INFINERGY

Proposed Lochluichart Wind Farm Extension II

Line of Sight Report – Proposed Radar impact on Inverness Airport

Prepared for:

Bluebell Wind Limited

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Executive Summary

Purpose of this Report

Bluebell Wind Limited, a joint venture between Infinergy Limited, a UK based wind farm developer, and Loch Luichart Estate, the site on which the proposed wind farm will be located on, are proposing to submit a planning application for a 9 turbine wind farm scheme called Lochluichart Wind Farm Extension II (LXX, or "the proposed development") in 2018.

The Scoping Report for the proposed development was formally submitted by Infinergy Limited on 12th April 2017. Contained within the Scoping Report, was an analysis of how it has become the norm amongst wind farm developers, in the subsidy free operating environment they currently exist in, to consider proposing wind turbines with tip-height of up to 200m.

Following an email response (20th April 2017) to the formal submission of the Scoping Report for the proposed development, from Anne Philips of the Safeguarding Team Highlands and Islands Airport Limited (see Appendix), a request was made by HIAL for Infinergy Limited to provide Line of Sight drawings between the Radar and Turbines at both 200m and 125m heights.

Technical Summary

Proposed Lochluichart Wind Farm Extension II Turbine Co-ordinates

The turbine co-ordinates provided below will be those on which the planning application for the proposed development will be submitted.

Turbine	Easting	Northing
2	233832	869578
3	234036	869306
4	234009	868766
5	233268	868761
6	232668	868596
7	232633	868934
8	232183	869027
9	232158	869399
11	232633	869609

Inverness Radar

The OS Grid coordinates for Inverness Radar are 276977.56E 852598.07N and the height of radar head is 31.4m AOD.

The table below summarises the radar line of sight results, please refer to Figure 1 plotting the location of Inverness Airport Radar, against the turbine locations for the proposed development.

LXX Turbine Tip Height	Number of Turbines visible to Inverness Airport
200m	0
125m	0

The table shows that, in relation to the potential impact on Inverness Airport from the proposed development none of the turbines will be visible, or in Line of Sight, by Inverness Airport Radar due to the presence of Little Wyvis (a Corbett of 764m AOD).

Recommendation

Due to the presence of Little Wyvis, none of the wind turbines from the proposed development will be visible, in Line of Sight, from Inverness Airport Radar. HIAL will again be consulted by the Highland Council, as part of the planning application process when the proposed development is submitted.

