

Dewberry Response to USGS Review of NY Great Lakes- Chautauqua LiDAR Project

Produced for U.S. Geological Survey

USGS Contract: G10OC00013

Task Order:G14PD00043

Report Date: 1/12/2015

SUBMITTED BY:

Dewberry
1000 North Ashley Drive Suite 801
Tampa, FL 33602
813.225.1325

SUBMITTED TO:

U.S. Geological Survey
1400 Independence Road
Rolla, MO 6540
573.308.3756

Table of Contents

Executive Summary	3
Project area	4
Edit Calls	4
Bridges	5
Bridge Saddles.....	7
Culverts.....	8
Water Artifacts	9
Missing Breaklines.....	11
Tinning	14
LAS Headers.....	15
Summary of Edit Calls.....	15

Executive Summary

The primary purpose of this project was to develop a consistent and accurate surface elevation dataset derived from high-accuracy Light Detection and Ranging (LiDAR) technology for the USGS NY Great Lakes – Chautauqua Project Area.

The LiDAR data were processed to a bare-earth digital terrain model (DTM). Detailed breaklines and bare-earth Digital Elevation Models (DEMs) were produced for the project area.

Deliverables for this project included raw point cloud data, classified point cloud data, bare earth digital elevation models, intensity images, breaklines, metadata, and project extent shapefiles.

The USGS review of these deliverables resulted in 43 DEM calls, including unremoved bridges, bridge saddles, aggressively classified culverts, water artifacts, and areas of tinning.

PROJECT AREA

Data was formatted according to tiles with each tile covering an area of 1500m by 1500m. A total of 218 tiles were produced for the project encompassing an area of approximately 130 sq. miles.

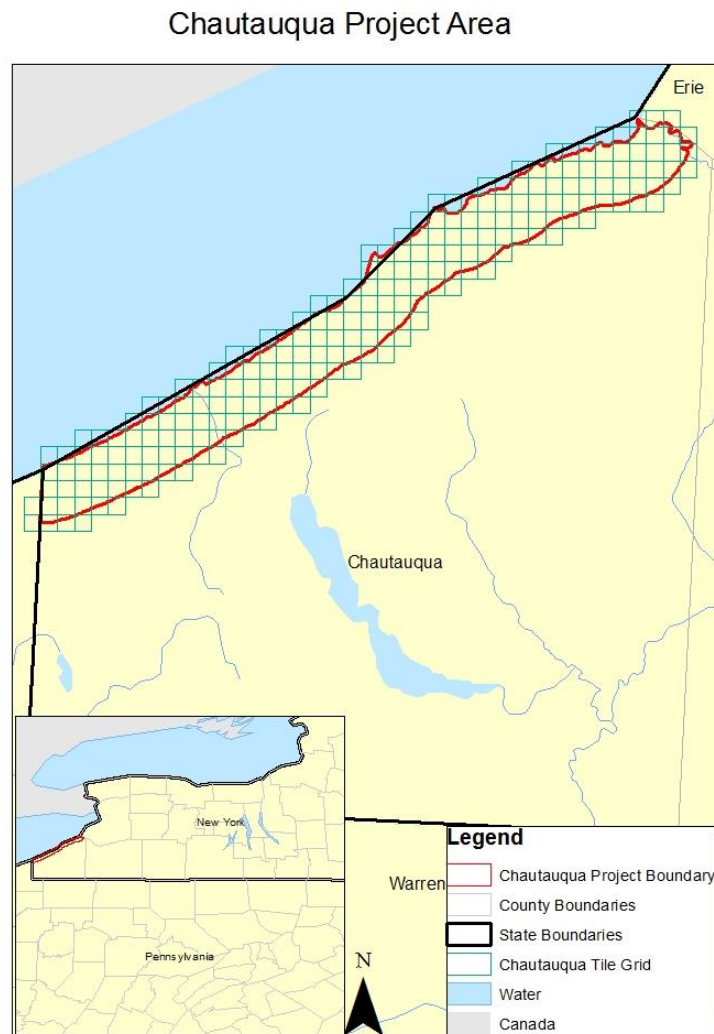


Figure 1: Project Map

Edit Calls

Five (5) main types of edit calls were made in USGS' review document of the Chautauqua Portion of NY Great Lakes LiDAR project area. The first type of call identified three (3) bridges that were left in the ground. The second type of call was for thirty-one (31) bridge saddles; remaining types of calls were for four (4) culvert calls, two (2) water artifacts and one (1) missed pond. Additionally, USGS made a note that there was a disparity in the LAS files between the total number of records in each file and the sum of the total number of returns. Lastly, the edit call shapefile provided also contained two edit calls for tinning. All edit calls and comments were analyzed, assessed and corrected if necessary. Examples of each are below.

