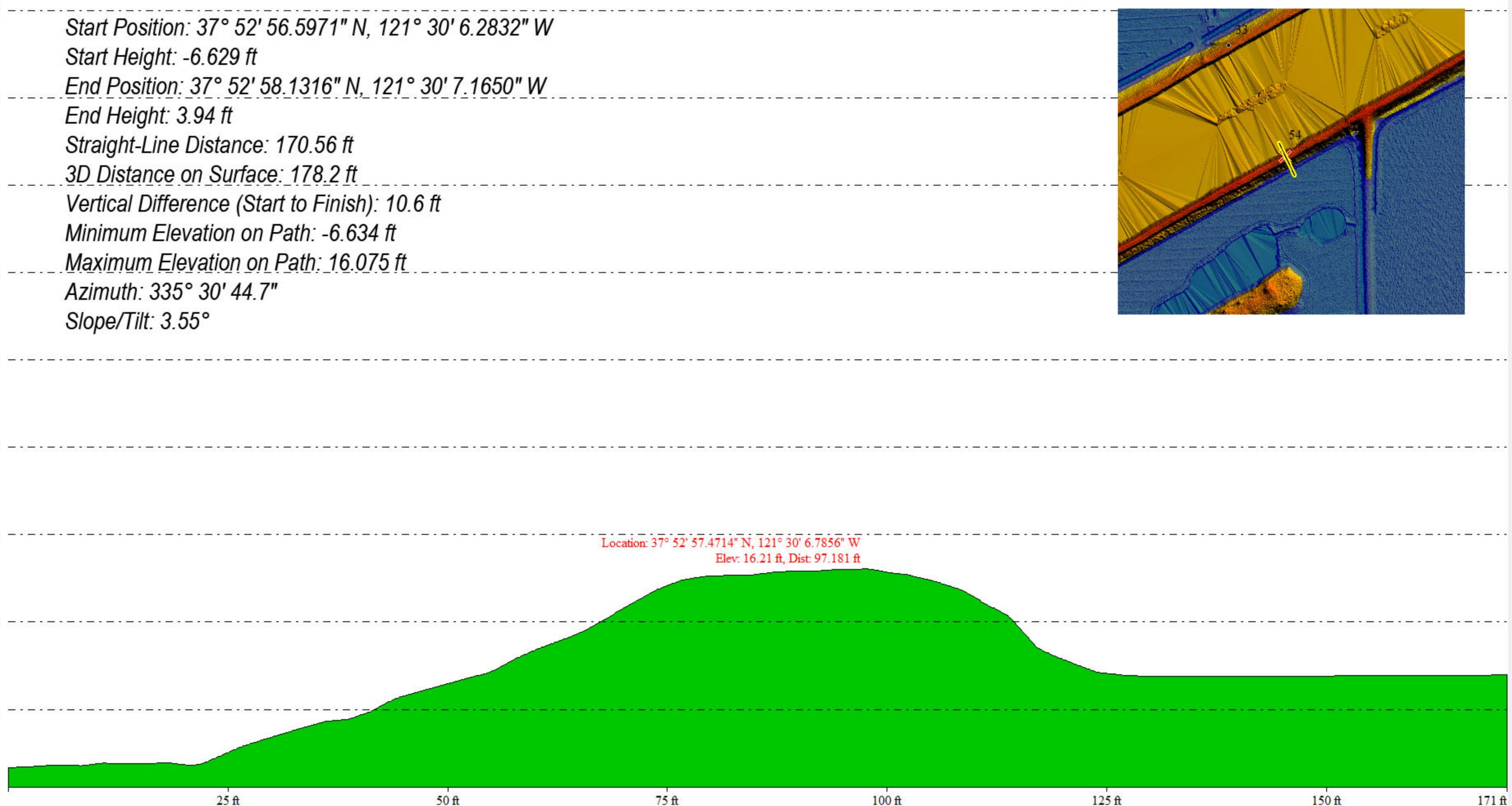
190 ft

# Station 54

Start Position: 37° 52' 56.5971" N, 121° 30' 6.2832" W  
Start Height: -6.629 ft  
End Position: 37° 52' 58.1316" N, 121° 30' 7.1650" W  
End Height: 3.94 ft  
Straight-Line Distance: 170.56 ft  
3D Distance on Surface: 178.2 ft  
Vertical Difference (Start to Finish): 10.6 ft  
Minimum Elevation on Path: -6.634 ft  
Maximum Elevation on Path: 16.075 ft  
Azimuth: 335° 30' 44.7"  
Slope/Tilt: 3.55°



80 ft  
70 ft  
60 ft  
50 ft  
40 ft  
30 ft  
20 ft  
10 ft  
0 ft



Start Position: 37° 53' 5.7551" N, 121° 29' 43.8512" W

Start Height: -4.134 ft

End Position: 37° 53' 7.4333" N, 121° 29' 44.8600" W

End Height: 4.311 ft

Straight-Line Distance: 188.04 ft

3D Distance on Surface: 196.55 ft

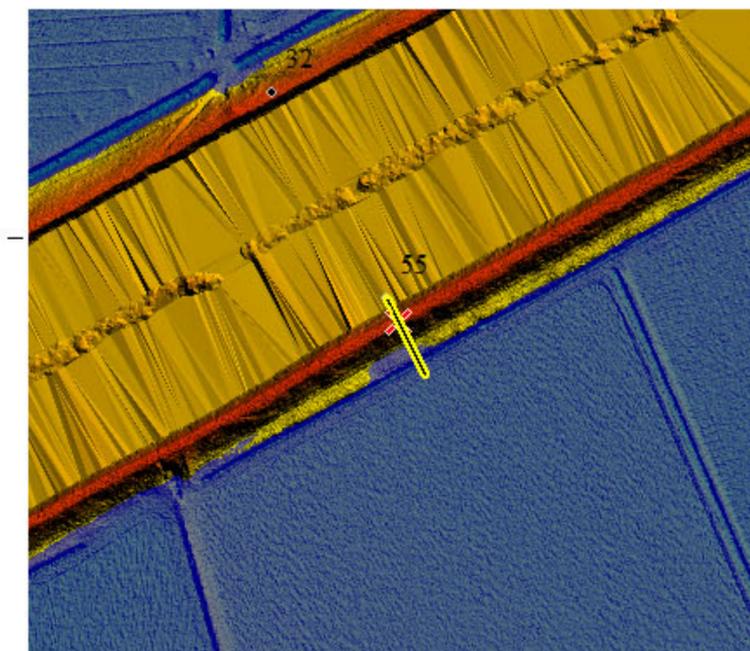
Vertical Difference (Start to Finish): 8.4 ft

Minimum Elevation on Path: -7.533 ft

Maximum Elevation on Path: 15.931 ft

Azimuth: 334° 31' 36.9"

Slope/Tilt: 2.57°



75 ft

50 ft

25 ft

0 ft

Location: 37° 53' 6.9226" N, 121° 29' 44.5530" W  
Elev: 15.85 ft, Dist: 130.81 ft

25 ft

50 ft

75 ft

100 ft

125 ft

150 ft

175 ft

188 ft

Start Position: 37° 53' 24.5330" N, 121° 29' 14.4458" W

Start Height: -5.296 ft

End Position: 37° 53' 24.3589" N, 121° 29' 18.6779" W

End Height: 5.089 ft

Straight-Line Distance: 339.72 ft

3D Distance on Surface: 344.96 ft

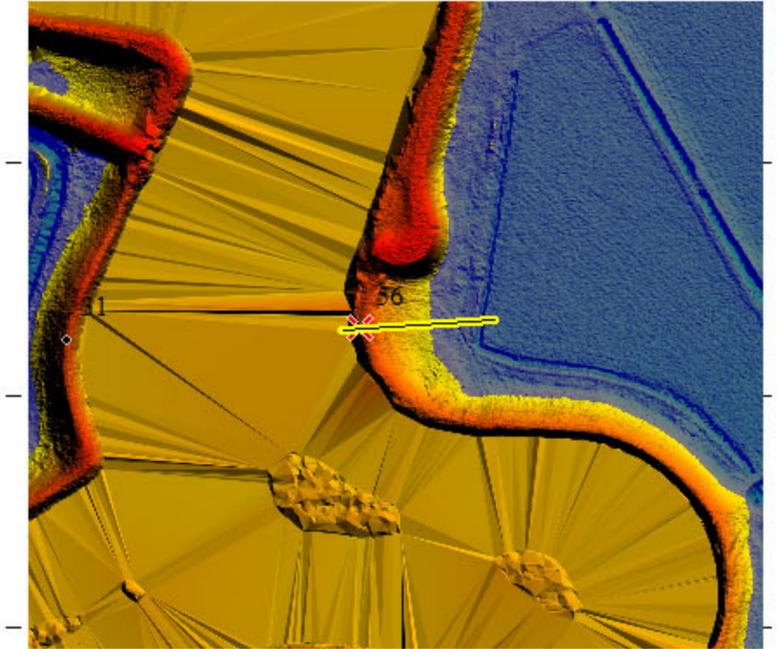
Vertical Difference (Start to Finish): 10.4 ft

Minimum Elevation on Path: -8.118 ft

Maximum Elevation on Path: 14.598 ft

Azimuth: 267° 01' 43.1"

Slope/Tilt: 1.75°



175 ft  
150 ft  
125 ft  
100 ft  
75 ft  
50 ft  
25 ft  
0 ft

50 ft 100 ft 150 ft 200 ft 250 ft 300 ft 340 ft

Location: 37° 53' 24.3811" N, 121° 29' 18.1382" W  
Elev: 14.53 ft, Dist: 296.39 ft



*Start Position: 37° 53' 39.9249" N, 121° 29' 26.8652" W*

*Start Height: -3.295 ft*

*End Position: 37° 53' 38.8903" N, 121° 29' 29.3371" W*

*End Height: 4.203 ft*

*Straight-Line Distance: 224.08 ft*

*3D Distance on Surface: 232.84 ft*

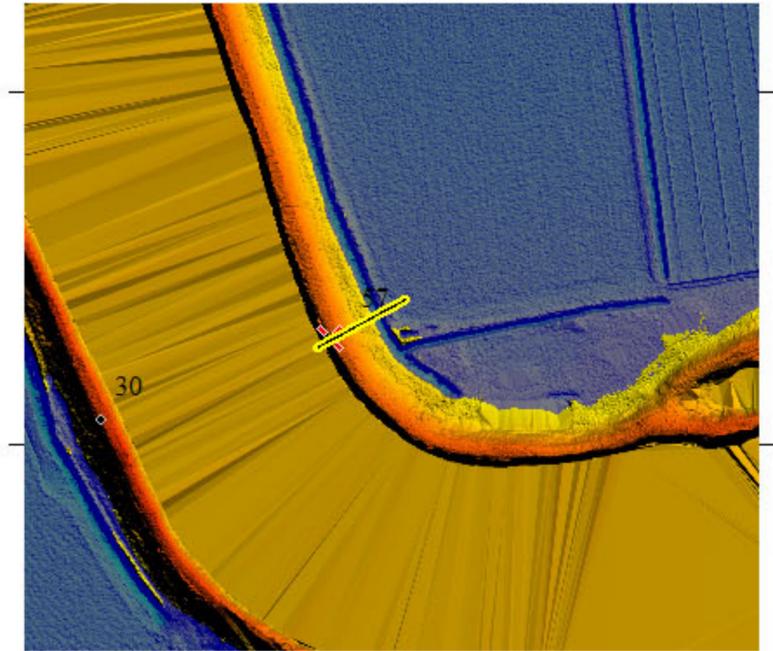
*Vertical Difference (Start to Finish): 7.5 ft*

*Minimum Elevation on Path: -8.826 ft*

*Maximum Elevation on Path: 12.49 ft*

*Azimuth: 242° 09' 34.0"*

*Slope/Tilt: 1.92°*



100 ft

75 ft

50 ft

25 ft

0 ft

*Location: 37° 53' 39.0573" N, 121° 29' 28.9380" W*  
*Elev: 12.71 ft, Dist: 187.9 ft*

50 ft

100 ft

150 ft

200 ft

224 ft

Start Position: 37° 53' 57.4030" N, 121° 29' 41.6464" W

Start Height: -5.884 ft

End Position: 37° 53' 55.6732" N, 121° 29' 43.3637" W

End Height: 4.657 ft

Straight-Line Distance: 222.62 ft

3D Distance on Surface: 230.95 ft

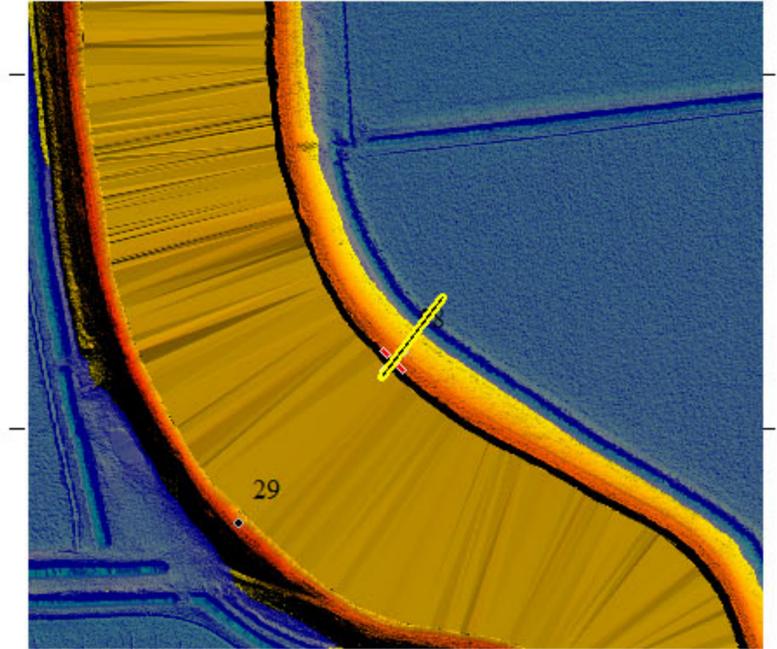
Vertical Difference (Start to Finish): 10.5 ft