Appendix

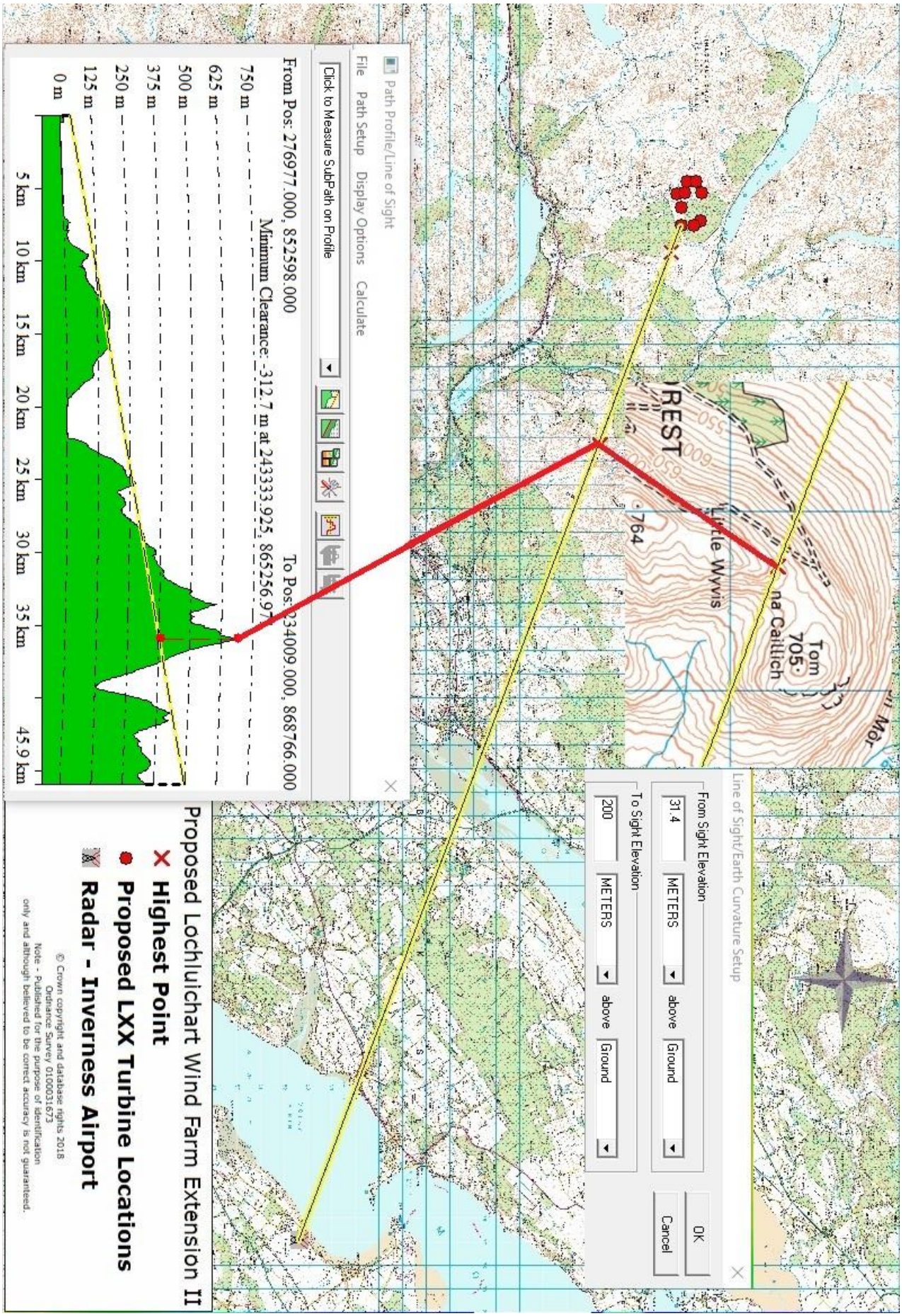


Figure 1.0 LXX HIAL Line of Sight Analysis from Inverness Airport Radar

Appendix 2

Line of Sight from Inverness Radar to LXX2

Radar set at 31.4m

WTG Tip at 200m

Start Position: 276977.000, 852598.000

Start Height: 41.961 m

End Position: 234009.000, 868766.000

End Height: 495.869 m

Path Length: 45916 m

Straight-Line Distance: 45916 m

3D Distance on Surface: 46139 m

Vertical Difference (Start to Finish): 453.9 m

Total Climbing: 1680.4 m over 22564 m on surface

Total Descending: 1345.1 m over 23575 m on surface

Minimum Elevation on Path: -1.47 m

Maximum Elevation on Path: 689.002 m

Azimuth: 288° 53' 1.7"

Slope/Tilt: 0.57°

Max Path Slope: 25.49° [33.483 km along path]

