Tools, Tips and Workflows
Breaklines should Undergo QA/QC
LP360

B S A U | A W G

GeoCue Group Support
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As with any data, breaklines should undergo a QA/QC process. For breaklines this should entail a check for potential topology errors as well as incorrect elevation values. Since breaklines are used to define and control surface behavior in terms of smoothness and continuity they may have a significant effect when incorporated in a surface model.

A Digital Terrain Model (DTM), which can be created in LP360, is a Bare Earth surface model (DEM) with incorporated breaklines.

The most common topology errors that may exist within a breakline dataset include dangles, overshoots and crossings. (See Figure 1)
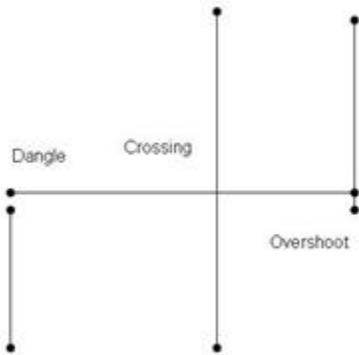
Figure 1 - Common Breakline Topology Errors

DTM's can provide a synoptic overview of potential problems with breaklines. Figure 2 shows an example anomaly in a DTM caused by a topology error in one of the breaklines.
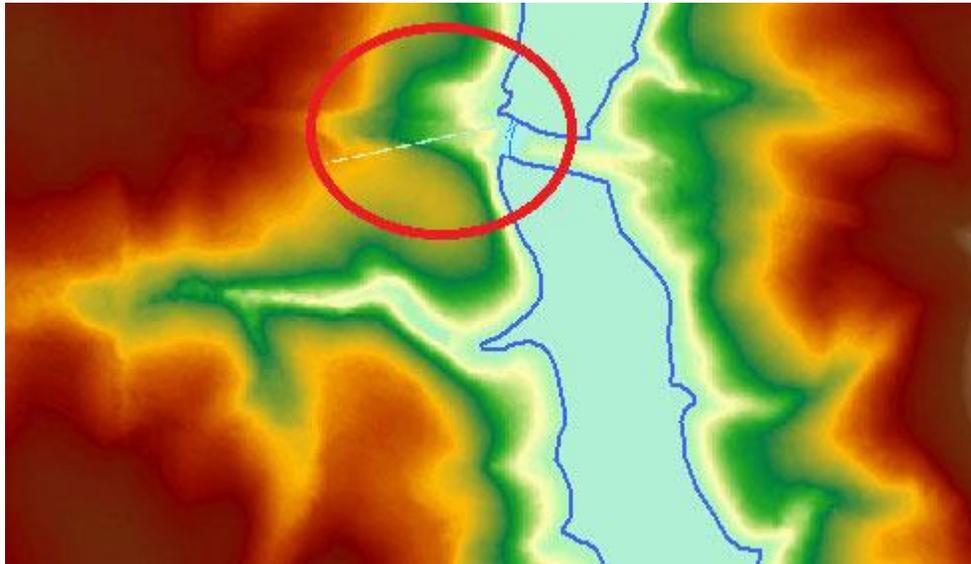
Figure 2 - DTM with a topology error