Minimum Elevation on Path: -9.256 ft

Maximum Elevation on Path: 13.252 ft

Azimuth: 218° 11' 27.9"

Slope/Tilt: 2.71°



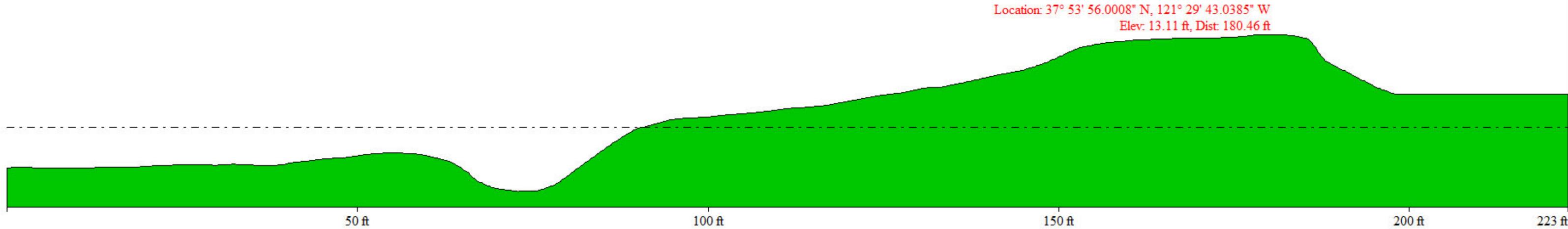
100 ft

75 ft

50 ft

25 ft

0 ft



50 ft

100 ft

150 ft

200 ft

223 ft

Start Position: 37° 54' 15.2025" N, 121° 29' 45.8496" W

Start Height: -6.622 ft

End Position: 37° 54' 13.7042" N, 121° 29' 47.8026" W

End Height: 4.528 ft

Straight-Line Distance: 217.87 ft

3D Distance on Surface: 221.84 ft

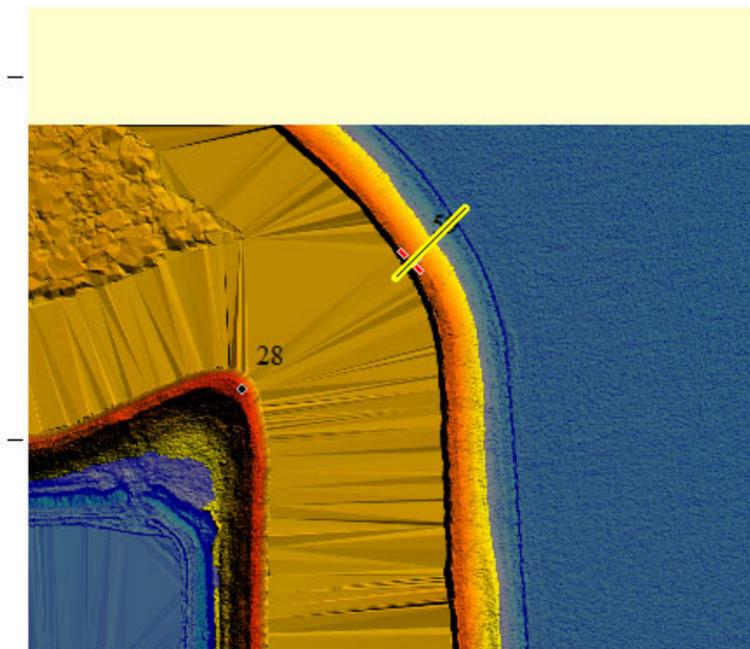
Vertical Difference (Start to Finish): 11.2 ft

Minimum Elevation on Path: -7.31 ft

Maximum Elevation on Path: 11.886 ft

Azimuth: 225° 55' 26.6"

Slope/Tilt: 2.93°



100 ft

75 ft

50 ft

25 ft

0 ft

50 ft

100 ft

150 ft

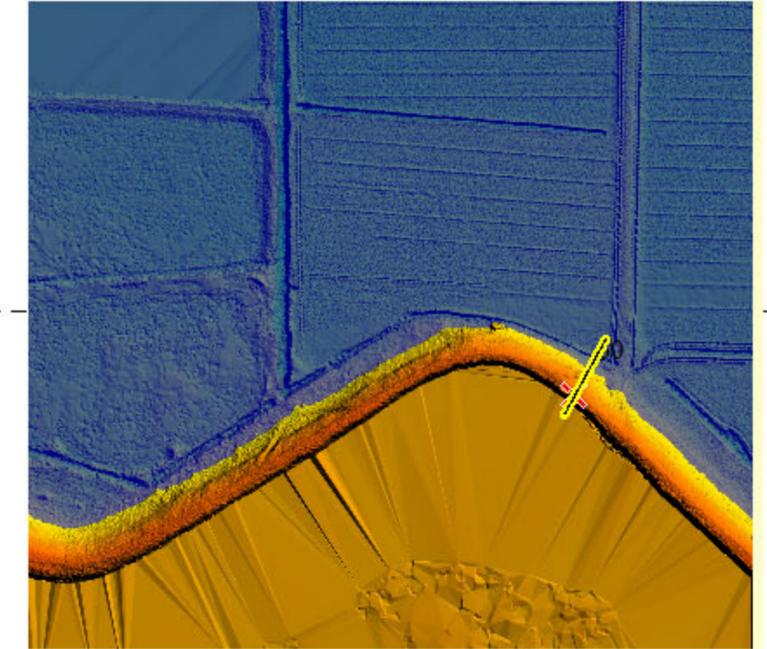
200 ft

218 ft

Location: 37° 54' 14.0331" N, 121° 29' 47.3739" W

Elev: 11.76 ft, Dist: 170.05 ft

Start Position: 37° 54' 30.0756" N, 121° 30' 5.4452" W  
Start Height: -4.408 ft  
End Position: 37° 54' 28.4151" N, 121° 30' 6.6324" W  
End Height: 5.637 ft  
Straight-Line Distance: 193.04 ft  
3D Distance on Surface: 196.95 ft  
Vertical Difference (Start to Finish): 10.0 ft  
Minimum Elevation on Path: -5.422 ft  
Maximum Elevation on Path: 11.426 ft  
Azimuth: 209° 31' 52.5"  
Slope/Tilt: 2.98°



100 ft  
75 ft  
50 ft  
25 ft  
0 ft

25 ft 50 ft 75 ft 100 ft 125 ft 150 ft 175 ft 193 ft

Location: 37° 54' 28.8323" N, 121° 30' 6.3341" W  
Elev: 11.49 ft, Dist: 144.54 ft

# Station 61

Start Position: 37° 54' 31.0341" N, 121° 30' 23.9303" W

Start Height: -4.351 ft

End Position: 37° 54' 29.2274" N, 121° 30' 25.6010" W

End Height: 5.869 ft

Straight-Line Distance: 226.55 ft

3D Distance on Surface: 230.53 ft

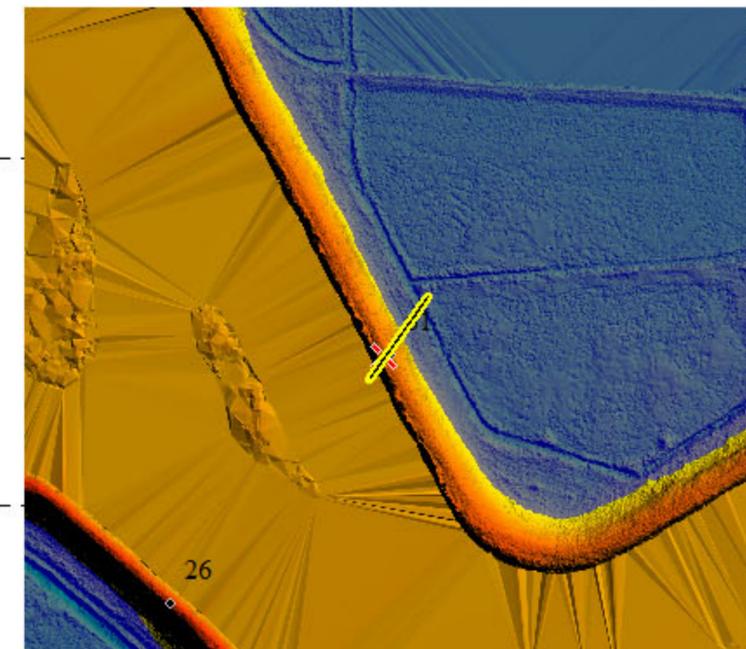
Vertical Difference (Start to Finish): 10.2 ft

Minimum Elevation on Path: -6.125 ft

Maximum Elevation on Path: 11.61 ft

Azimuth: 216° 13' 43.9"

Slope/Tilt: 2.58°



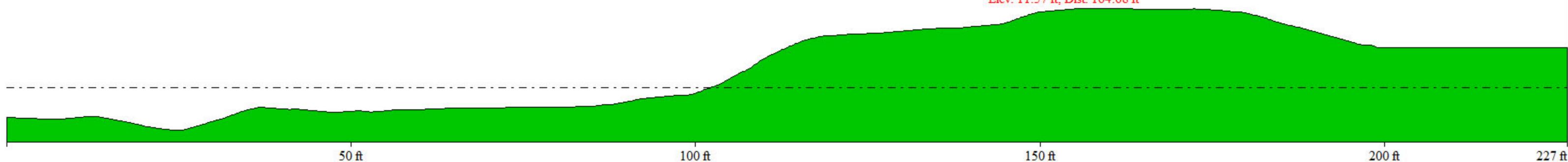
100 ft

75 ft

50 ft

25 ft

0 ft



Location: 37° 54' 29.7209" N, 121° 30' 25.1447" W  
Elev: 11.57 ft, Dist: 164.68 ft

50 ft

100 ft

150 ft

200 ft

227 ft

*Start Position: 37° 54' 42.0638" N, 121° 30' 40.8668" W*

*Start Height: -5.853 ft*

*End Position: 37° 54' 39.8973" N, 121° 30' 41.1989" W*

*End Height: 5.319 ft*

*Straight-Line Distance: 220.75 ft*

*3D Distance on Surface: 225.06 ft*

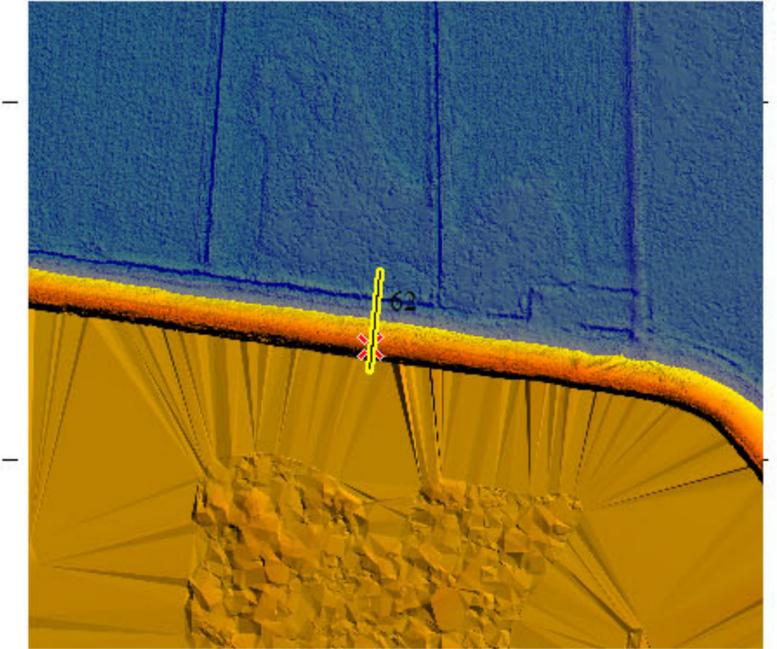
*Vertical Difference (Start to Finish): 11.2 ft*