Min LOS Clearance: -312.729 m

Min LOS Clearance Location: 243333.925, 865256.971

Baseline Elev at Min LOS Clearance Location: 397.367 m

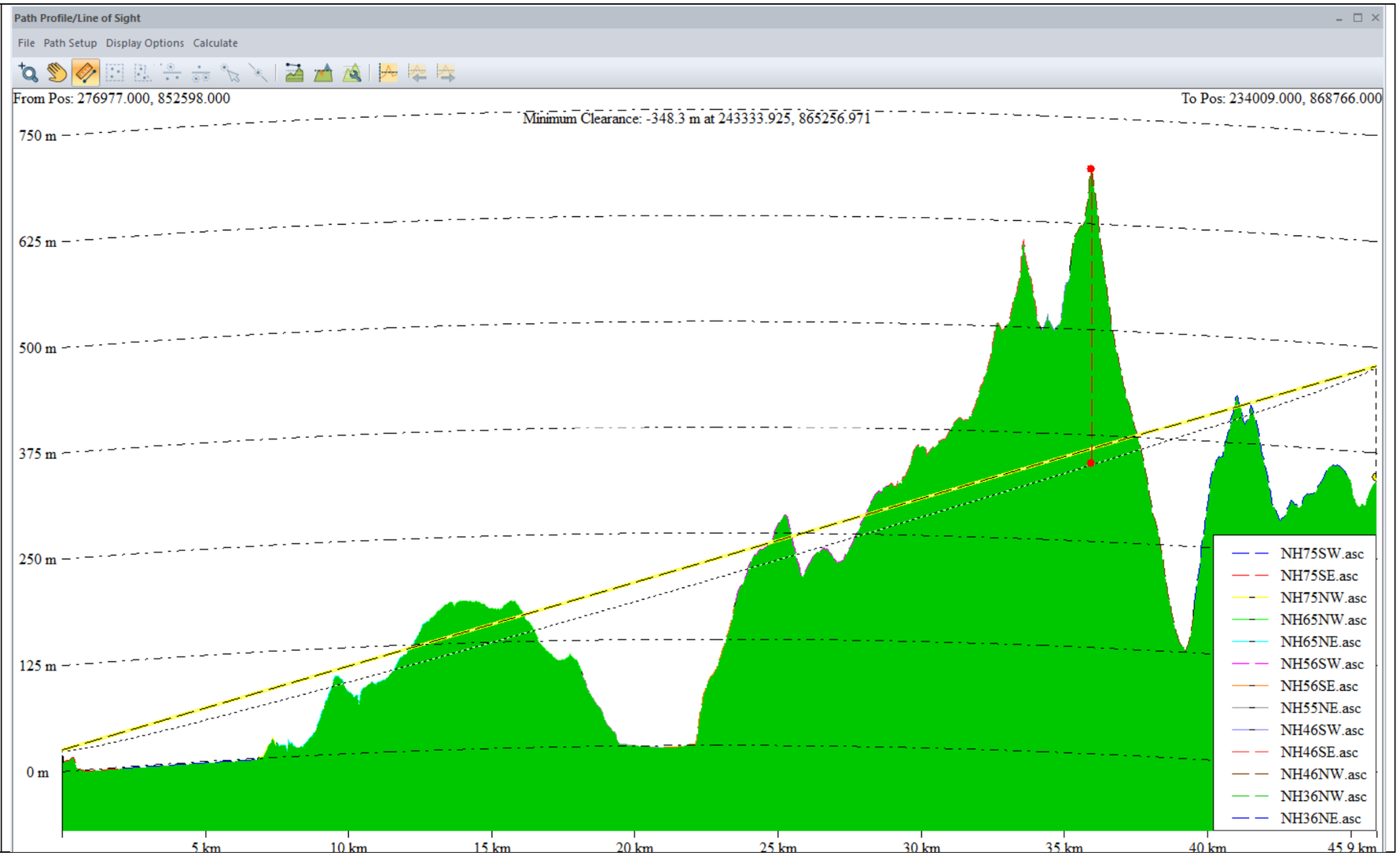
Scatter Angle: 2.1°

Lochluichart Wind Farm Extension II Planning Application

Line of Sight from Inverness Radar based on the revised (now) 5 turbine scheme.

