

C-4 Report on Nominal Pulse Spacing (NPS)

The USGS Lidar Base Specification 2023 rev. A states: "Assessment and reporting of the NPS are made against single swath, single instrument, first-return-only data, including only the geometrically usable part of the swath and excluding acceptable data voids. Higher net densities of lidar point measurements are being achieved more often by flying multiple passes of the lidar instrument over the project area or flying with large amounts (greater than [$>$] 50 percent) of overlap between swaths, creating a need for a new term to describe total pulse density without being confused with NPS and NPD. This specification will use the terms aggregate nominal pulse spacing (ANPS) and aggregate nominal pulse density (ANPD) to describe the net overall pulse spacing and density, respectively. The required ANPS and ANPD by QL are listed in Table 1. Dependent on the local terrain and land cover conditions in a project, a greater pulse density may be required on specific projects."

Table 1. Aggregate nominal pulse spacing and density.

[QL, quality level; pls/m², pulses per square meter; m, meter; \leq , less than or equal to; \geq , greater than or equal to]

Quality level	Aggregate nominal pulse spacing (m)	Aggregate nominal pulse density (pls/m ²)
QL0	≤ 0.35	≥ 8.0
QL1	≤ 0.35	≥ 8.0
QL2	≤ 0.71	≥ 2.0
QL3	≤ 1.41	≥ 0.5

The purpose of this section is to report on the lidar point density and nominal point spacing by LAS file. Averages by files (not including overlap), project boundary polygons (including overlap), and aggregate project boundary polygons (including overlap) are reported. Any 'Exclusion Shapefile' pathed out on the Input Tab of this tool was applied to the processing for this test to avoid skewing the results with known areas of no data.

Quality level tested: QL1

Units: Meter

File	Number of First Returns	Area	Point Density	NPS
Average			17.517/1.627 <small>pp Square Meter/ pp Square US Survey Foot</small>	0.239/0.784 <small>Meter/ US Survey Feet</small>

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<u>Boundary ID</u>	<u>Number of First Returns</u>	<u>Area</u>	<u>Point Density</u>	<u>NPS</u>
Aggregate	99,087,556,871	4,164,000,000	23.796/2.211 <small>pp Square Meter/ pp Square US Survey Foot</small>	0.205/0.673 <small>Meter/ US Survey Feet</small>