*Minimum Elevation on Path: -6.606 ft*

*Maximum Elevation on Path: 12.332 ft*

*Azimuth: 186° 55' 25.8"*

*Slope/Tilt: 2.90°*



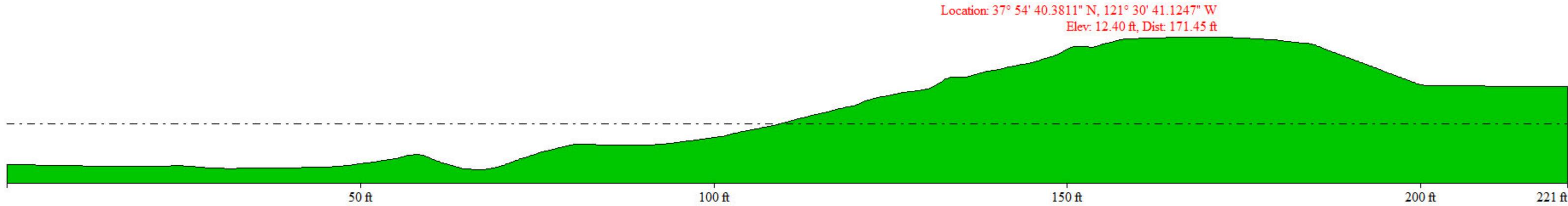
100 ft

75 ft

50 ft

25 ft

0 ft



50 ft

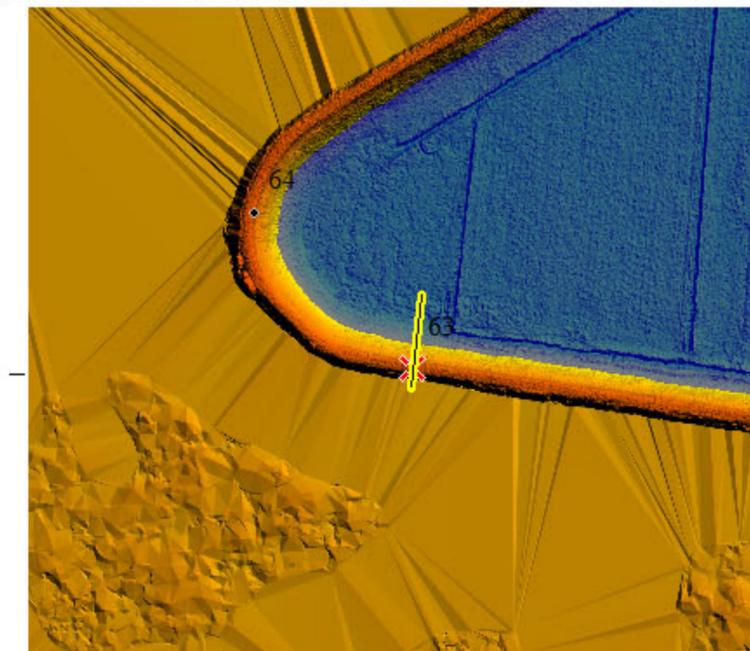
100 ft

150 ft

200 ft

221 ft

*Start Position: 37° 54' 43.6653" N, 121° 30' 53.0914" W*  
*Start Height: -8.081 ft*  
*End Position: 37° 54' 41.6131" N, 121° 30' 53.4211" W*  
*End Height: 5.372 ft*  
*Straight-Line Distance: 209.26 ft*  
*3D Distance on Surface: 213.14 ft*  
*Vertical Difference (Start to Finish): 13.5 ft*  
*Minimum Elevation on Path: -8.155 ft*  
*Maximum Elevation on Path: 12.196 ft*  
*Azimuth: 187° 15' 10.6"*  
*Slope/Tilt: 3.68°*

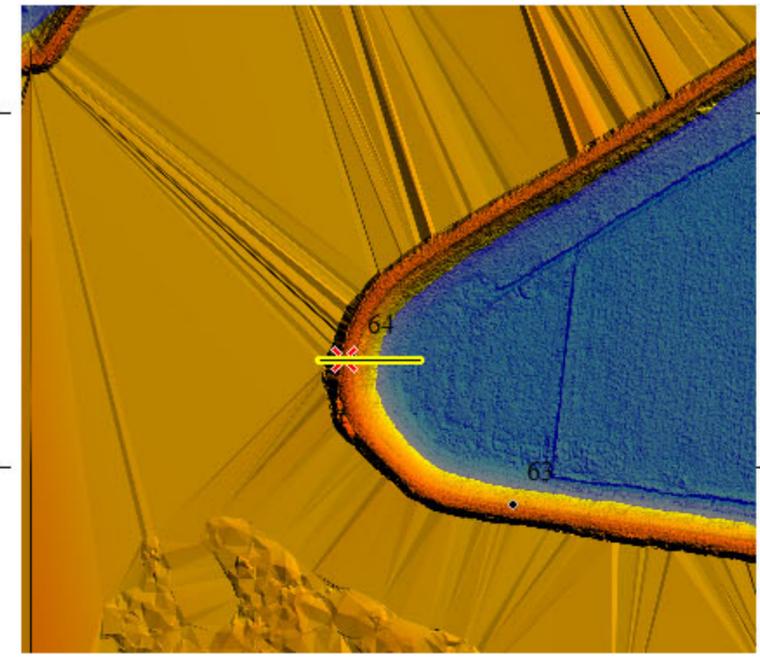


Location: 37° 54' 42.0399" N, 121° 30' 53.3525" W  
Elev: 12.15 ft, Dist: 165.74 ft

100 ft  
75 ft  
50 ft  
25 ft  
0 ft

50 ft 100 ft 150 ft 200 ft 209 ft

Start Position: 37° 54' 45.4518" N, 121° 30' 55.8434" W  
 Start Height: -7.178 ft  
 End Position: 37° 54' 45.4869" N, 121° 30' 58.6305" W  
 End Height: 5.216 ft  
 Straight-Line Distance: 223.39 ft  
 3D Distance on Surface: 226.66 ft  
 Vertical Difference (Start to Finish): 12.4 ft  
 Minimum Elevation on Path: -7.233 ft  
 Maximum Elevation on Path: 13.202 ft  
 Azimuth: 270° 54' 44.2"  
 Slope/Tilt: 3.18°



100 ft

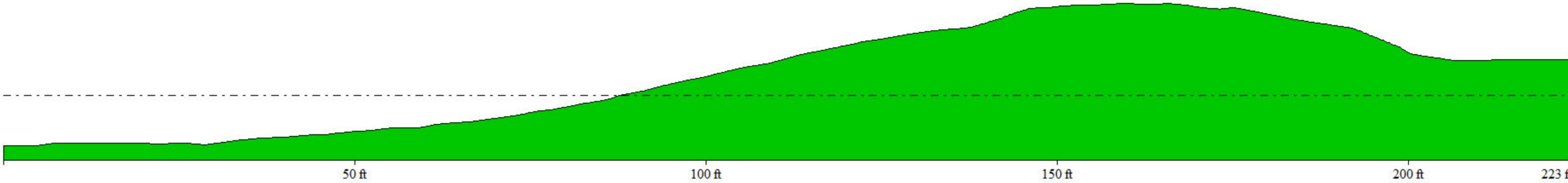
75 ft

50 ft

25 ft

0 ft

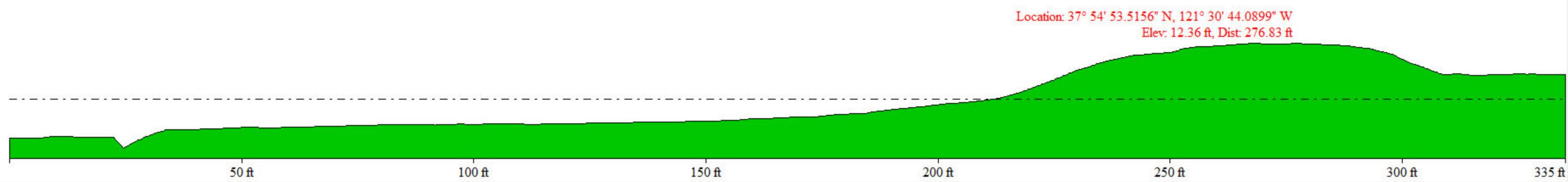
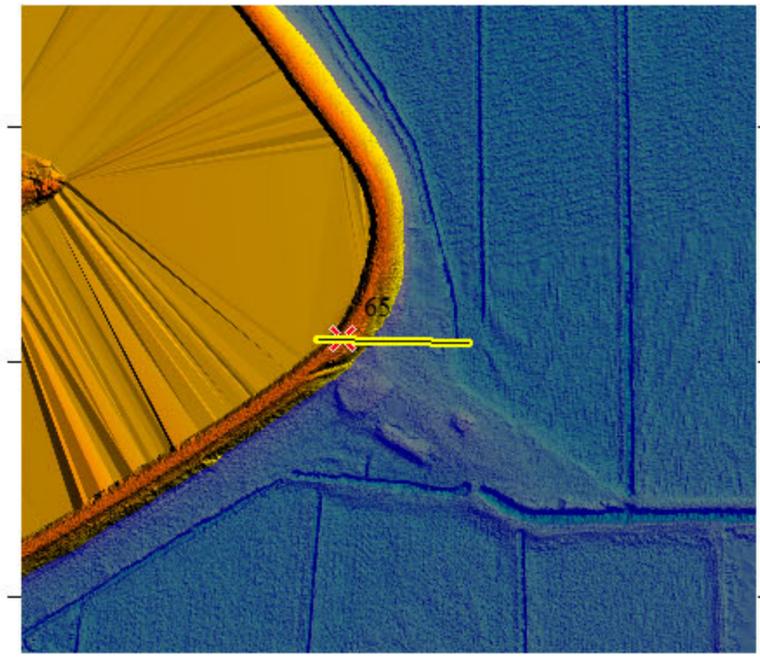
Location: 37° 54' 45.4778" N, 121° 30' 57.9059" W  
 Elev: 13.47 ft, Dist: 165.31 ft



# Station 65

175 ft  
150 ft  
125 ft  
100 ft  
75 ft  
50 ft  
25 ft  
0 ft

Start Position: 37° 54' 53.4090" N, 121° 30' 40.6381" W  
 Start Height: -8.438 ft  
 End Position: 37° 54' 53.5380" N, 121° 30' 44.8175" W  
 End Height: 5.406 ft  
 Straight-Line Distance: 335.17 ft  
 3D Distance on Surface: 340.25 ft  
 Vertical Difference (Start to Finish): 13.8 ft  
 Minimum Elevation on Path: -10.582 ft  
 Maximum Elevation on Path: 12.123 ft  
 Azimuth: 272° 13' 54.6"  
 Slope/Tilt: 2.37°



Start Position: 37° 55' 9.6638" N, 121° 30' 52.2320" W

Start Height: -8.652 ft

End Position: 37° 55' 8.7055" N, 121° 30' 54.7510" W

End Height: 4.792 ft

Straight-Line Distance: 223.92 ft

3D Distance on Surface: 227.93 ft

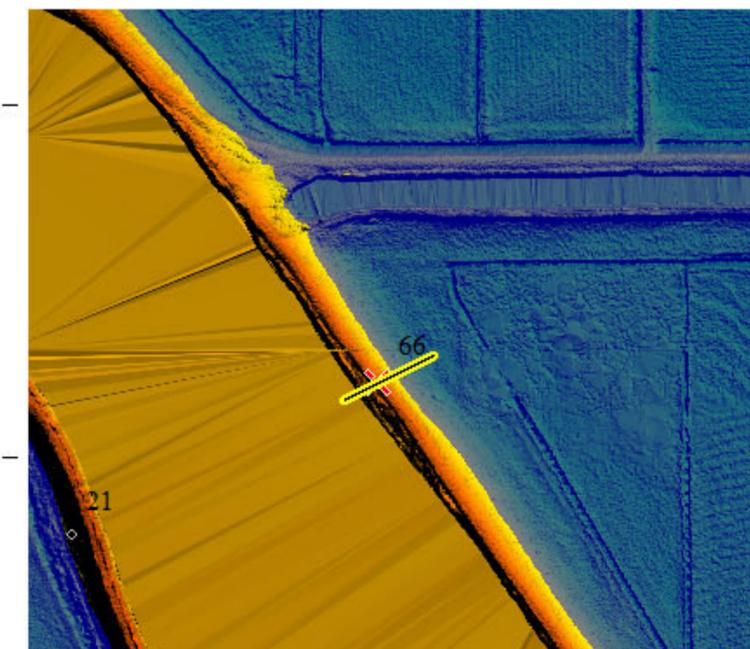
Vertical Difference (Start to Finish): 13.4 ft

Minimum Elevation on Path: -8.794 ft

Maximum Elevation on Path: 11.895 ft

Azimuth: 244° 20' 52.7"

Slope/Tilt: 3.44°



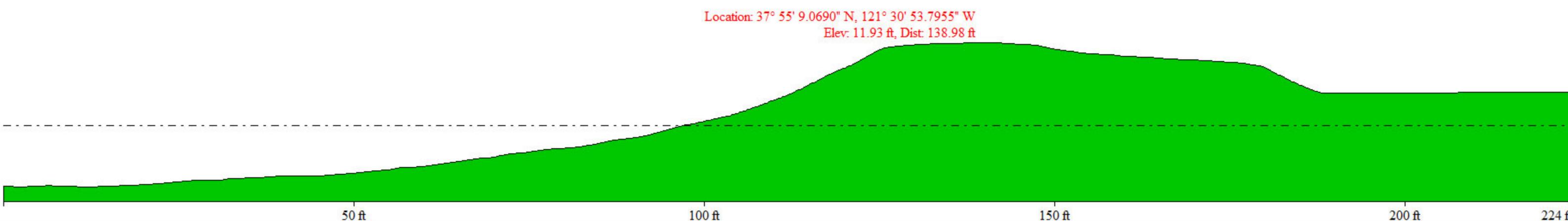
100 ft

75 ft

50 ft

25 ft

0 ft



Start Position: 37° 55' 22.9821" N, 121° 31' 18.6448" W

Start Height: -9.817 ft

End Position: 37° 55' 21.2000" N, 121° 31' 19.2573" W

End Height: 5.637 ft

Straight-Line Distance: 186.83 ft

3D Distance on Surface: 191.82 ft

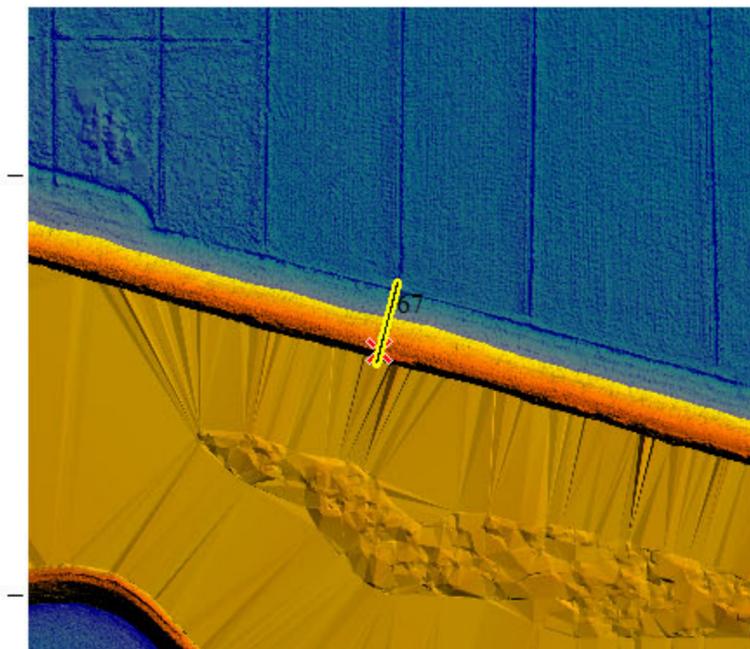
Vertical Difference (Start to Finish): 15.5 ft

