

Technical Insights

So what can you do with that ASCII LIDAR data?

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Unfortunately, much LIDAR data has been delivered in text format (American Standard Code for Information Interchange, ASCII) rather than the rich binary LAS format. Many agencies now have disk drives of LIDAR, in ASCII format, on the shelf that accompanied more familiar LIDAR-derived products such as gridded Digital Elevation Models (DEMs) and digital contour files. So is there value in these ASCII LIDAR files?

To this question, I would say most emphatically yes! Generally the value will be limited when compared to a full LAS data set but, in most cases, there will be information above and beyond the DEMs and contours that were delivered as standard products.

We recently visited a municipality that has been using gridded elevation data derived from LIDAR. They have various files of ASCII format LIDAR data that were delivered with the project but have remained unused. We were asked to have a look at these data to see if useful additional information could be derived. Upon inspecting the files, I noted that they have data sets labeled as "Ground" files and separate files of "non-Ground." LP360 includes an import function for reading ASCII files so I decided to attempt to use this as a method to create a merged LAS file of ground and non-ground. I first imported the ground file (the import tool is under the LP360 drop-down on the main LP360 toolbar in the ArcGIS® version and under the File menu item for LP360 for Windows®). Note that if the files are different, you will need to import them one at a time.

It is necessary to inspect the file content to see what data has been provided by the vendor. The ASCII Import wizard is depicted in Figure 1 with the columns of a file labeled "non-ground." Note that these data are comma delimited and comprise 4 columns. The first 3 are the X, Y, Z (respectively) coordinates of the points whereas the fourth appears to be Intensity (since it contains a fairly wide range of values). If in doubt about additional columns, try the most logical choice on import and just see how it looks!