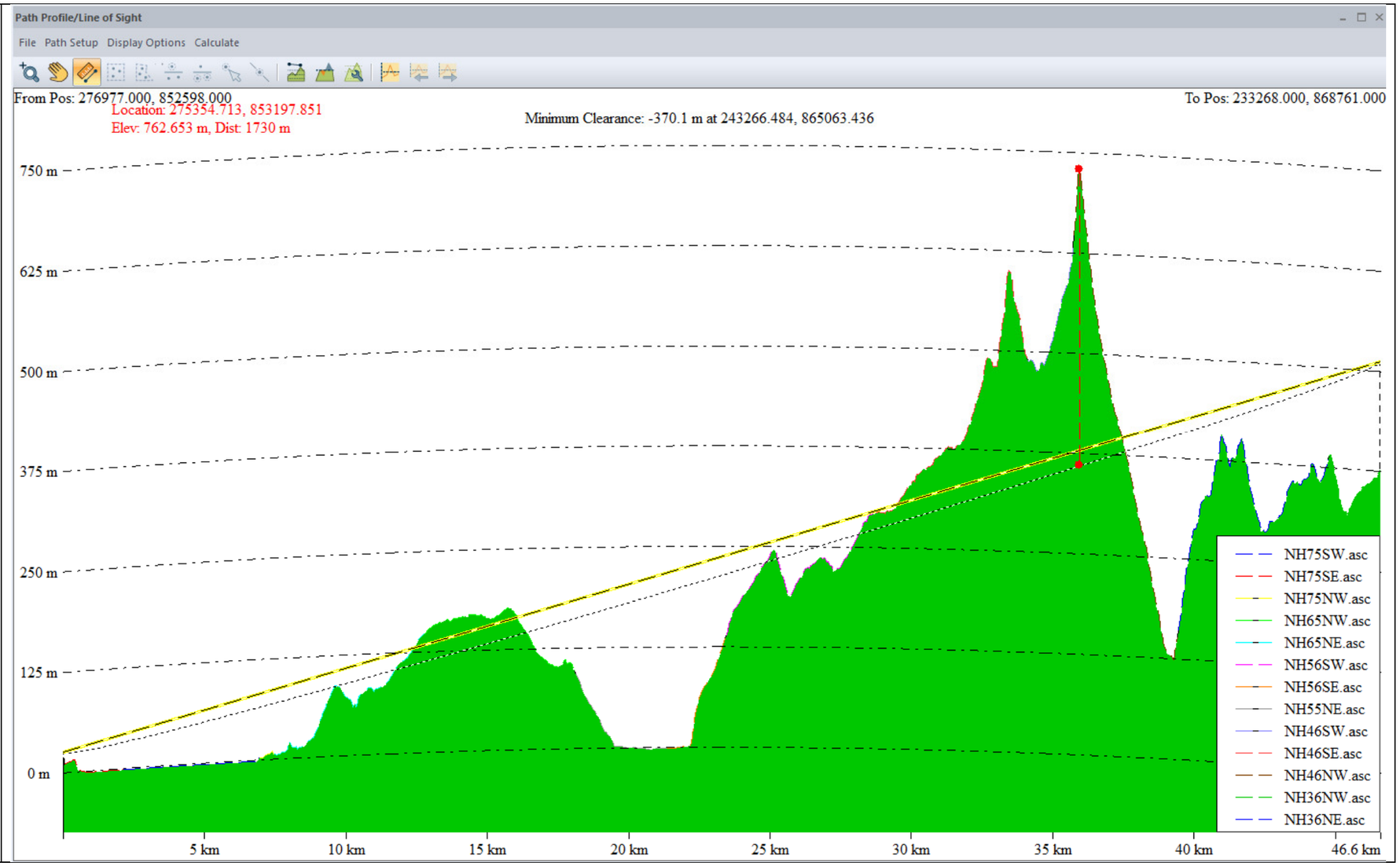
Turbine 4

Start Position: 276977.000, 852598.000
Start Height: 25.561 m
End Position: 234009.000, 868766.000
End Height: 478.869 m
Path Length: 45916 m
Straight-Line Distance: 45916 m
3D Distance on Surface: 46139 m
Vertical Difference (Start to Finish): 453.3 m
Total Climbing: 1680.4 m over 22564 m on surface
Total Descending: 1345.1 m over 23575 m on surface
Minimum Elevation on Path: -1.47 m
Maximum Elevation on Path: 689.002 m
Azimuth: 288° 53' 1.7"
Slope/Tilt: 0.57°
Max Path Slope: 25.49° [33.483 km along path]
Min LOS Clearance: -348.312 m (-329.599 m from baseline)
Min LOS Clearance Location: 243333.925, 865256.971
Baseline Elev at Min LOS Clearance Location: 380.497 m
Scatter Angle: 2.3°
Path Loss: 133.3 dB