BRIDGES

USGS identified these three bridges within one area as being left in the ground model. Dewberry found that these three structures are culverts. Photographic explanations can be found below.

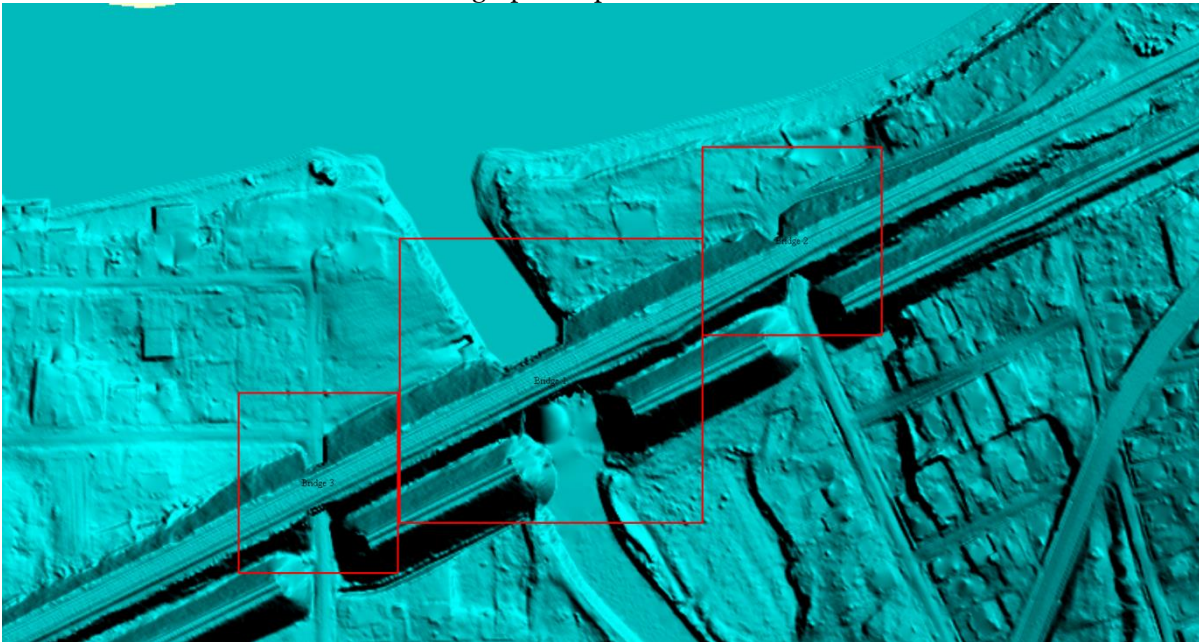


Figure 2 – USGS Screen Shot



Figure 3 - Tile 17TPH565180. Full Point Cloud Intensity Imagery of the features.



Figure 4 - Tile 17TPH565180. Bing Imagery shows that there are cinders/ ground between the railroad tracks and along the sides of the track. These three features are culverts and remain modeled in the ground surface.

BRIDGE SADDLES

USGS marked 31 bridges that had saddles across the bridge expanse. Breaklines were added at these locations to help enforce the DEM and Contours in these areas. Delivered products and metadata were updated to reflect these changes.