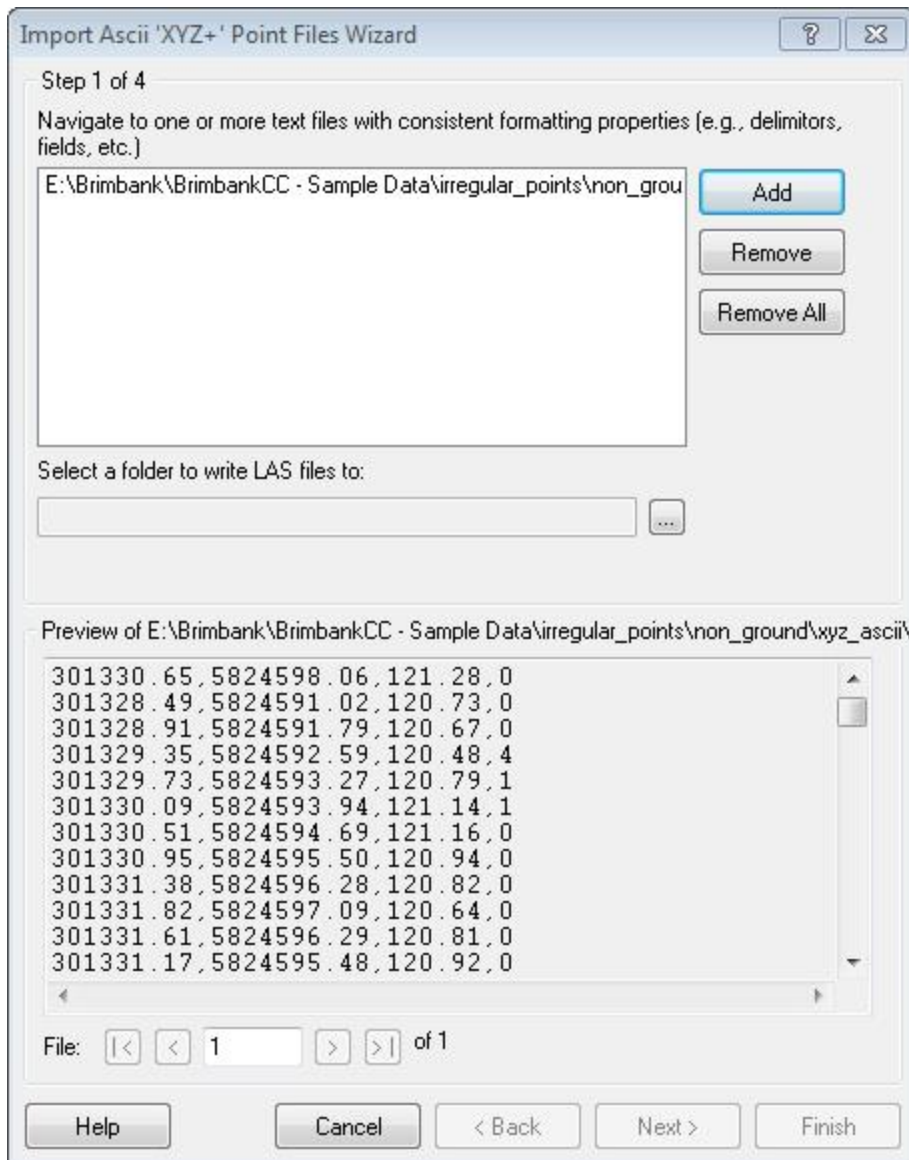


Figure 1: Import ASCII file

Following the conversion from ASCII to LAS, it is necessary to import the resultant LAS file as a separate operation. Figure 2 shows the result of the import. Note the diagonal band (upper left extending down to the right). This is an area of mixed ground, non-ground and may appear to be an error in the file. However, it is simply an area of overlap where a high proportion of points on the ground have not been classified (hence non-Ground). Thus notice that the label non-Ground (for this particular vendor's data) means points that have not been classified as ground, even if they are rightly ground points. Note also that the choice of the fourth column being intensity was correct although this particular data set does not exhibit a very wide dynamic range.