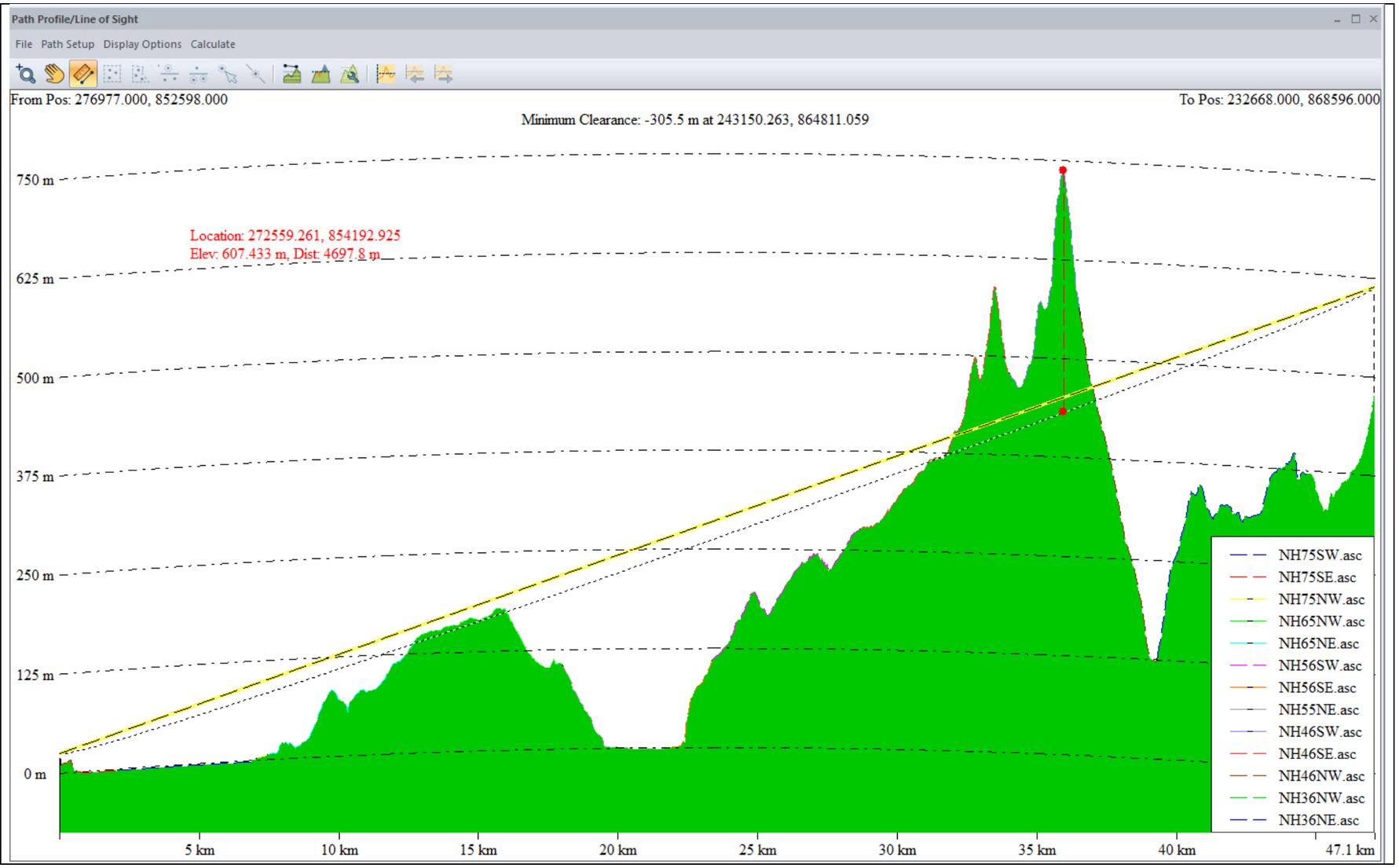
Turbine 5

Start Position: 276977.000, 852598.000
Start Height: 25.561 m
End Position: 233268.000, 868761.000
End Height: 512.281 m
Path Length: 46608 m
Straight-Line Distance: 46608 m
3D Distance on Surface: 46862 m
Vertical Difference (Start to Finish): 486.7 m
Total Climbing: 1742.4 m over 24286 m on surface
Total Descending: 1373.7 m over 22576 m on surface
Minimum Elevation on Path: -1.47 m
Maximum Elevation on Path: 729.317 m
Azimuth: 288° 33' 25.9"
Slope/Tilt: 0.60°
Max Path Slope: 30.81° [35.856 km along path]
Min LOS Clearance: -370.145 m (-350.934 m from baseline)
Min LOS Clearance Location: 243266.484, 865063.436
Baseline Elev at Min LOS Clearance Location: 400.949 m
Scatter Angle: 2.3°
Path Loss: 133.4 dB