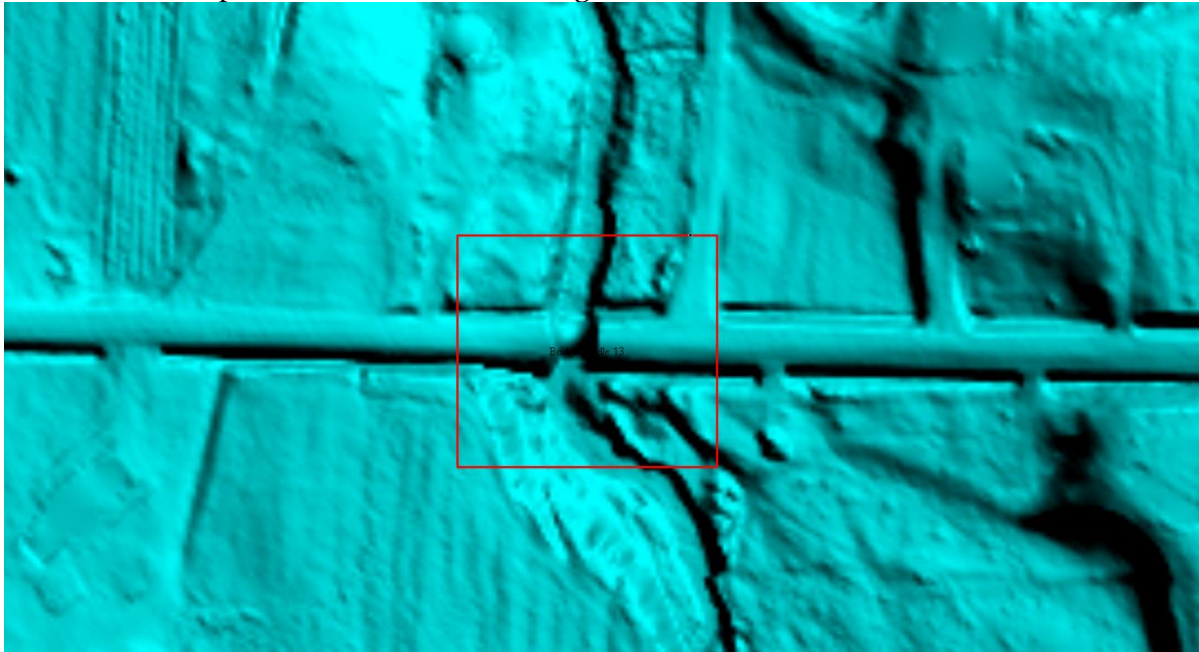


Figure 5 – USGS Image of DEM with bridge saddle.

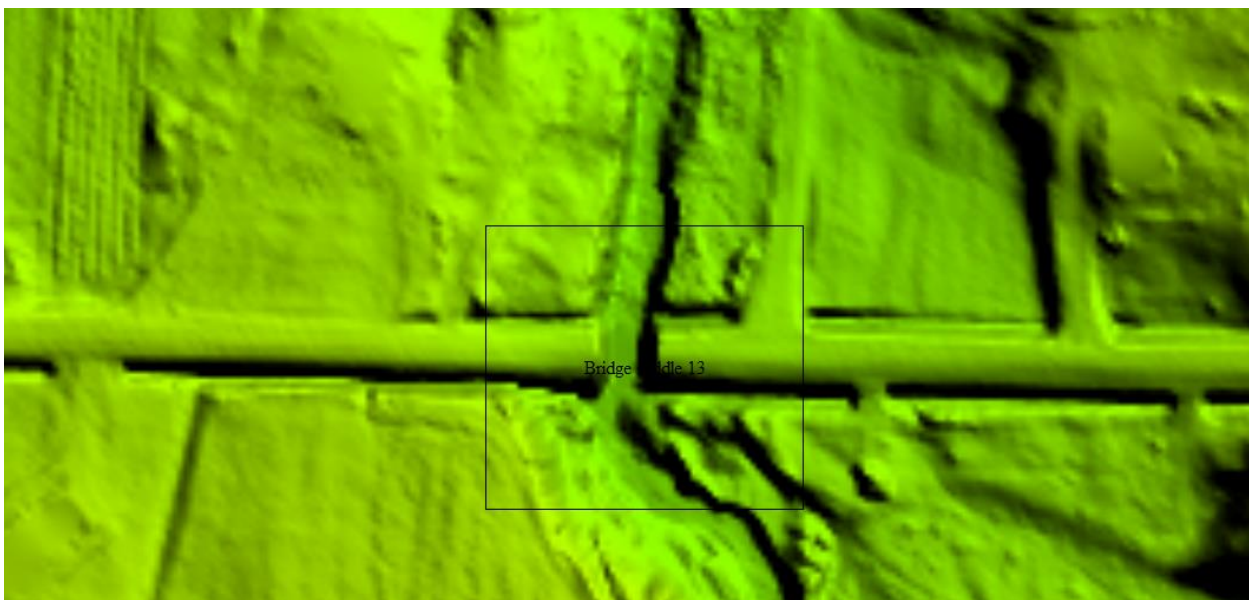


Figure 6 – Tile 17TPH490120 DEM with bridge saddle fix.

CULVERTS

USGS found four (4) instances where box culverts had been removed from ground. Dewberry agrees that these should be returned to the ground surface model; the LAS has been re-classified and the DEMs and contours updated. An example can be found below