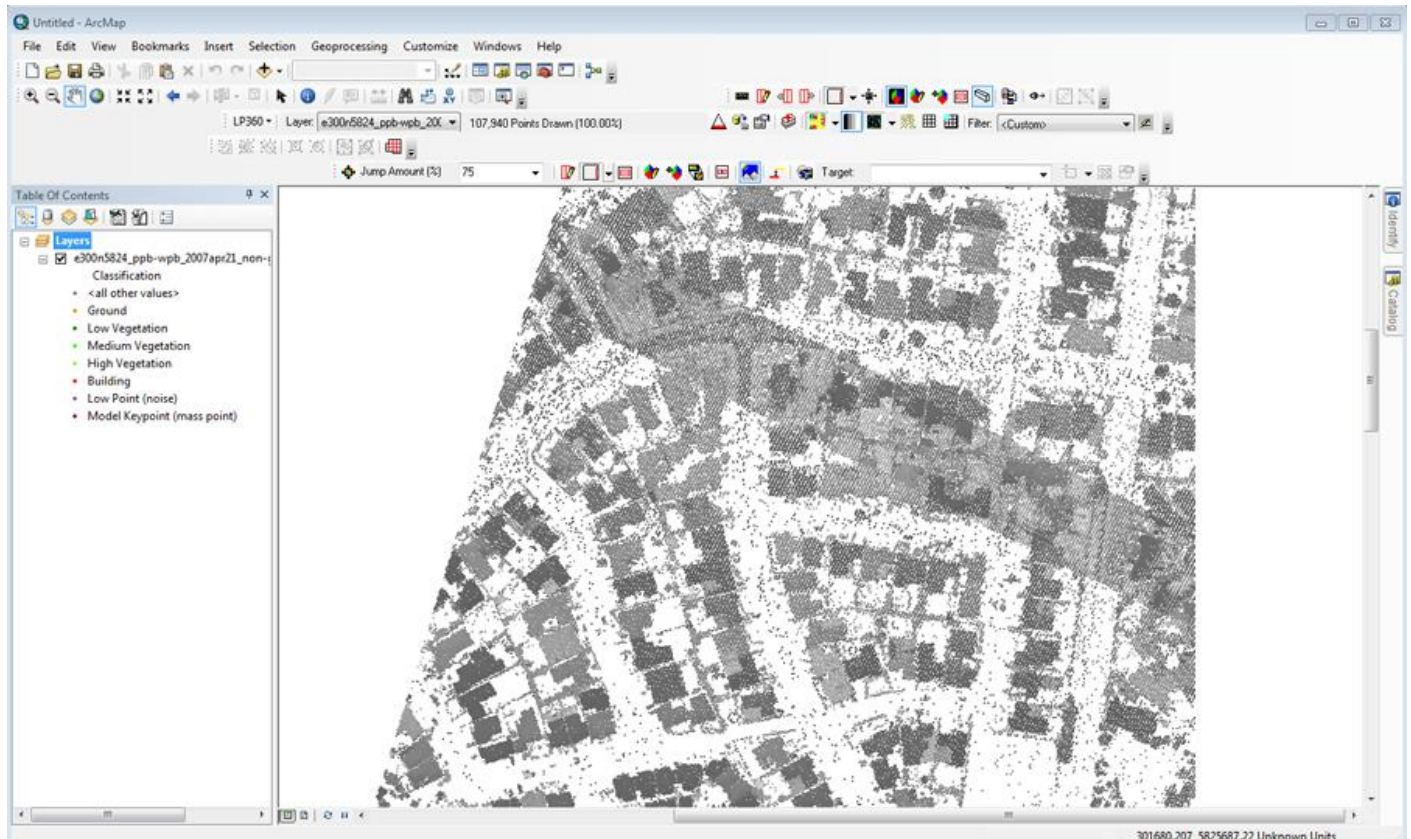


Figure 2: The Non-Ground class following conversion to LAS

I next imported the file marked as Ground. This data set contained only three columns of data (X, Y, Z) and thus, unfortunately, did not have intensity. Note that the ASCII converter allows you to assign all points that are being converted to a specific Class. When importing data that represents a specific class, use this option. I set the class to Ground since I was converting the ground class (see Figure 3).

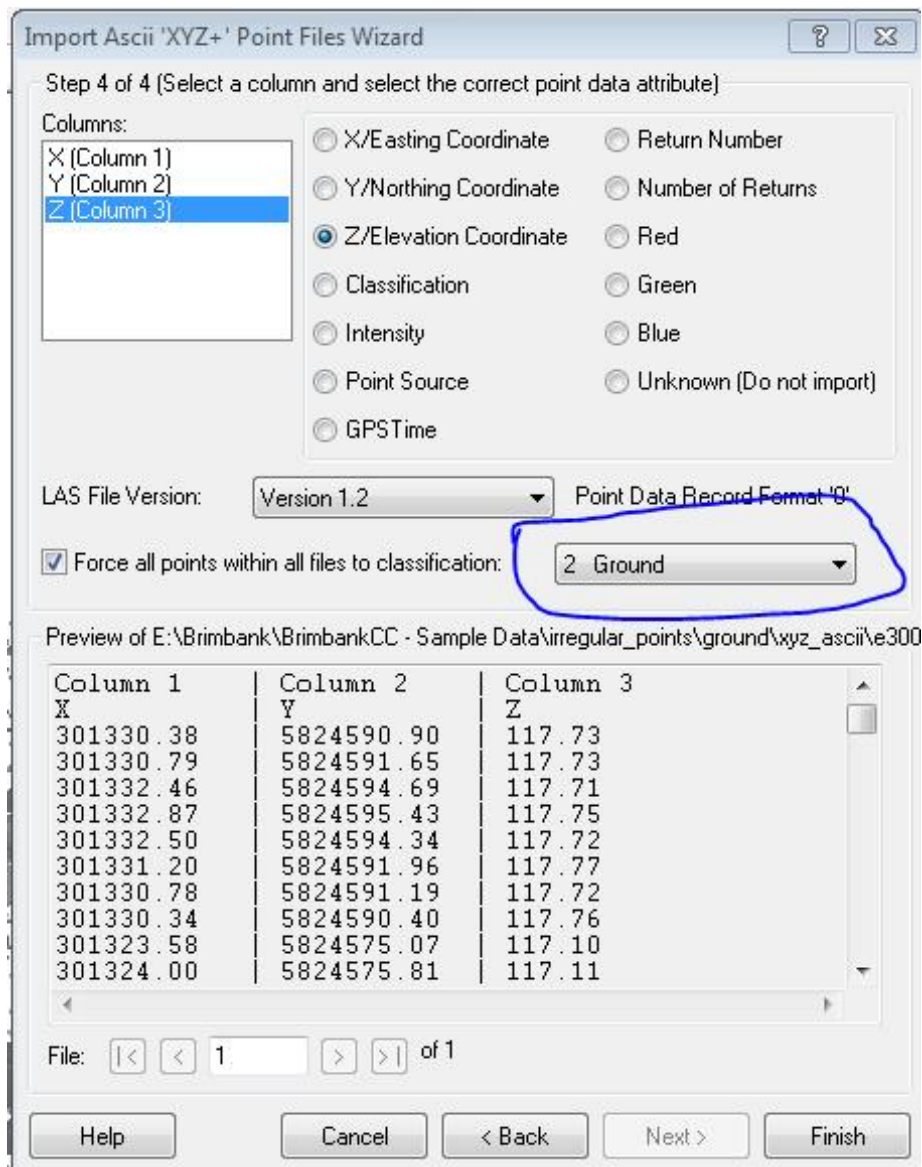


Figure 3: Setting a Class

Finally, I imported this resultant LAS file into a project, on to the same layer as the previously imported non-ground LAS. To achieve this, right click the LAS layer containing the previously imported LAS file (in the LAS File tab of the Table of Contents) and select the "add files..." option. The result is shown in Figure 4. Note that you can now use the Export Data command to create a merged LAS file containing the ground and non-ground data. My resultant file has the ground data in class 2 and the non-ground data in class 0 (which is the "Never Classified" class). As you can see in Figure 4, we now have a fairly good data set in LAS format!