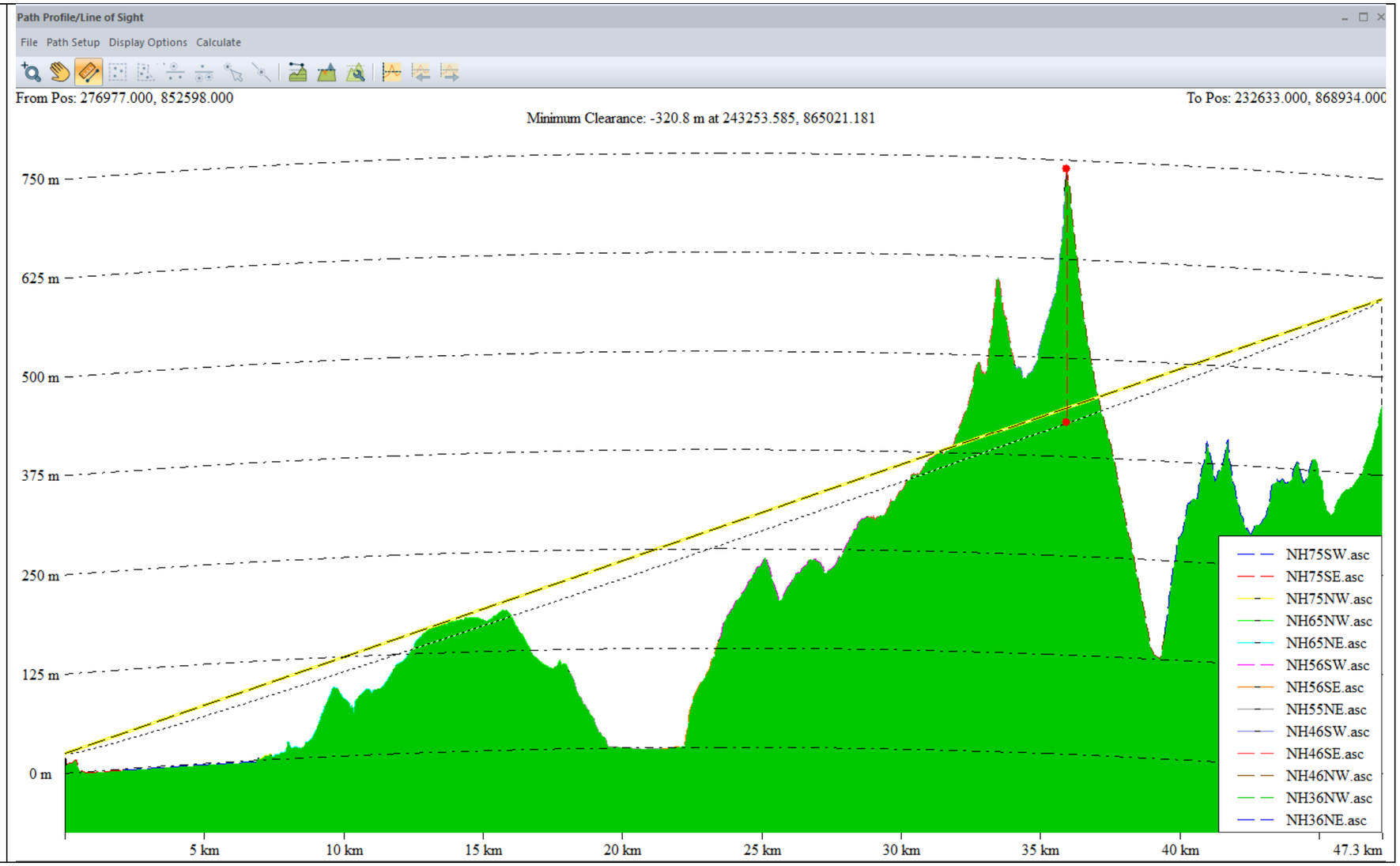
Turbine 6

Start Position: 276977.000, 852598.000
Start Height: 25.561 m
End Position: 232668.000, 868596.000
End Height: 614.127 m
Path Length: 47115 m
Straight-Line Distance: 47115 m
3D Distance on Surface: 47362 m
Vertical Difference (Start to Finish): 588.6 m
Total Climbing: 1742.4 m over 25192 m on surface
Total Descending: 1271.8 m over 22171 m on surface
Minimum Elevation on Path: -1.47 m
Maximum Elevation on Path: 737.296 m
Azimuth: 288° 06' 57.2"
Slope/Tilt: 0.72°
Max Path Slope: 33.41° [35.555 km along path]
Min LOS Clearance: -305.549 m (-286.007 m from baseline)
Min LOS Clearance Location: 243150.263, 864811.059
Baseline Elev at Min LOS Clearance Location: 474.896 m
Scatter Angle: 1.8°
Path Loss: 133.5 dB