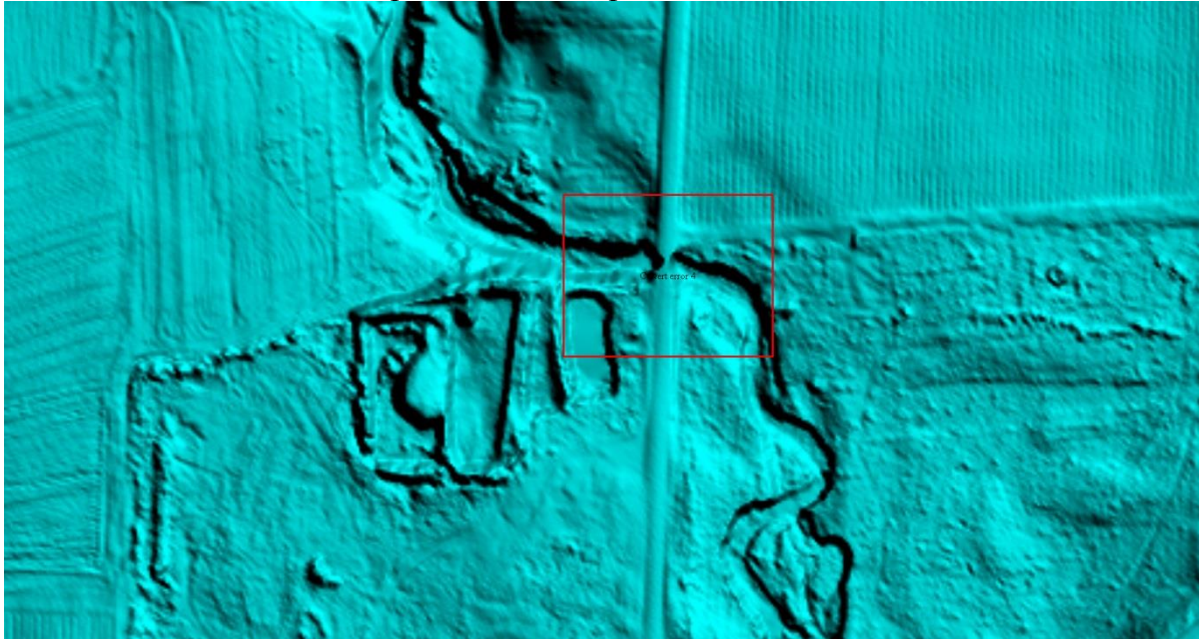


Figure 7 – USGS Screen Shot

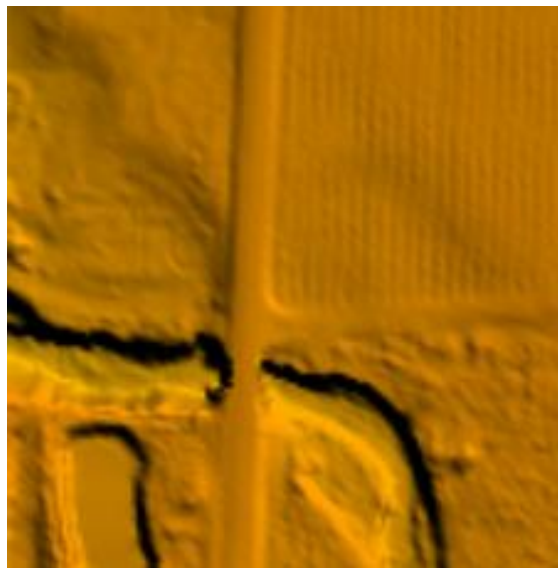


Figure 8 – DEM Tile 17TPG310000- Culvert points have been returned to ground.

WATER ARTIFACTS

USGS identified one (1) pond that was below the 2 acre collection criteria that had a sizeable artifact and one (1) pond over 2 acres that had an elevation discrepancy between tiles. Dewberry has corrected these artifacts. Examples are shown below.