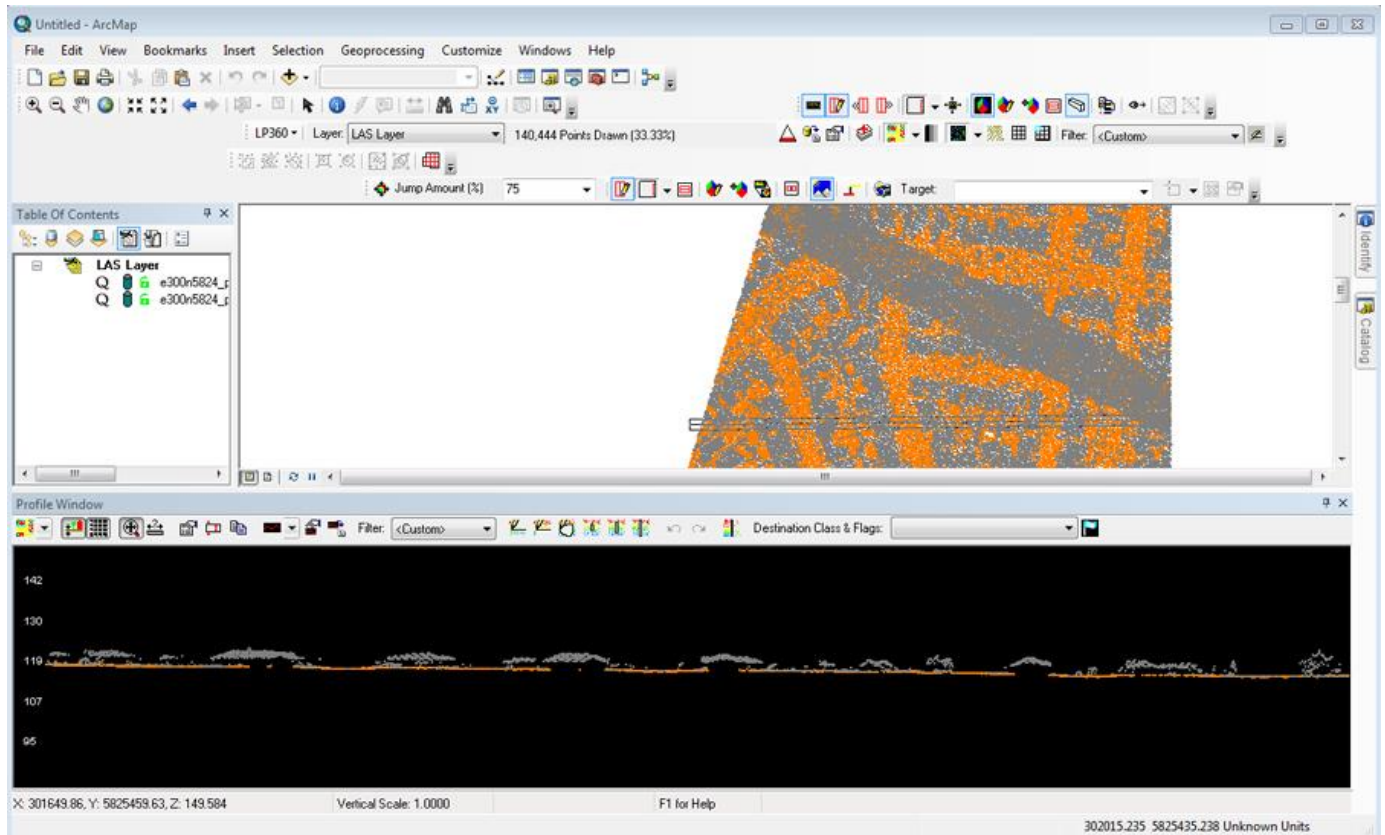


Figure 4: The consolidated LAS data

Finally, in Figure 5 is depicted the merged LAS file after a bit of processing work. First, the diagonal strip of unclassified ground data shown in Figure 2 was densified a bit using the Adaptive TIN Ground classifier point cloud task (LP360 Advanced). Next a rough extraction of planar surfaces (e.g. roofs) was performed using the planar extraction filter of LP360 (advanced). Note the TIN view depicted in the 3D view pane of LP360.