Minimum Elevation on Path: -11.071 ft

Maximum Elevation on Path: 11.813 ft

Azimuth: 195° 13' 52.7"

Slope/Tilt: 4.73°



75 ft

50 ft

25 ft

0 ft

Location: 37° 55' 21.4613" N, 121° 31' 19.1675" W  
Elev: 11.68 ft, Dist: 159.44 ft

25 ft

50 ft

75 ft

100 ft

125 ft

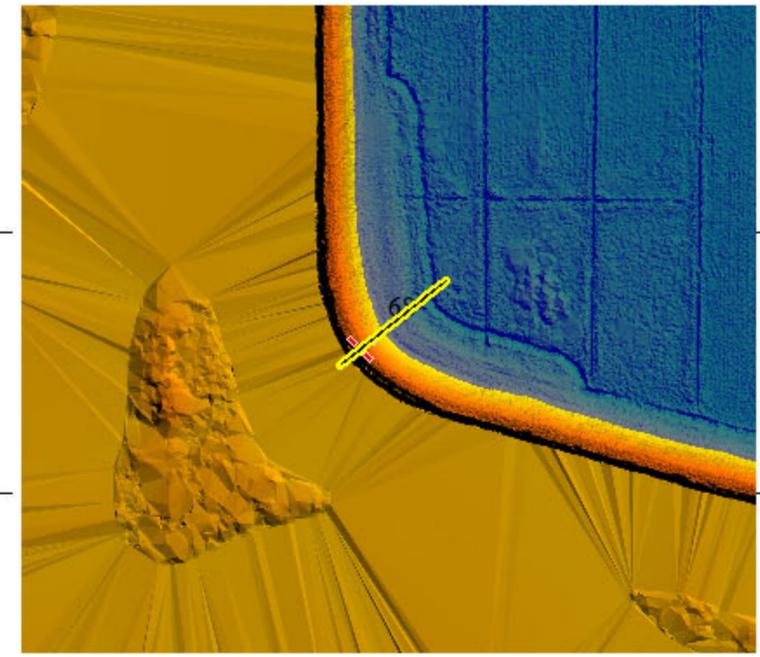
150 ft

175 ft

187 ft

# Station 68

Start Position: 37° 55' 26.6941" N, 121° 31' 29.1948" W  
 Start Height: -7.609 ft  
 End Position: 37° 55' 24.8654" N, 121° 31' 32.1638" W  
 End Height: 4.69 ft  
 Straight-Line Distance: 301.36 ft  
 3D Distance on Surface: 305.05 ft  
 Vertical Difference (Start to Finish): 12.3 ft  
 Minimum Elevation on Path: -9.295 ft  
 Maximum Elevation on Path: 12.234 ft  
 Azimuth: 232° 07' 57.5"  
 Slope/Tilt: 2.34°



150 ft

125 ft

100 ft

75 ft

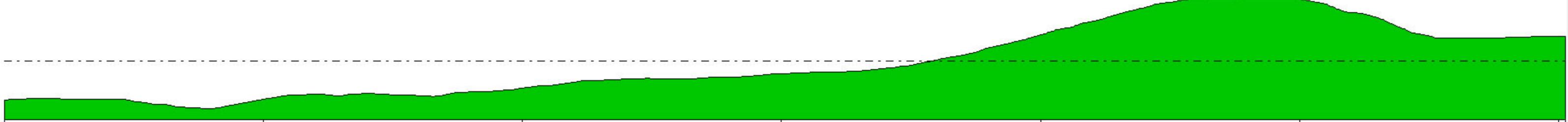
50 ft

25 ft

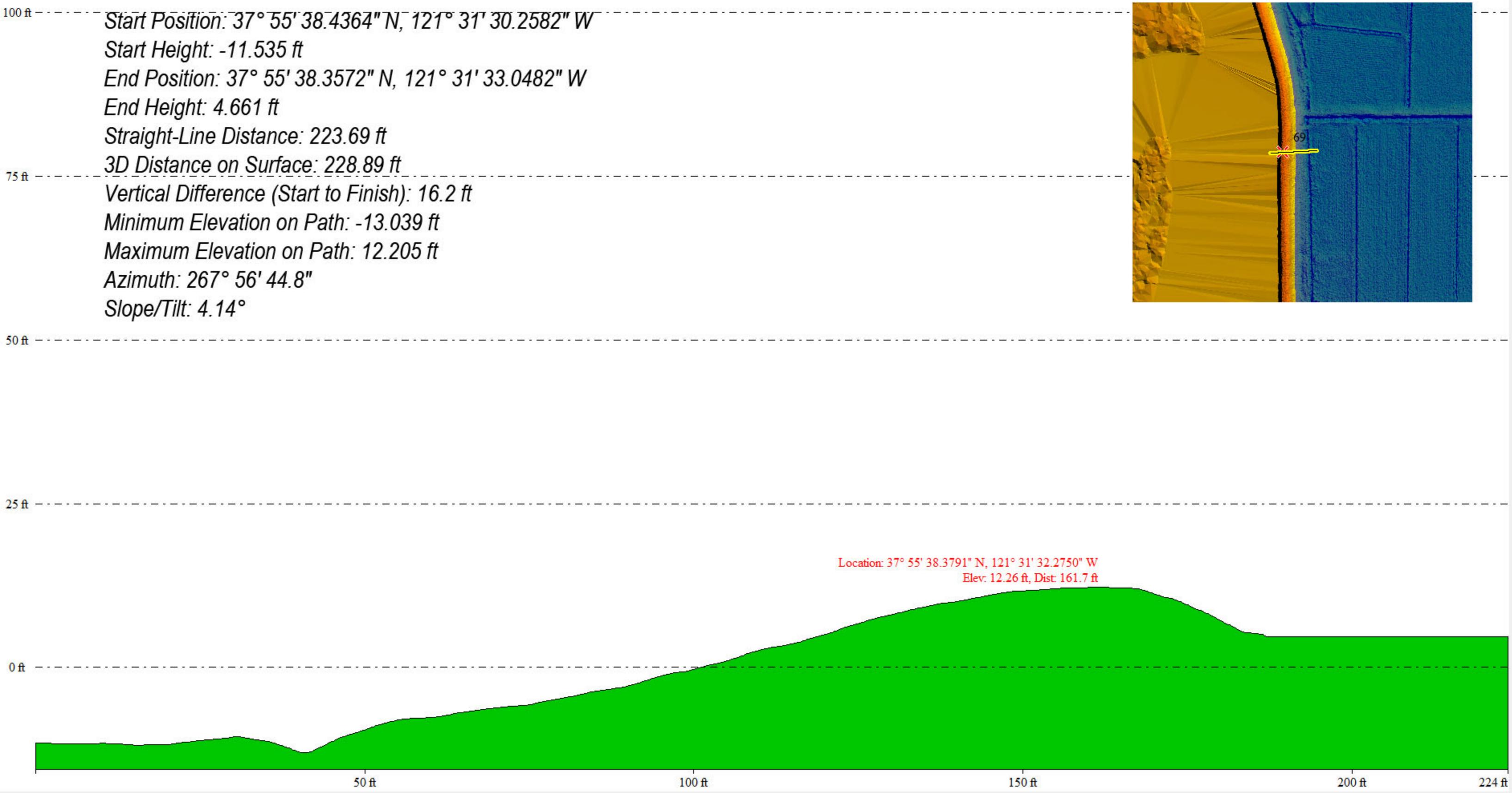
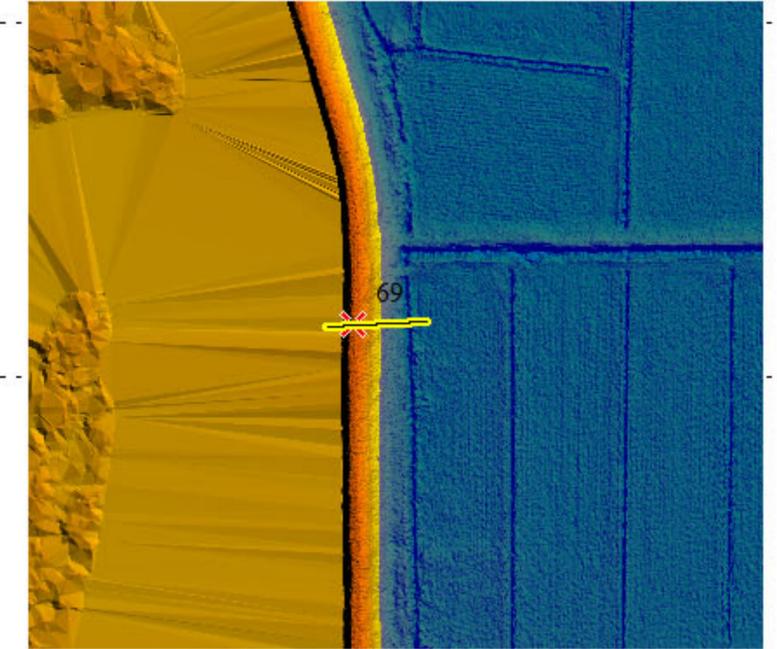
0 ft

Location: 37° 55' 25.2157" N, 121° 31' 31.5950" W  
 Elev: 12.30 ft, Dist: 243.63 ft

50 ft      100 ft      150 ft      200 ft      250 ft      301 ft



Start Position: 37° 55' 38.4364" N, 121° 31' 30.2582" W  
Start Height: -11.535 ft  
End Position: 37° 55' 38.3572" N, 121° 31' 33.0482" W  
End Height: 4.661 ft  
Straight-Line Distance: 223.69 ft  
3D Distance on Surface: 228.89 ft  
Vertical Difference (Start to Finish): 16.2 ft  
Minimum Elevation on Path: -13.039 ft  
Maximum Elevation on Path: 12.205 ft  
Azimuth: 267° 56' 44.8"  
Slope/Tilt: 4.14°

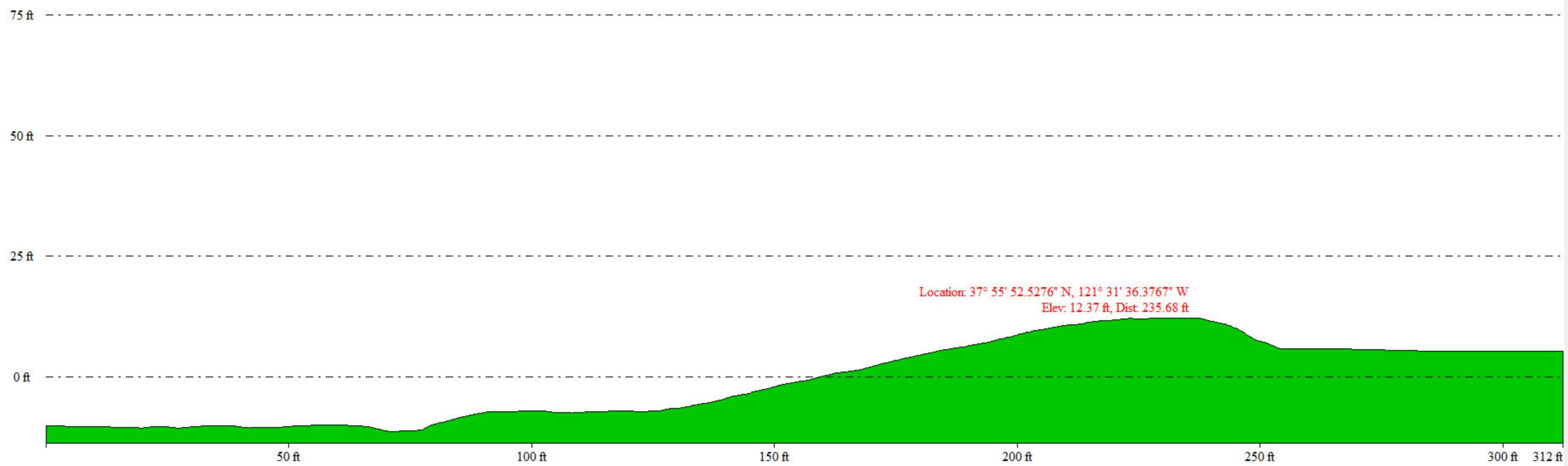
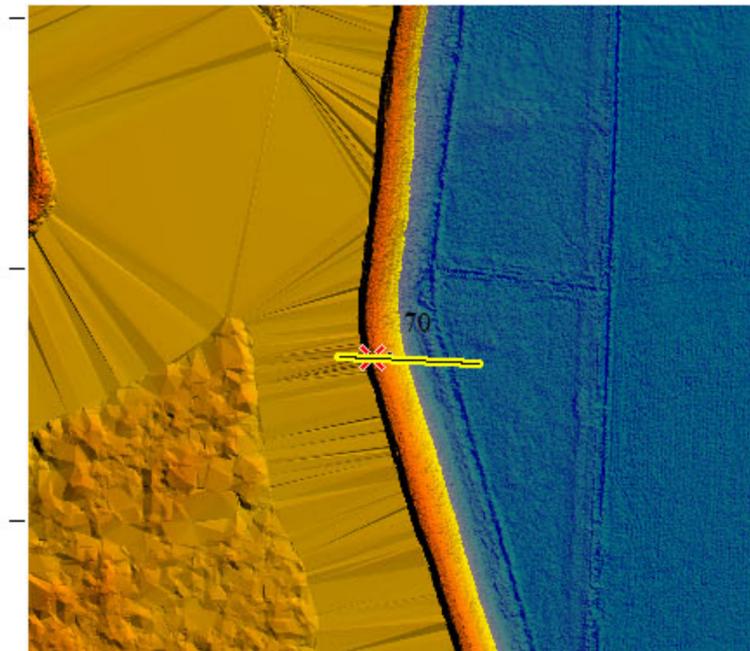