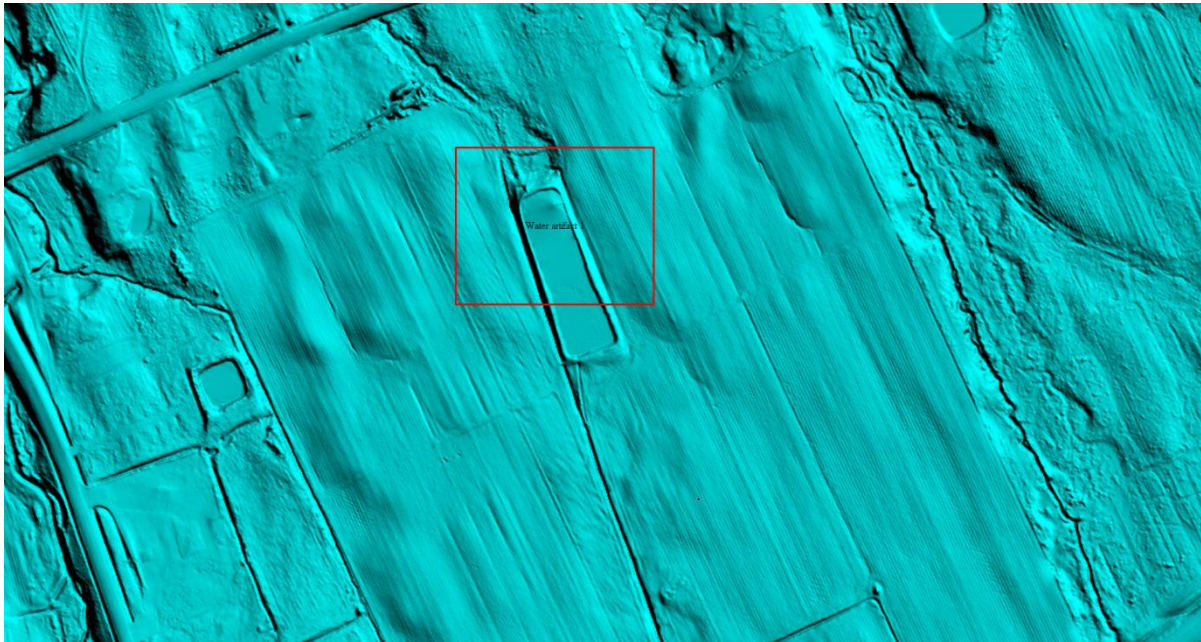


Figure 9 –USGS Screen Shot

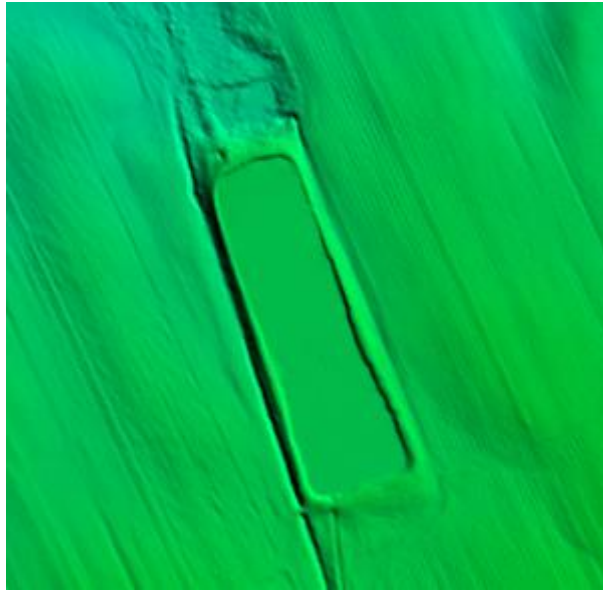


Figure 10 - Tile 17TPG085895. The artifact has been removed from the LiDAR and DEM.