DTM's may also reveal if breaklines are being correctly enforced into the surface model and if there are any problems with the elevation values on the breaklines. Figure 3 illustrates a breakline with an elevation value in conflict with the LIDAR dataset. Note the abrupt triangles immediately surrounding the breakline.
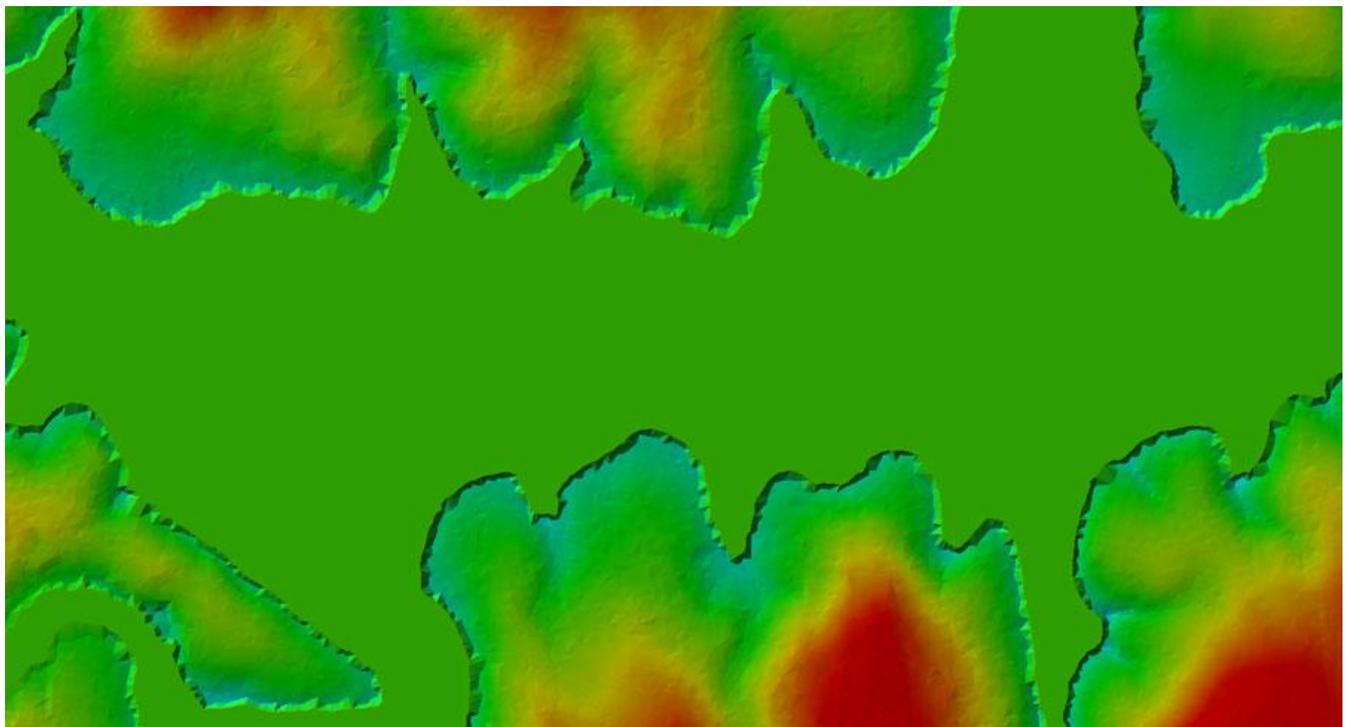
Figure 3 - Breakline with elevation issues

Visual elevation checks may also be performed on-the-fly using LP360 and breakline enforcement. Once the LIDAR data and breaklines have been added to LP360 (either via LP360 for ArcGIS or LP360 Standalone) breakline enforcement can be activated. While compiling breaklines with LP360's sketch tool it is advisable to have breakline enforcement turned on so that one may visualize the results as the line work is being compiled.

Note: Breakline enforcement within the LP360 display windows (main and 3D viewer) can only be viewed if 100% of the points are being displayed in the window being viewed.

Once satisfied with the overview a closer examination of the breaklines can occur. It is recommended that topology checks be run on the breaklines using ArcGIS tools (Standard or Advanced level license for ArcGIS). For users who do not have a Standard or Advanced level license of ArcGIS they can allow LP360 to perform an on-the-fly topology correction within the breakline enforcement options. This option fixes the topology errors within memory only and does not make any changes to the breakline features themselves.