# Station 70

150 ft ----- *Start Position: 37° 55' 52.3759" N, 121° 31' 33.4413" W*  
*Start Height: -10.169 ft*  
*End Position: 37° 55' 52.5769" N, 121° 31' 37.3317" W*  
*End Height: 5.388 ft*

125 ft ----- *Straight-Line Distance: 312.36 ft*  
*3D Distance on Surface: 316.64 ft*  
*Vertical Difference (Start to Finish): 15.6 ft*  
*Minimum Elevation on Path: -11.337 ft*

100 ft ----- *Maximum Elevation on Path: 12.271 ft*  
*Azimuth: 273° 44' 0.1"*  
*Slope/Tilt: 2.85°*



*Start Position: 37° 56' 10.2608" N, 121° 31' 38.4693" W*

*Start Height: -12.039 ft*

*End Position: 37° 56' 8.8696" N, 121° 31' 39.8914" W*

*End Height: 5.031 ft*

*Straight-Line Distance: 181.06 ft*

*3D Distance on Surface: 185.55 ft*

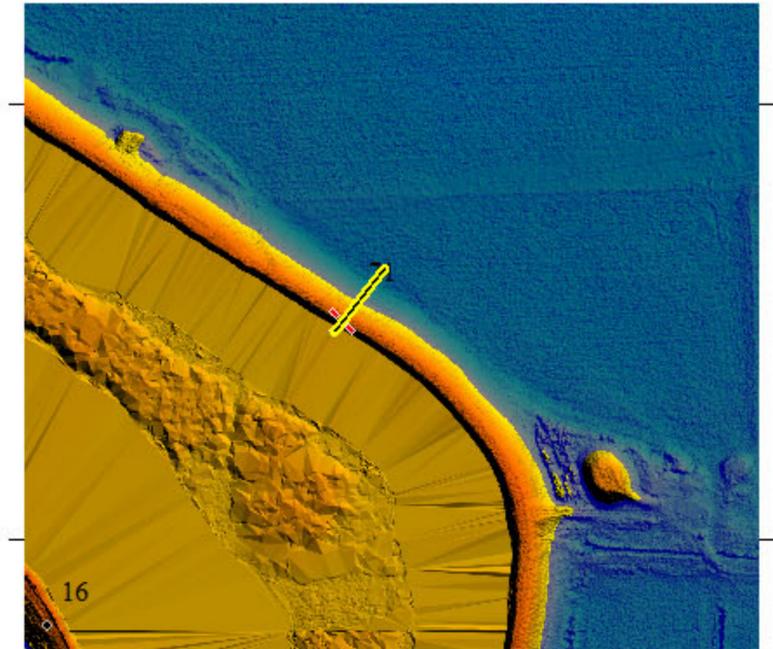
*Vertical Difference (Start to Finish): 17.1 ft*

*Minimum Elevation on Path: -12.278 ft*

*Maximum Elevation on Path: 11.386 ft*

*Azimuth: 218° 59' 39.3"*

*Slope/Tilt: 5.39°*



75 ft

50 ft

25 ft

0 ft

Location: 37° 56' 9.1125" N, 121° 31' 39.6430" W  
Elev: 11.41 ft, Dist: 149.44 ft

25 ft

50 ft

75 ft

100 ft

125 ft

150 ft

181 ft

Start Position: 37° 56' 18.5812" N, 121° 31' 52.1512" W

Start Height: -3.675 ft

End Position: 37° 56' 17.7784" N, 121° 31' 54.9561" W

End Height: 4.492 ft

Straight-Line Distance: 238.92 ft

3D Distance on Surface: 243.41 ft

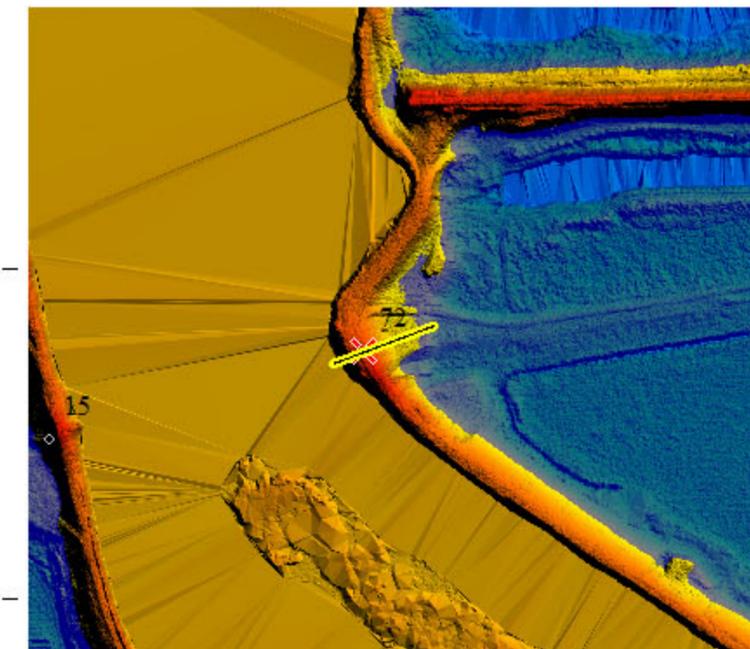
Vertical Difference (Start to Finish): 8.2 ft

Minimum Elevation on Path: -3.675 ft

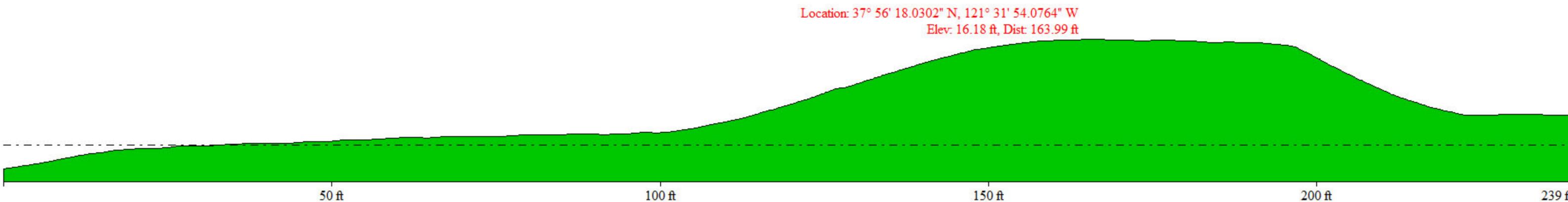
Maximum Elevation on Path: 16.189 ft

Azimuth: 250° 07' 51.4"

Slope/Tilt: 1.96°

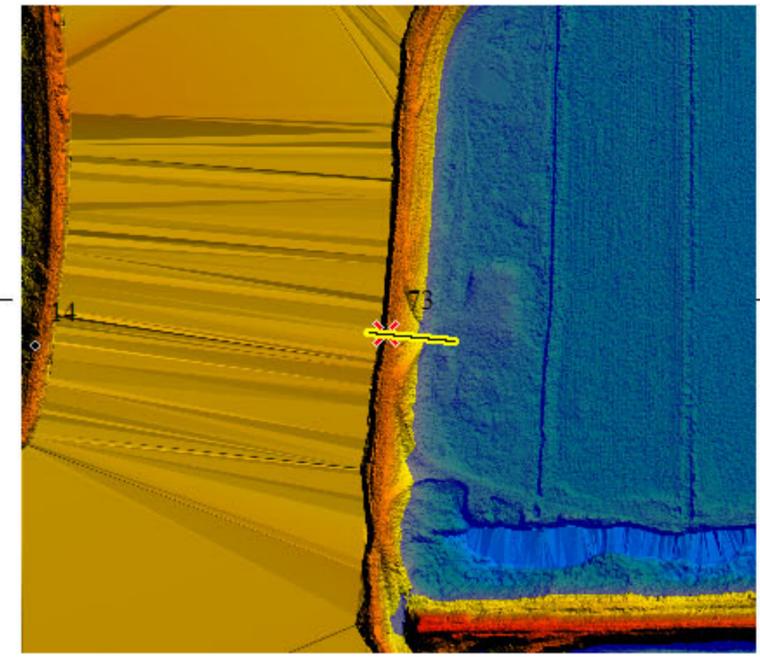


125 ft  
100 ft  
75 ft  
50 ft  
25 ft  
0 ft



100 ft

Start Position: 37° 56' 29.8461" N, 121° 31' 51.5904" W  
Start Height: -6.612 ft  
End Position: 37° 56' 30.0665" N, 121° 31' 53.9903" W  
End Height: 4.118 ft  
Straight-Line Distance: 193.54 ft  
3D Distance on Surface: 197.14 ft  
Vertical Difference (Start to Finish): 10.7 ft  
Minimum Elevation on Path: -6.612 ft  
Maximum Elevation on Path: 11.19 ft  
Azimuth: 276° 36' 50.2"  
Slope/Tilt: 3.17°



75 ft

50 ft

25 ft

0 ft

Location: 37° 56' 30.0162" N, 121° 31' 53.4425" W  
Elev: 11.42 ft, Dist: 149.36 ft

25 ft 50 ft 75 ft 100 ft 125 ft 150 ft 175 ft 194 ft

Start Position: 37° 56' 49.1079" N, 121° 31' 26.6815" W

Start Height: -10.744 ft

End Position: 37° 56' 50.5878" N, 121° 31' 29.2968" W

End Height: 4.502 ft

Straight-Line Distance: 257.48 ft

3D Distance on Surface: 260.77 ft

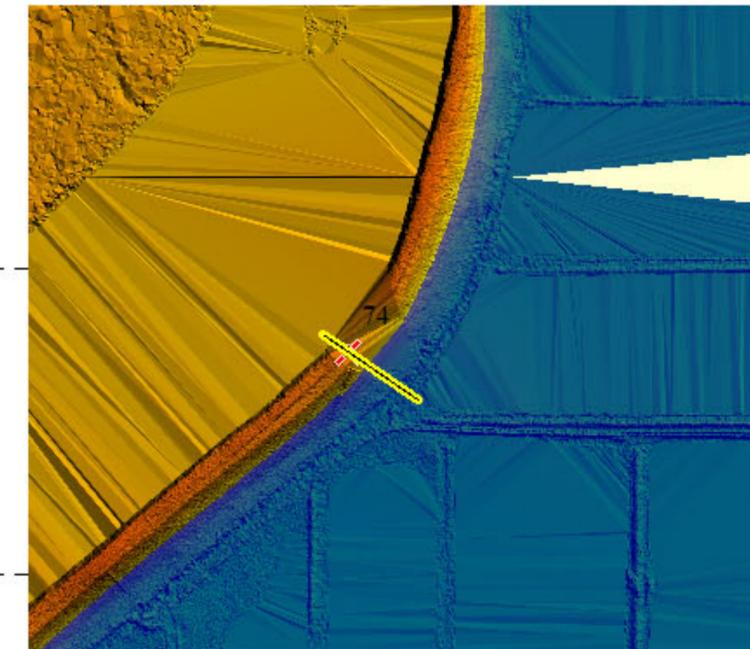
Vertical Difference (Start to Finish): 15.2 ft

Minimum Elevation on Path: -12.014 ft

Maximum Elevation on Path: 9.303 ft

Azimuth: 305° 32' 55.2"

Slope/Tilt: 3.39°



125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 56' 50.1734" N, 121° 31' 28.5643" W  
Elev: 9.61 ft, Dist: 185.37 ft