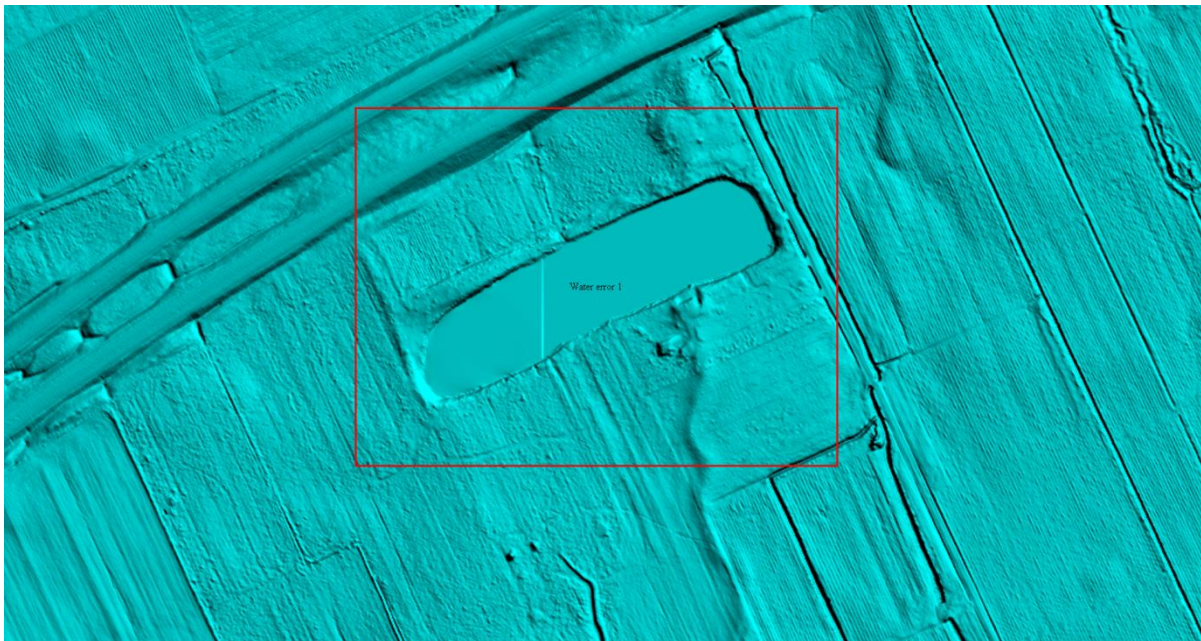


Figure 11 – USGS Screenshot

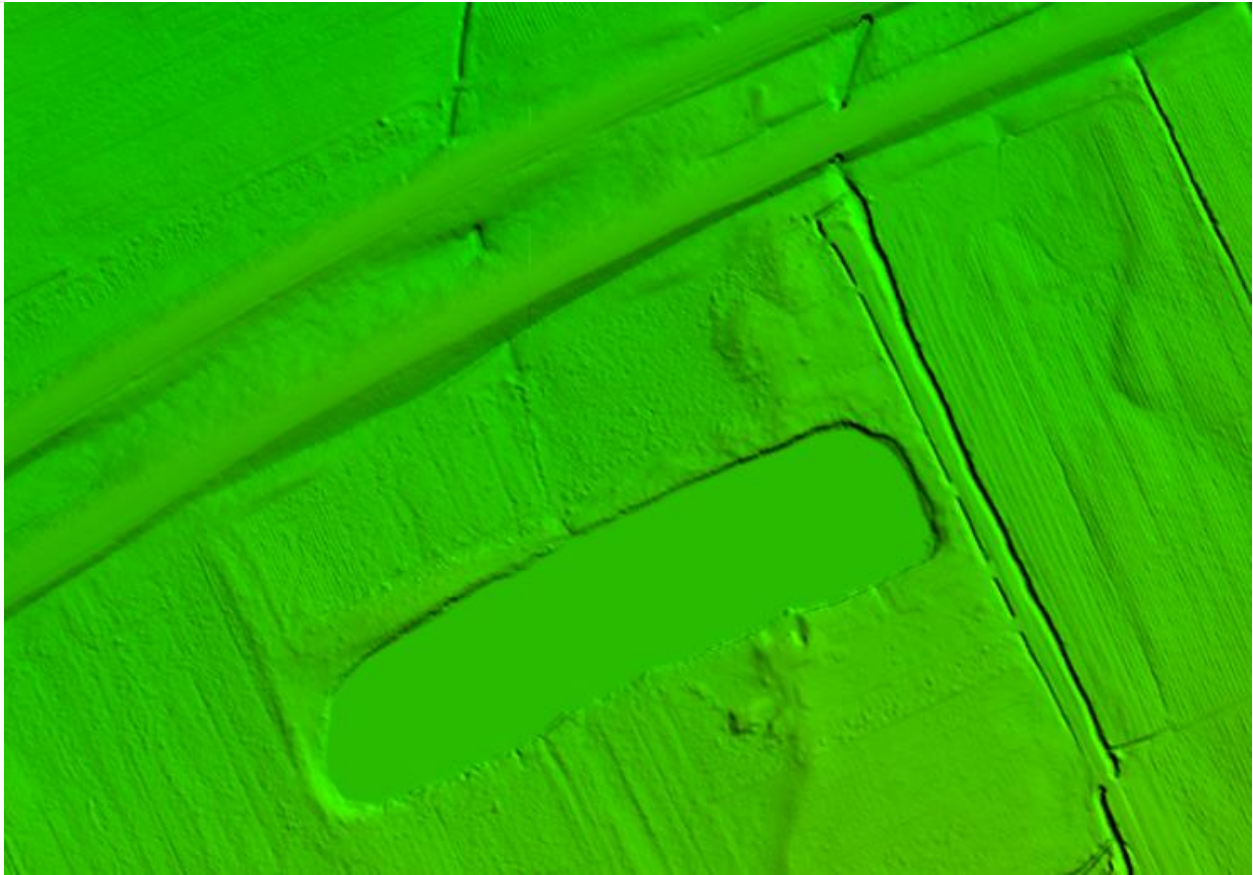


Figure 12 - Tile 17TPG100895 and 17TPG085895. The elevation change artifact between tiles has been corrected.

MISSING BREAKLINES

USGS identified one (1) pond greater than 2 acres in size that had not been collected with breaklines and flattened in the DEMs. This feature has been corrected in both the breaklines and DEMs. Examples are shown below.



Figure 13 – USGS Screenshot.