☑ Perform On-the-Fly Topology Corrections (Recommended if using more than one source layer)

Figure 4 - Breakline Enforcement option

The elevation values for breaklines can be reviewed in detail using the sketch properties within ArcGIS by selecting the breakline with said tool. This is a useful tool to review if a breakline, such as a lake, has a single elevation or if a downstream constrained line has been properly constrained as in figure 5.

#	X	Y	Z
0	2021277.288	870496.824	416.342
1	2021548.448	870596.561	412.942
2	2021841.427	870690.065	412.516
3	2022093.887	870755.517	412.156
4	2022352.581	870811.619	410.061
5	2022580.106	870817.853	409.780
6	2022841.917	870705.649	409.428
7	2023178.530	870549.809	408.970
8	2023530.728	870499.940	408.531

Figure 5 - Sketch Properties for a downhill constrained breakline

The wireframe mesh draw type is helpful when trying to determine where and/or how the breakline is being incorporated into the surface. Figure 6 shows an example of the wireframe mesh before breaklines were enforced whereas Figure 7 is an example of the same area of the wireframe mesh after breaklines were enforced. Notice how the surface changes when the breaklines are introduced.
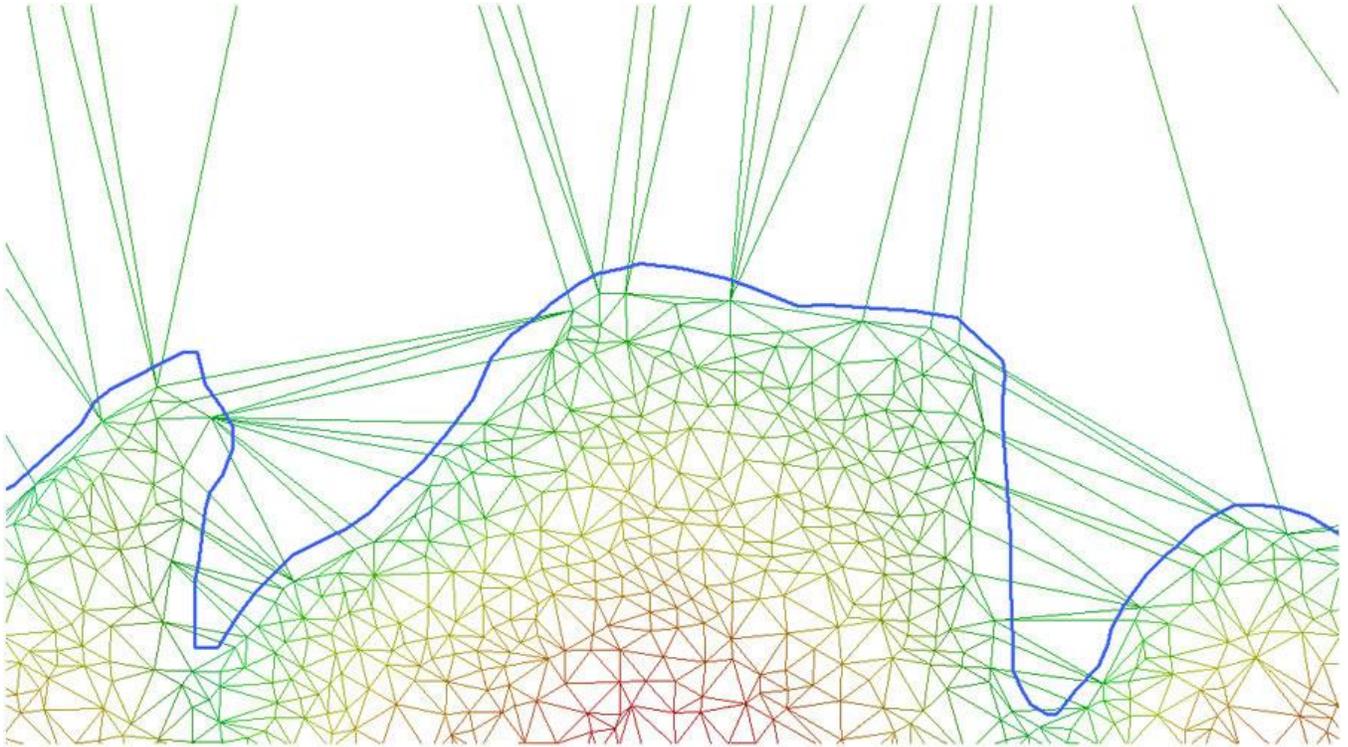
Figure 6 - Wireframe mesh no breakline enforcement
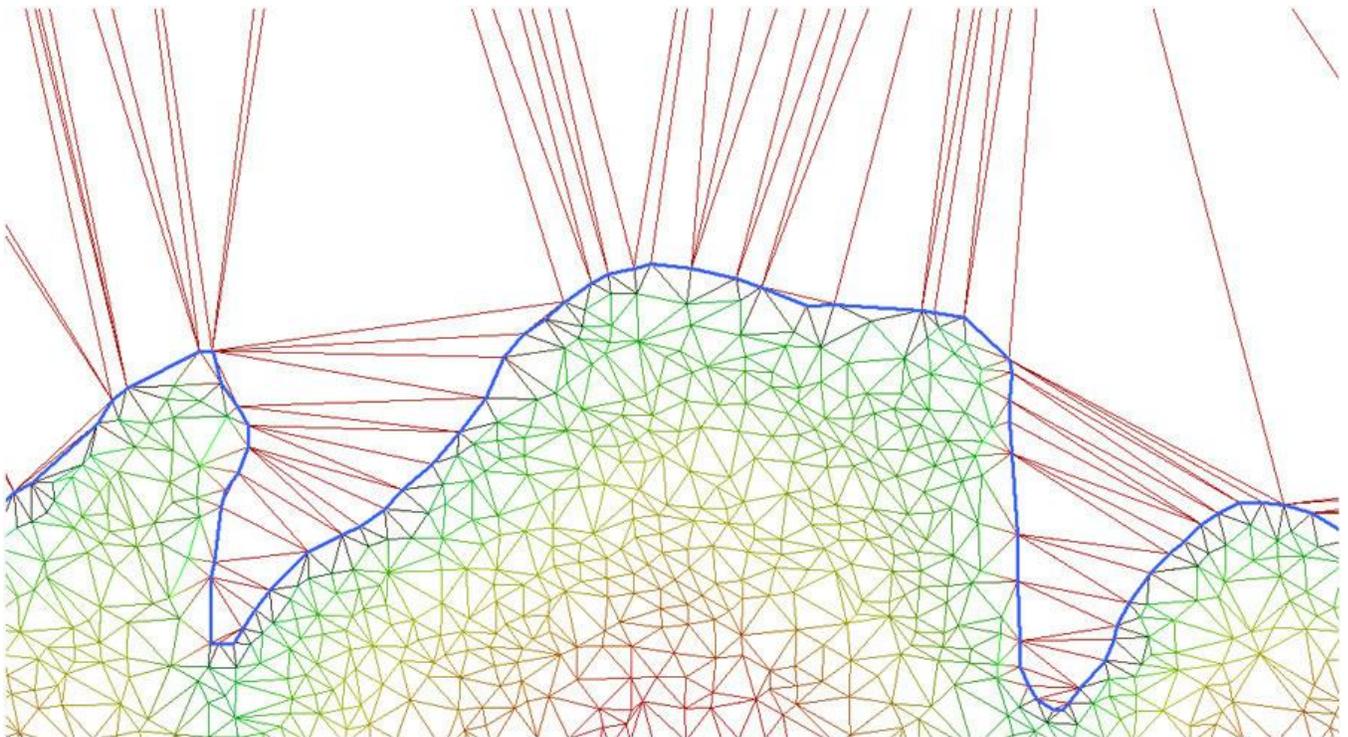
Figure 7 - Wireframe mesh with breaklines enforced