50 ft

100 ft

150 ft

200 ft

257 ft

Start Position: 37° 57' 9.1558" N, 121° 31' 28.0597" W

Start Height: -10.045 ft

End Position: 37° 57' 8.6958" N, 121° 31' 30.8583" W

End Height: 5.408 ft

Straight-Line Distance: 228.93 ft

3D Distance on Surface: 233.03 ft

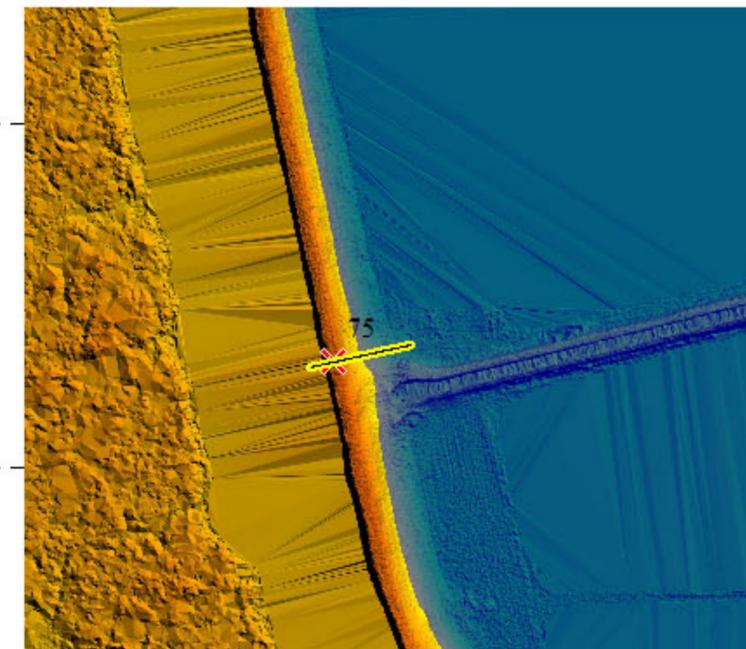
Vertical Difference (Start to Finish): 15.5 ft

Minimum Elevation on Path: -10.045 ft

Maximum Elevation on Path: 11.568 ft

Azimuth: 258° 16' 27.2"

Slope/Tilt: 3.86°



100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 57' 8.8085" N, 121° 31' 30.1729" W

Elev: 11.56 ft, Dist: 172.86 ft

50 ft

100 ft

150 ft

200 ft

229 ft

Start Position: 37° 57' 23.0952" N, 121° 31' 31.2437" W

Start Height: -12.103 ft

End Position: 37° 57' 23.0220" N, 121° 31' 34.5156" W

End Height: 5.134 ft

Straight-Line Distance: 262.16 ft

3D Distance on Surface: 267 ft

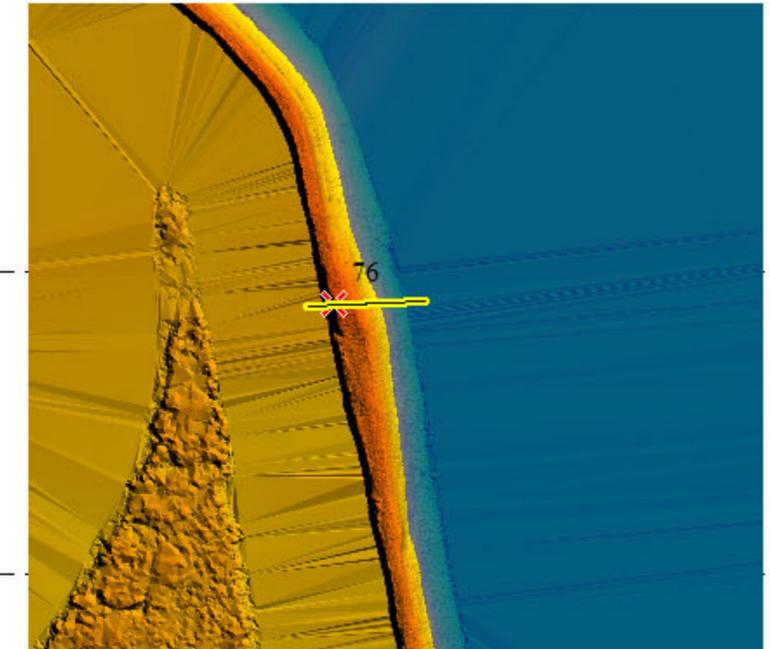
Vertical Difference (Start to Finish): 17.2 ft

Minimum Elevation on Path: -12.164 ft

Maximum Elevation on Path: 15.036 ft

Azimuth: 268° 22' 51.6"

Slope/Tilt: 3.76°



125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 57' 23.0396" N, 121° 31' 33.7284" W

Elev: 15.29 ft, Dist: 199.09 ft

50 ft

100 ft

150 ft

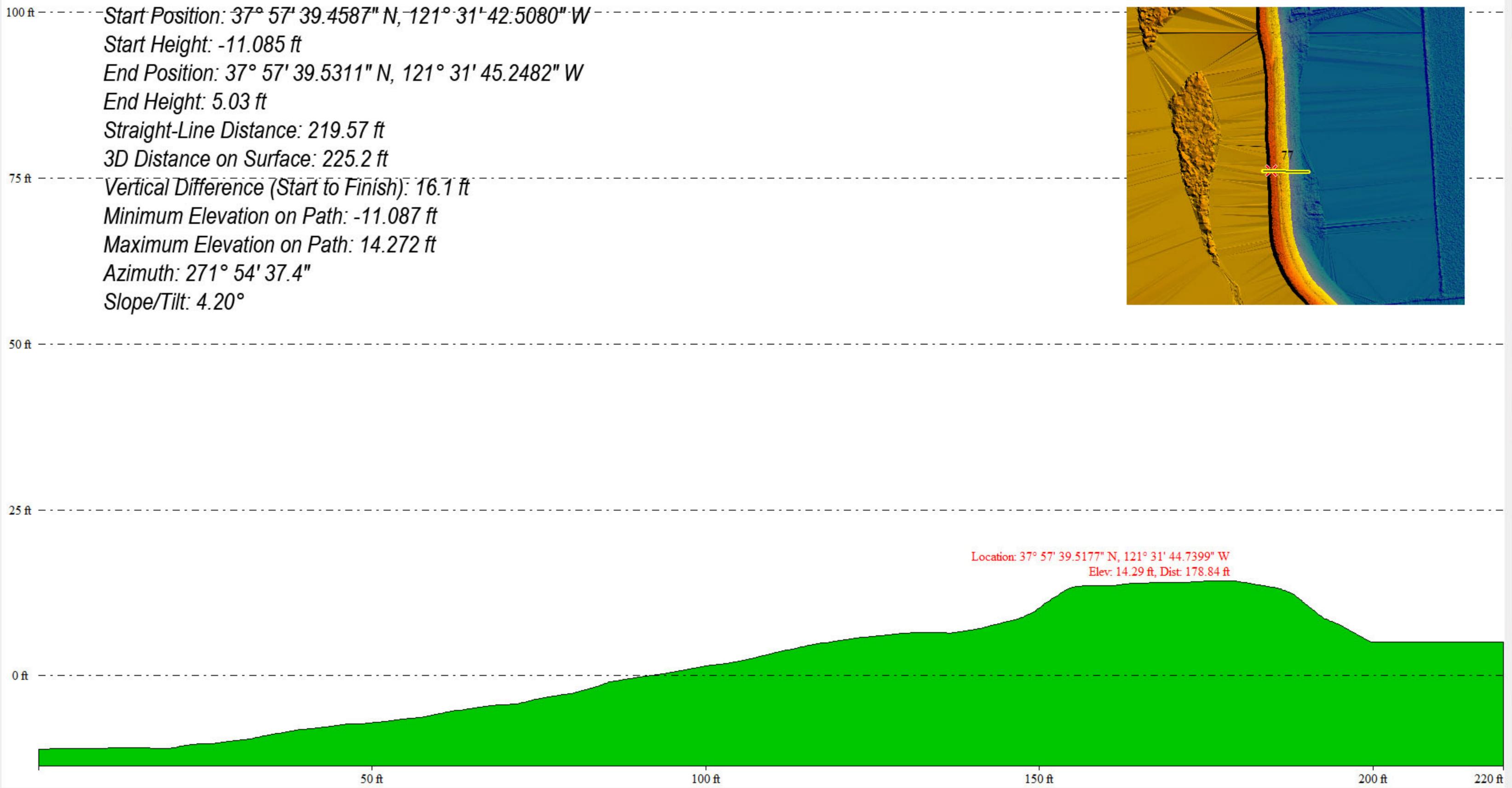
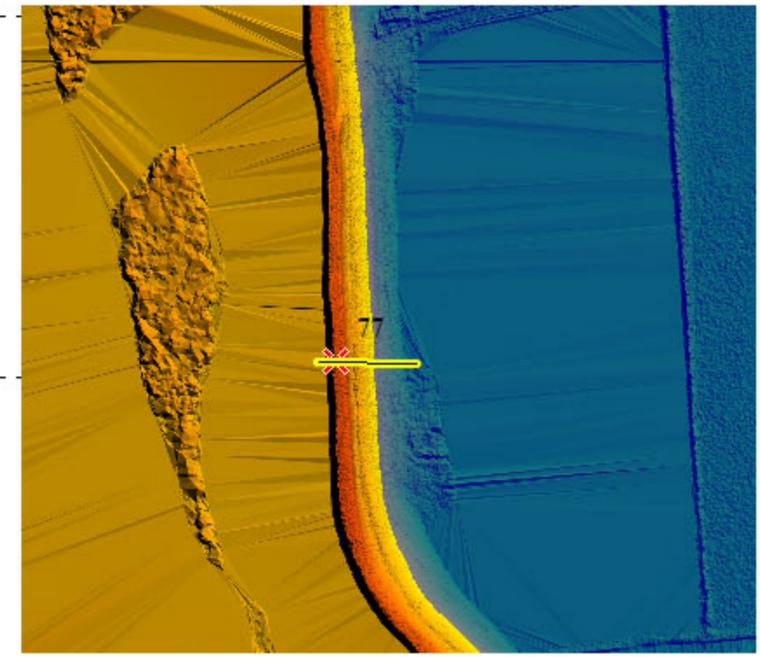
200 ft

250 ft

262 ft

# Station 77

Start Position: 37° 57' 39.4587" N, 121° 31' 42.5080" W  
 Start Height: -11.085 ft  
 End Position: 37° 57' 39.5311" N, 121° 31' 45.2482" W  
 End Height: 5.03 ft  
 Straight-Line Distance: 219.57 ft  
 3D Distance on Surface: 225.2 ft  
 Vertical Difference (Start to Finish): 16.1 ft  
 Minimum Elevation on Path: -11.087 ft  
 Maximum Elevation on Path: 14.272 ft  
 Azimuth: 271° 54' 37.4"  
 Slope/Tilt: 4.20°



*Start Position: 37° 57' 59.6544" N, 121° 31' 46.5784" W*

*Start Height: -10.082 ft*

*End Position: 37° 57' 59.4627" N, 121° 31' 49.5164" W*

*End Height: 4.804 ft*

*Straight-Line Distance: 236.08 ft*

*3D Distance on Surface: 241.92 ft*

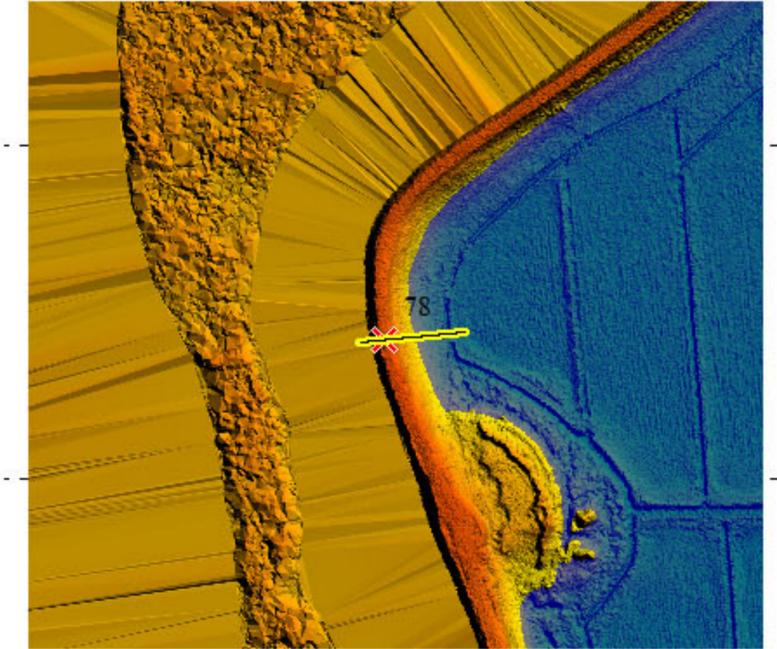
*Vertical Difference (Start to Finish): 14.9 ft*

*Minimum Elevation on Path: -11.028 ft*

*Maximum Elevation on Path: 13.365 ft*

*Azimuth: 265° 17' 13.7"*

*Slope/Tilt: 3.61°*



100 ft

75 ft

50 ft

25 ft

0 ft

*Location: 37° 57' 59.5090" N, 121° 31' 48.8065" W*  
*Elev: 13.50 ft, Dist: 179.04 ft*

50 ft

100 ft

150 ft

200 ft

236 ft

*Start Position: 37° 58' 16.8224" N, 121° 32' 10.4807" W*

*Start Height: 4.494 ft*

*End Position: 37° 58' 15.5138" N, 121° 32' 12.4309" W*

*End Height: 4.417 ft*

*Straight-Line Distance: 204.71 ft*

*3D Distance on Surface: 211.78 ft*

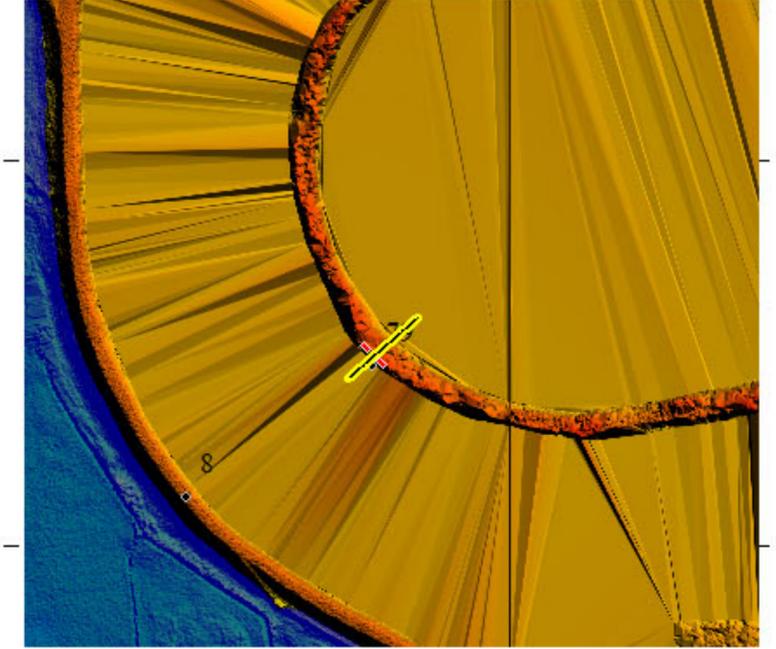
*Vertical Difference (Start to Finish): -0.1 ft*