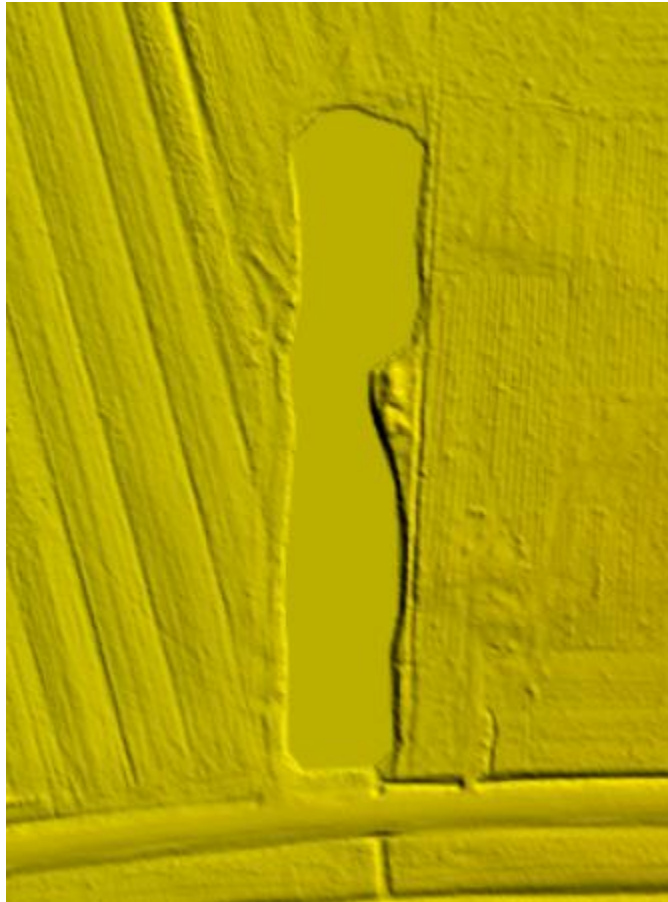


Figure 14 –Tile 17TPH550150. Breaklines have been added, the LiDAR hydro-classified and the DEM hydro flattened.

TINNING

Tinning issues were not mentioned in the USGS review document but two areas were flagged in the Error Shapefile. The areas flagged with tinning occur in vegetated areas. As the profile examples below indicate, there are no additional points that can be classified to ground and all vegetation is classified to default, class 1.