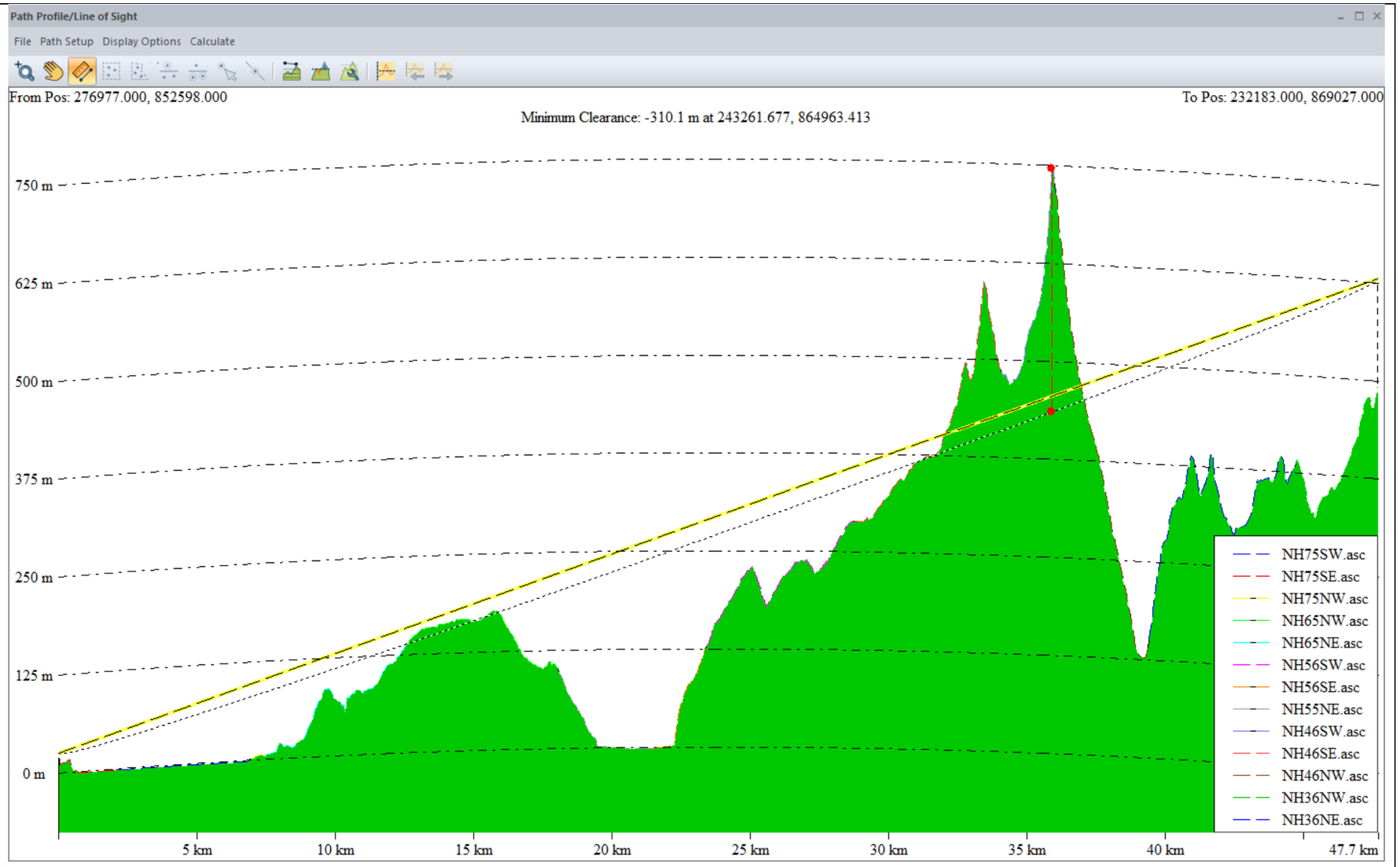
Turbine 7

Start Position: 276977.000, 852598.000
Start Height: 25.561 m
End Position: 232633.000, 868934.000
End Height: 598.612 m
Path Length: 47264 m
Straight-Line Distance: 47264 m
3D Distance on Surface: 47533 m
Vertical Difference (Start to Finish): 573.1 m
Total Climbing: 1850.2 m over 24774 m on surface
Total Descending: 1395.1 m over 22759 m on surface
Minimum Elevation on Path: -1.47 m
Maximum Elevation on Path: 738.542 m
Azimuth: 288° 29' 12.8"
Slope/Tilt: 0.69°
Max Path Slope: 34.88° [35.806 km along path]
Min LOS Clearance: -320.785 m (-301.129 m from baseline)
Min LOS Clearance Location: 243253.585, 865021.181
Baseline Elev at Min LOS Clearance Location: 461.371 m
Scatter Angle: 1.8°
Path Loss: 133.5 dB



Turbine 8

Start Position: 276977.000, 852598.000
Start Height: 25.561 m
End Position: 232183.000, 869027.000
End Height: 630.619 m
Path Length: 47718 m
Straight-Line Distance: 47718 m
3D Distance on Surface: 47995 m
Vertical Difference (Start to Finish): 605.1 m
Total Climbing: 1903.7 m over 25156 m on surface
Total Descending: 1416.6 m over 22839 m on surface
Minimum Elevation on Path: -1.47 m
Maximum Elevation on Path: 746.126 m
Azimuth: 288° 24' 17.6"
Slope/Tilt: 0.73°
Max Path Slope: 32.02° [35.824 km along path]
Min LOS Clearance: -310.071 m (-290.104 m from baseline)
Min LOS Clearance Location: 243261.677, 864963.413
Baseline Elev at Min LOS Clearance Location: 480.981 m
Scatter Angle: 1.7°
Path Loss: 133.6 dB



Settings used for each calculation

Radar Height 15 AGL

Tip Height 133m AGL