*Minimum Elevation on Path: 4.31 ft*

*Maximum Elevation on Path: 15.479 ft*

*Azimuth: 229° 42' 53.3"*

*Slope/Tilt: -0.02°*



100 ft

75 ft

50 ft

25 ft

Location: 37° 58' 15.9987" N, 121° 32' 11.7083" W  
Elev: 15.63 ft, Dist: 128.86 ft

50 ft

100 ft

150 ft

205 ft

Start Position: 37° 58' 9.9295" N, 121° 31' 30.8359" W

Start Height: -10.876 ft

End Position: 37° 58' 11.7104" N, 121° 31' 33.1574" W

End Height: 5.197 ft

Straight-Line Distance: 258.86 ft

3D Distance on Surface: 264.15 ft

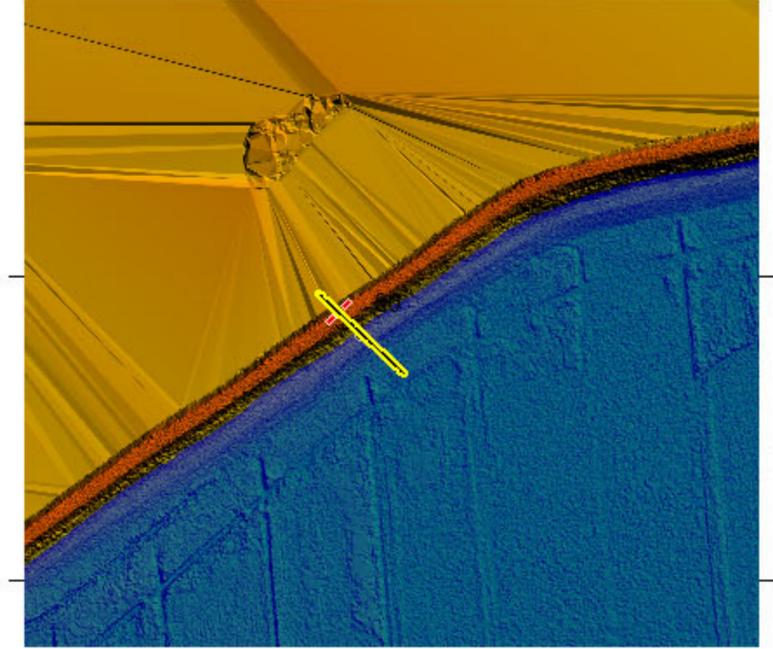
Vertical Difference (Start to Finish): 16.1 ft

Minimum Elevation on Path: -11.205 ft

Maximum Elevation on Path: 12.847 ft

Azimuth: 314° 05' 55.4"

Slope/Tilt: 3.55°



125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 58' 11.2918" N, 121° 31' 32.6117" W  
Elev: 12.97 ft, Dist: 198.02 ft

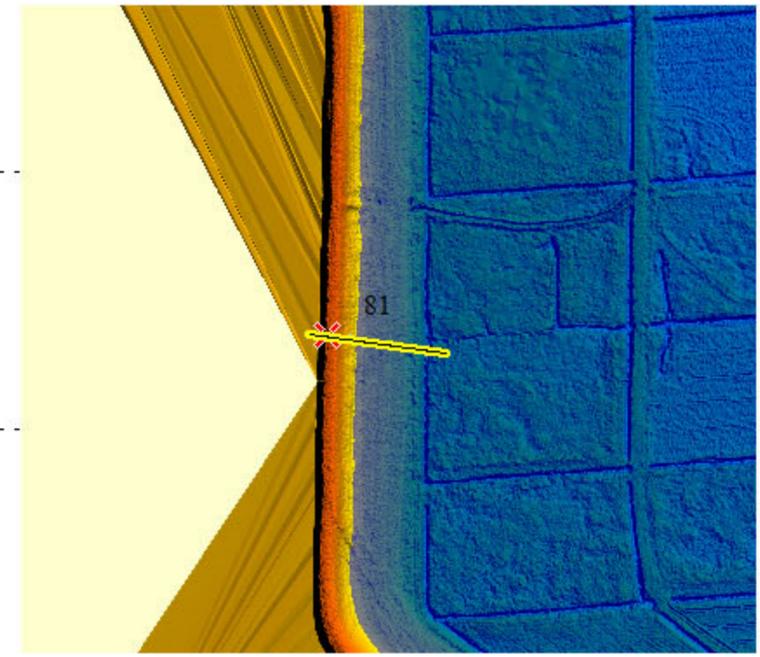
50 ft

100 ft

150 ft

200 ft

259 ft



Start Position: 37° 58' 58.5517" N, 121° 30' 53.9709" W

Start Height: -9.394 ft

End Position: 37° 58' 58.7471" N, 121° 30' 57.3829" W

End Height: 0 ft

Straight-Line Distance: 273.89 ft

3D Distance on Surface: 282.15 ft

Vertical Difference (Start to Finish): 9.4 ft

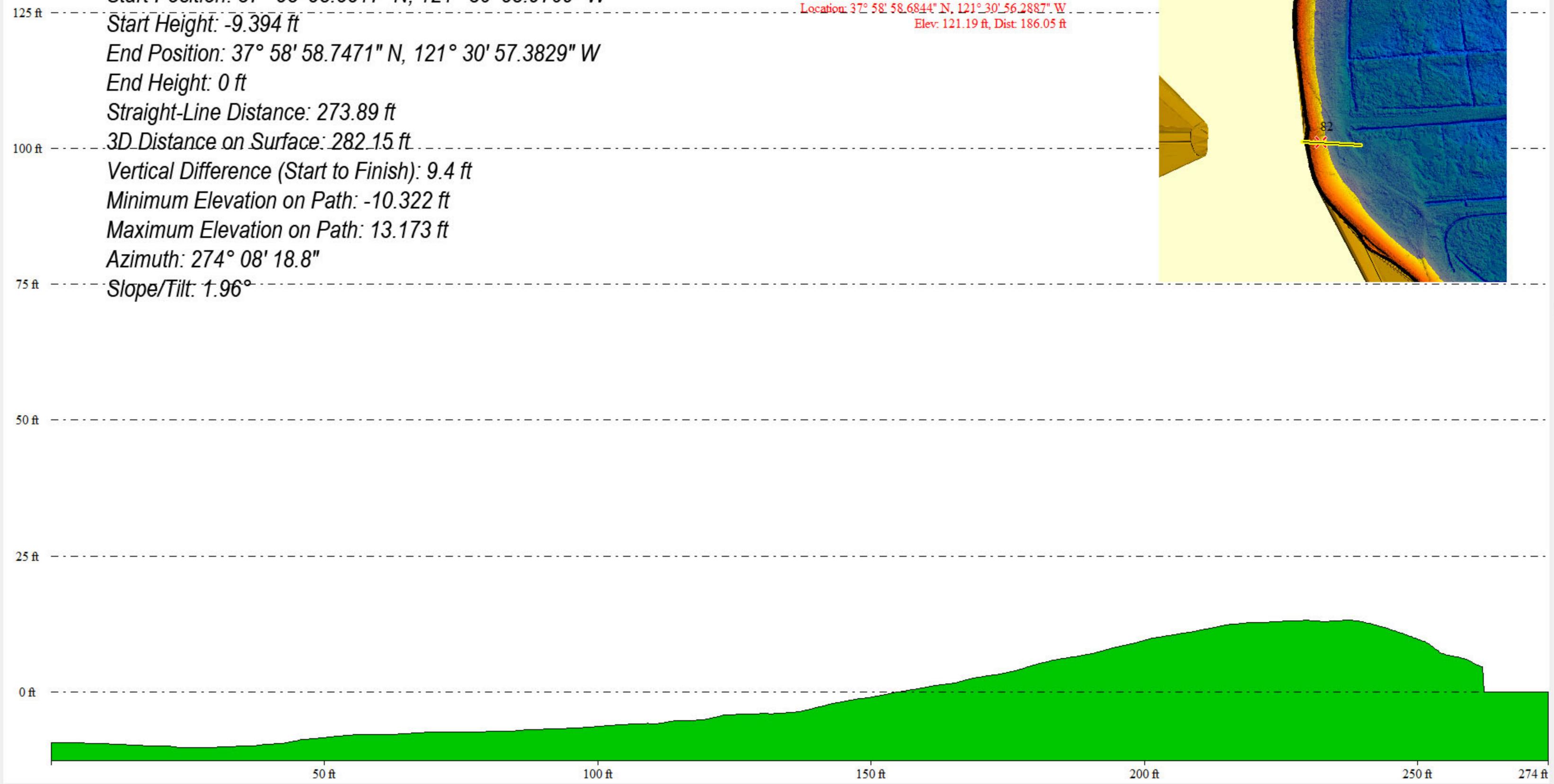
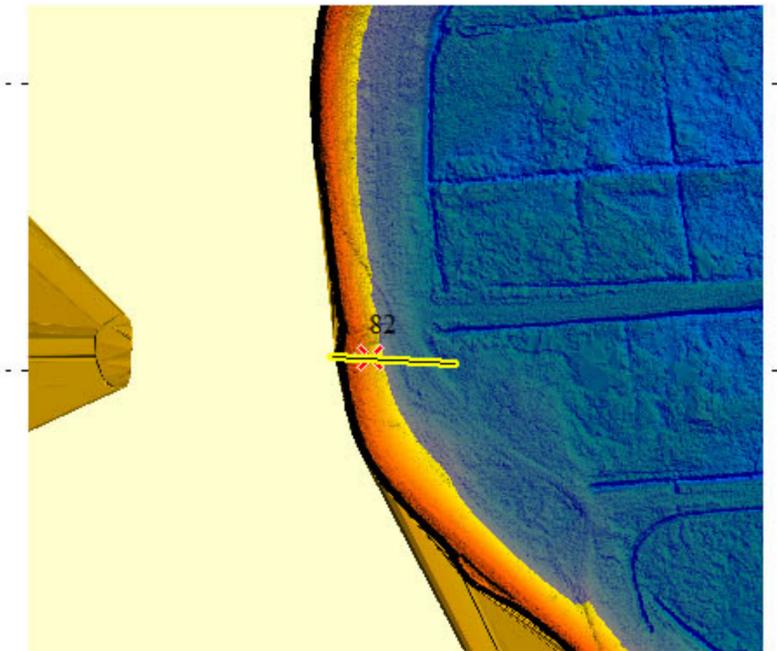
Minimum Elevation on Path: -10.322 ft

Maximum Elevation on Path: 13.173 ft

Azimuth: 274° 08' 18.8"

Slope/Tilt: 1.96°

Location: 37° 58' 58.6844" N, 121° 30' 56.2887" W  
Elev: 121.19 ft, Dist: 186.05 ft



# Station 83

Start Position: 37° 59' 9.2261" N, 121° 30' 45.8650" W

Start Height: -14.945 ft

End Position: 37° 59' 11.6483" N, 121° 30' 47.6925" W

End Height: 3.846 ft

Straight-Line Distance: 285.38 ft

3D Distance on Surface: 292.14 ft

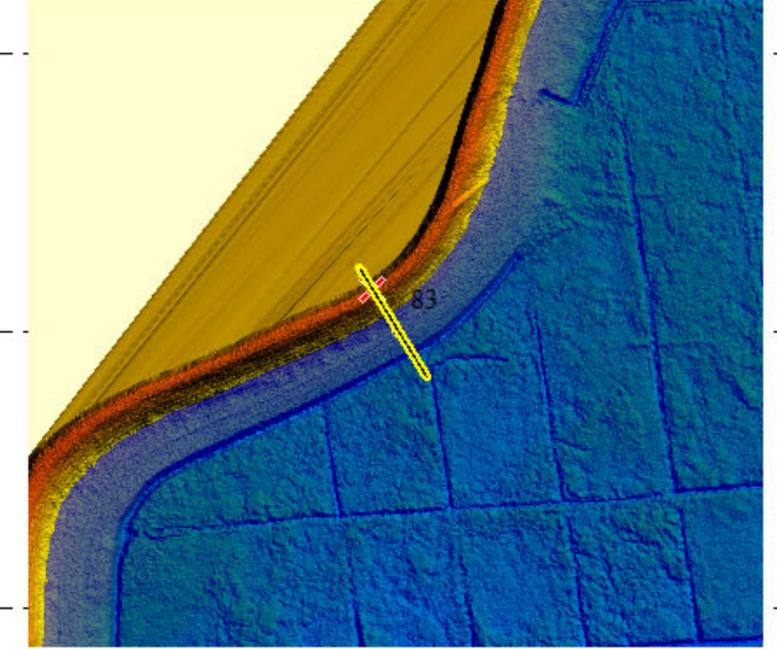
Vertical Difference (Start to Finish): 18.8 ft