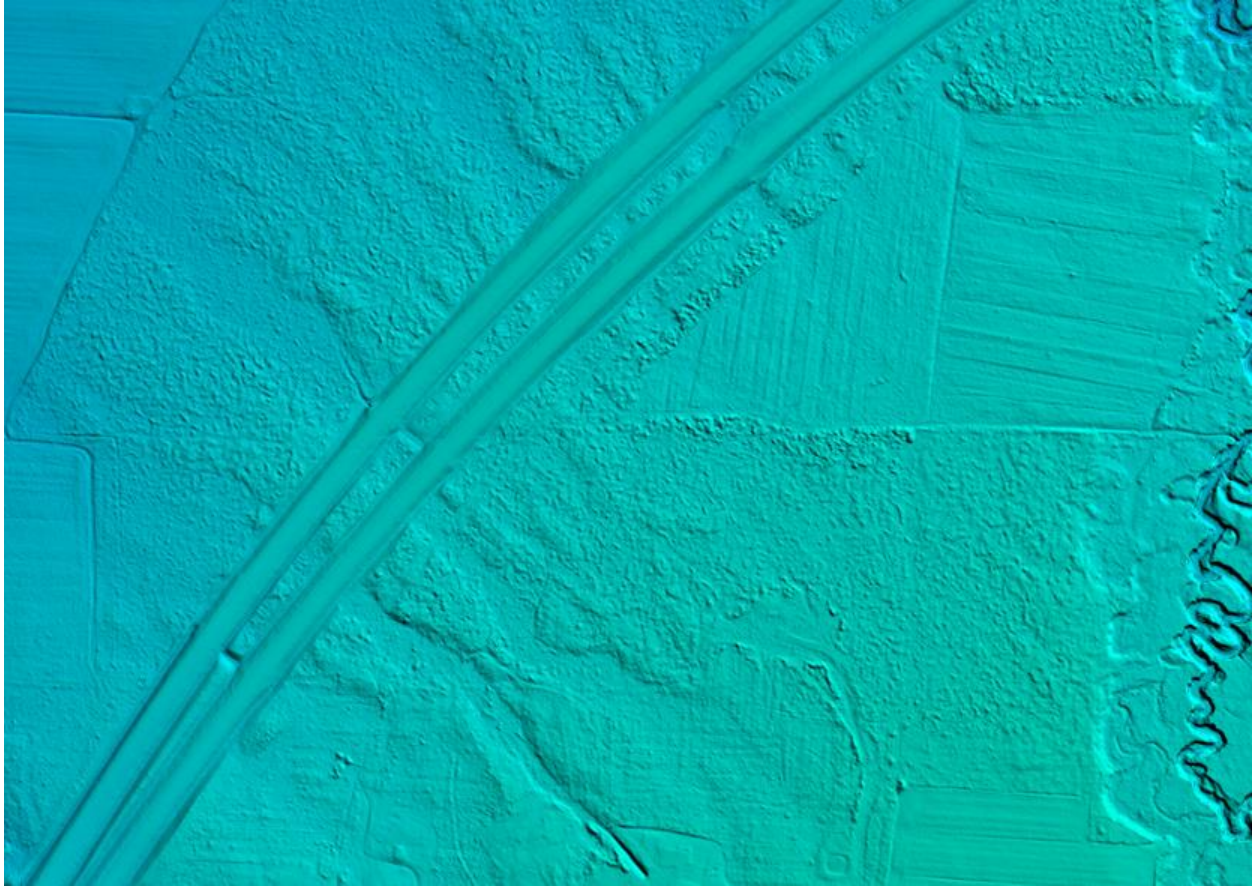


Figure 15 - Tile 17TPH40090 and 17TPG40075. Screen shot of the DEM in area flagged by USGS as containing tinning.

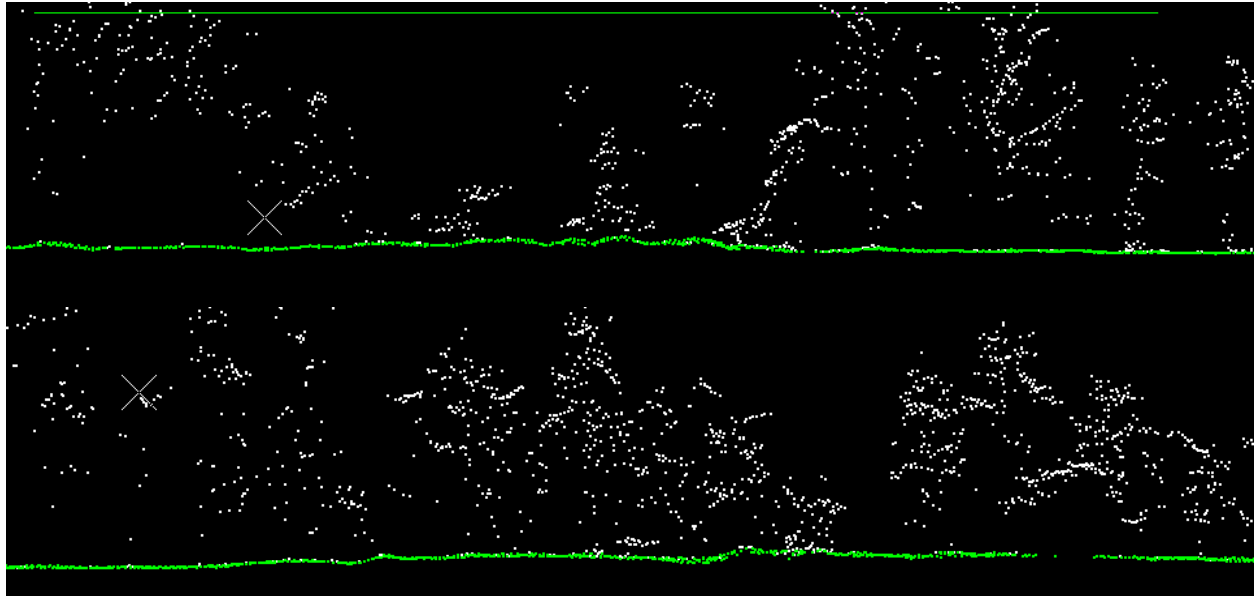


Figure 16 - Tiles 17TPH40090 and 17TPG40075; Unclassified – White, Ground- Green. The top screenshot is an example from the LiDAR tile 17TPH40090 and the bottom screenshot is an example from the LiDAR tile 17TPG40075. There are no additional points available to re-classify to the ground class and all vegetation is appropriately classified to class 1.

LAS HEADERS

The USGS review document contained a statement that there was a disparity between the total number of point records in each file and the sum of the total number of returns. Dewberry has re-checked the LAS headers and confirmed that the sum of the total number of returns does match the total number of point records for each file. We have confirmed this in our LAS statistics and have no display issues or warnings generated from any header issues.

Summary of Edit Calls

- There were three bridge removal calls.
 - These three areas were confirmed with Bing imagery to actually be box culverts and have not been removed from the ground surface.
- There were thirty bridge saddle calls.
 - These areas had additional breaklines added to help DEM and contours.
- There were four calls to better represent box culverts.
 - The culvert points have been re-classified to the ground model.
- There were three hydrographic related calls.
 - The water artifacts have been removed and the pond that needed breaklines and hydro flattening has been corrected.
- There were 2 area calls for tinning.
 - No additional points are available to add to the ground model.
- There was one comment that a header issue may exist.
 - The number of returns for each file was confirmed to match the sum of the total number of returns. The headers were verified to be correct.