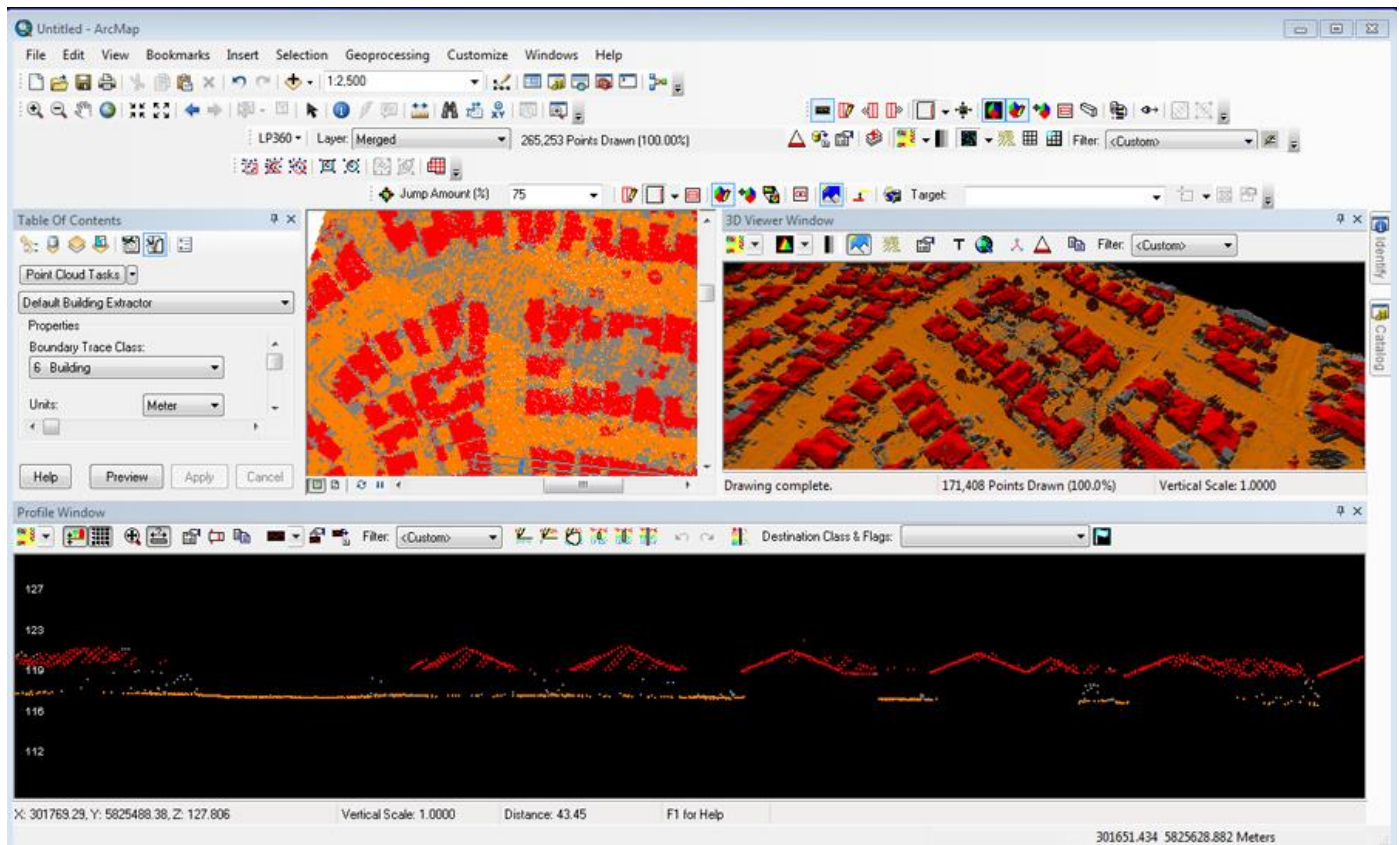


Figure 5: Planar surface extraction

As you can see from this example, there is significant value in ASCII format LIDAR data, so long as you have the tools to convert these files to the more useful LAS format. We were fortunate in this example to have ground and non-ground in two separate files. If the ASCII data do not contain a class field, the packaging into separate files allows us to create a classified LAS file. We were unfortunate in that the ground file did not have intensity values. Intensity is extremely valuable in that it can provide an ortho-like visualization background for heads-up digitizing.

There are two takeaway messages from this article. The first is to insist that your LIDAR data be delivered in American Society for Photogrammetry and Remote Sensing (ASPRS) standard LAS format. This is easy since all major LIDAR hardware and software vendors support LAS. The second is that there is tremendous value in your on-the-shelf LIDAR data, even if it is in ASCII format. Using LP360, you can import these data, convert them to LAS and do value-added visualization and information extraction.