Minimum Elevation on Path: -16.288 ft

Maximum Elevation on Path: 12.498 ft

Azimuth: 329° 09' 21.7"

Slope/Tilt: 3.77°



125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

Location: 37° 59' 11.1474" N, 121° 30' 47.3147" W  
Elev: 12.44 ft, Dist: 226.37 ft

50 ft

100 ft

150 ft

200 ft

250 ft

285 ft

150 ft

*Start Position: 37° 59' 25.4138" N, 121° 30' 31.1029" W*

*Start Height: -12.584 ft*

*End Position: 37° 59' 28.0270" N, 121° 30' 32.9747" W*

*End Height: 0 ft*

*Straight-Line Distance: 303.86 ft*

*3D Distance on Surface: 313.77 ft*

*Vertical Difference (Start to Finish): 12.6 ft*

*Minimum Elevation on Path: -14.913 ft*

*Maximum Elevation on Path: 13.316 ft*

*Azimuth: 330° 27' 9.2"*

*Slope/Tilt: 2.37°*

125 ft

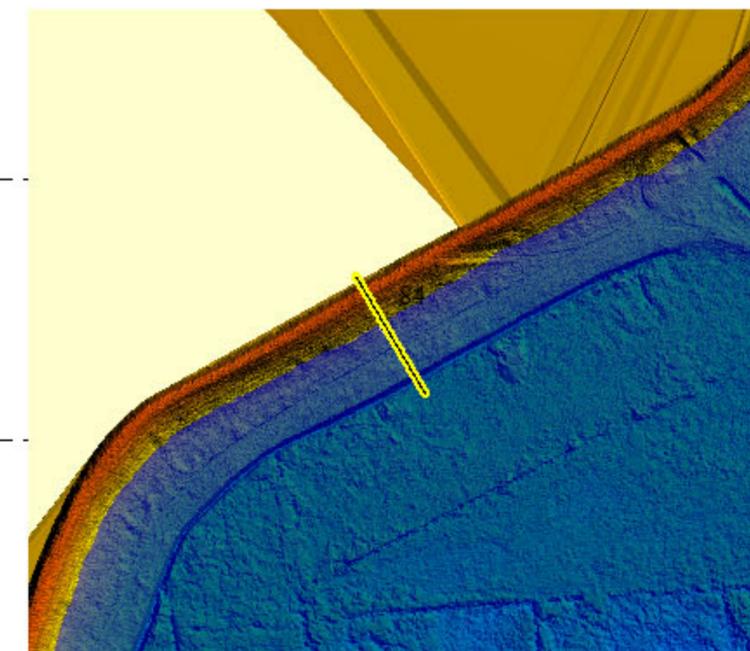
100 ft

75 ft

50 ft

25 ft

0 ft



50 ft

100 ft

150 ft

200 ft

250 ft

304 ft

Start Position: 37° 59' 42.6018" N, 121° 30' 17.1849" W

Start Height: -12.706 ft

End Position: 37° 59' 43.1867" N, 121° 30' 21.2633" W

End Height: 4.174 ft

Straight-Line Distance: 331.79 ft

3D Distance on Surface: 336.8 ft

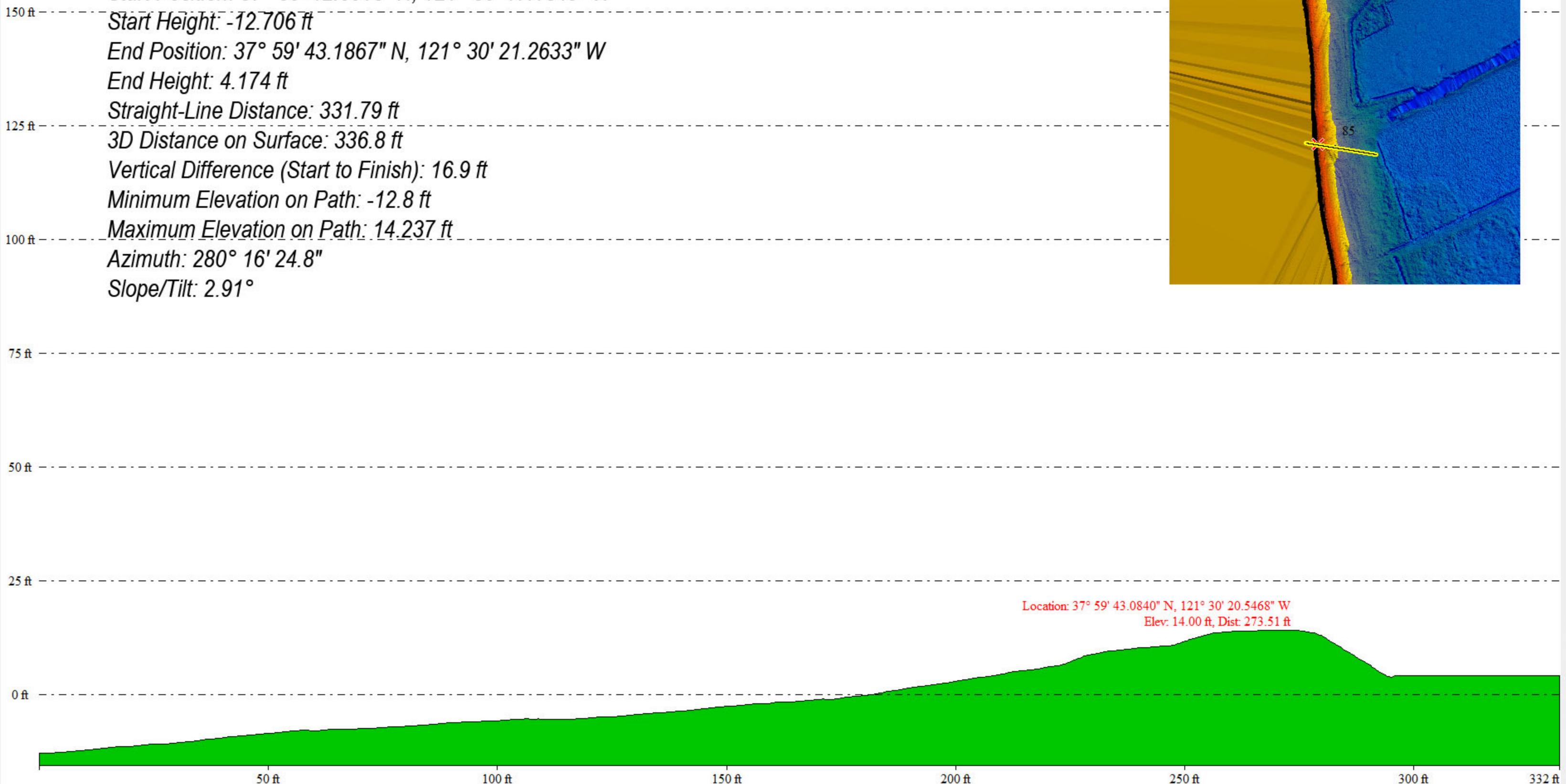
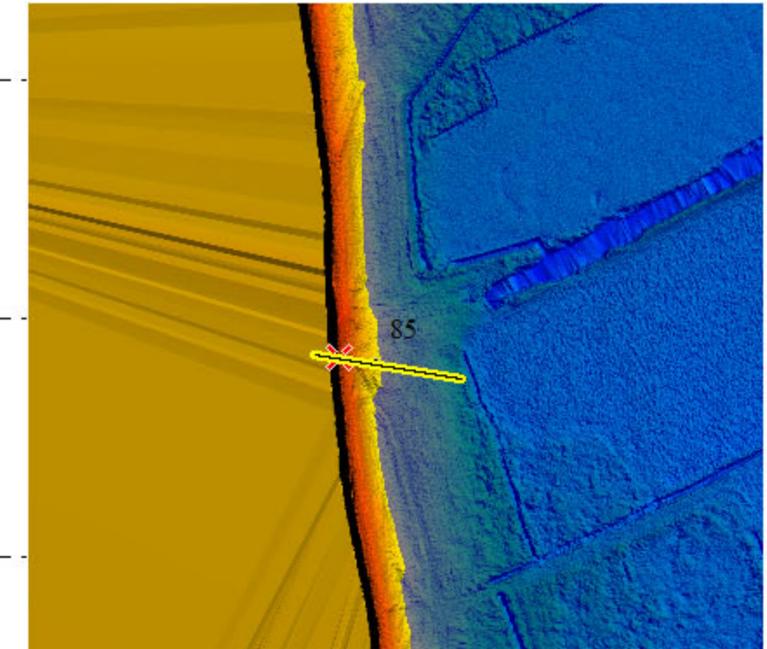
Vertical Difference (Start to Finish): 16.9 ft

Minimum Elevation on Path: -12.8 ft

Maximum Elevation on Path: 14.237 ft

Azimuth: 280° 16' 24.8"

Slope/Tilt: 2.91°



*Start Position: 38° 00' 3.3648" N, 121° 30' 29.9011" W*

*Start Height: -9.286 ft*

*End Position: 38° 00' 1.3869" N, 121° 30' 32.2461" W*

*End Height: 3.998 ft*

*Straight-Line Distance: 274.34 ft*

*3D Distance on Surface: 279.86 ft*

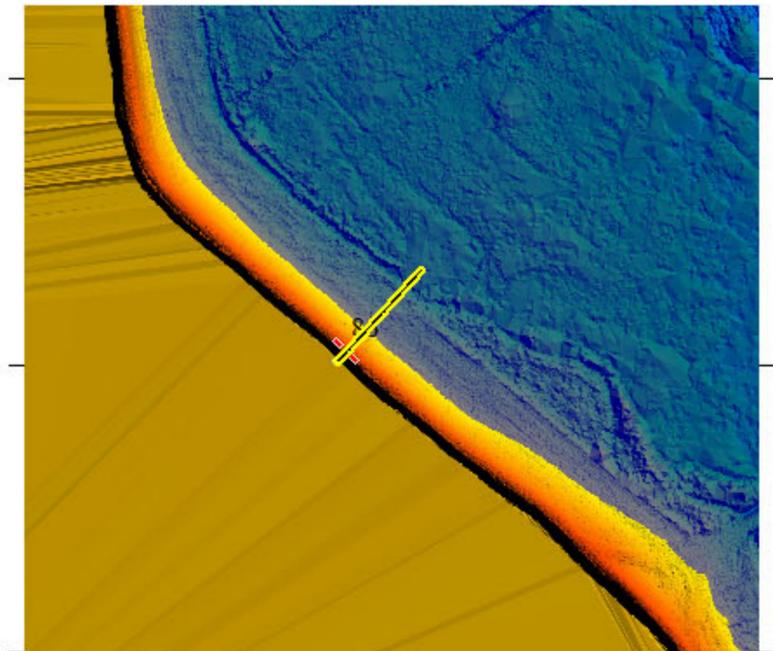
*Vertical Difference (Start to Finish): 13.3 ft*

*Minimum Elevation on Path: -10.697 ft*

*Maximum Elevation on Path: 13.495 ft*

*Azimuth: 223° 10' 18.3"*

*Slope/Tilt: 2.77°*



125 ft

100 ft

75 ft

50 ft

25 ft

0 ft

*Location: 38° 00' 1.5867" N, 121° 30' 32.0092" W*  
*Elev: 13.40 ft, Dist: 246.62 ft*

50 ft

100 ft

150 ft

200 ft

250 ft

274 ft

## Appendix A

### Delta LIDAR data READ ME

Author date: 11.6.2007

This is a general description of the data contained on this hard drive and the status of the project.

These data are from LIDAR flights of the Sacramento-San Joaquin Delta conducted during late January and February of 2007. The work was conducted under contract issued by California Department of Water Resources to URS Corporation. The prime LIDAR creation subcontractor was EarthData International, (later Fugro EarthData), also known as EDI. The principal aerial survey firm under subcontract to EDI was Airborne 1 Corporation. In effect, Airborne 1 performed the aerial survey, and EDI did the processing and deliverables preparation. Also involved in the contract to URS was an independent QA/QC firm, Spectrum Mapping LLC.

For this release, the survey includes:

- a) raw data, in folders titled "point cloud"
- b) bare earth elevations
- c) canopy/first return points
- d) LIDAR intensity return images
- e) flightlines and project tiles

The data are in a variety of formats, including ASCII, native LIDAR .las formats, ESRI v. 9.2 geodatabase points, and ESRI raster export format. The intensity images are geotiffs.

All data are registered to UTM Zone 10, NAD83, vertical datum NAVD88. The elevation units in the point files are in meters. The elevations for the ESRI grids are in decimeters (done to allow integer type grids to save file size).

The bare earth grid is of one meter resolution.

The accuracy specifications are as follows:

Vertical accuracy: 95% at 0.6' (<18.5cm) and 90% at 0.5' (15cm)  
Horizontal accuracy: 1.0' (30cm), 1 sigma.

The final QA/QC reports, final metadata, and the 1 foot contours (with breakline development) are not yet available and will be delivered later, probably around early January.

Included with the delivery is an indication of where reflights are planned for winter (probably January) of 2007-08. Data are provided in the reflight area, but end users should be aware that these are provisional data which will be revised with update data once processing of the reflight areas is complete, probably around March or April of 2008.

If problems, corrections, or issues arise with any portion of this dataset, please contact Joel Dudas at California Department of Water Resources, 916-651-7002, [jdudas@water.ca.gov](mailto:jdudas@water.ca.gov).

These data are considered public domain data and are not subject to distribution restrictions.

By using these data, users indicate that they understand that they shall not hold the California Department of Water Resources liable from any consequence from the use or misuse of these data.