

Dewberry Response to USGS Review of the Eastern Shore Virginia QL2 LiDAR BAA Project

Produced for U.S. Geological Survey

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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 Eastern Shore Virginia 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, survey data, metadata, project report, project extent shapefiles and other ancillary data.

The USGS review of these deliverables resulted in one hundred and ten swath calls, nine LAS header information calls, twenty four hydro-flatten calls, twenty two floating calls, fifty eight void calls, eleven DEM calls, and one temporal confirmation call.

PROJECT AREA

One thousand three hundred seventy-five (1375) LAS tiles and one thousand three hundred ten (1310) DEM tiles were delivered for the project. Sixty five (65) tiles contained all water and were removed from DEM processing as these tiles do not contain any topographic data. Dewberry extended the client provided boundary where tiles had ground to include thirty four (34) extra tiles. Each tile's extent is 5,000 feet by 5,000 feet.

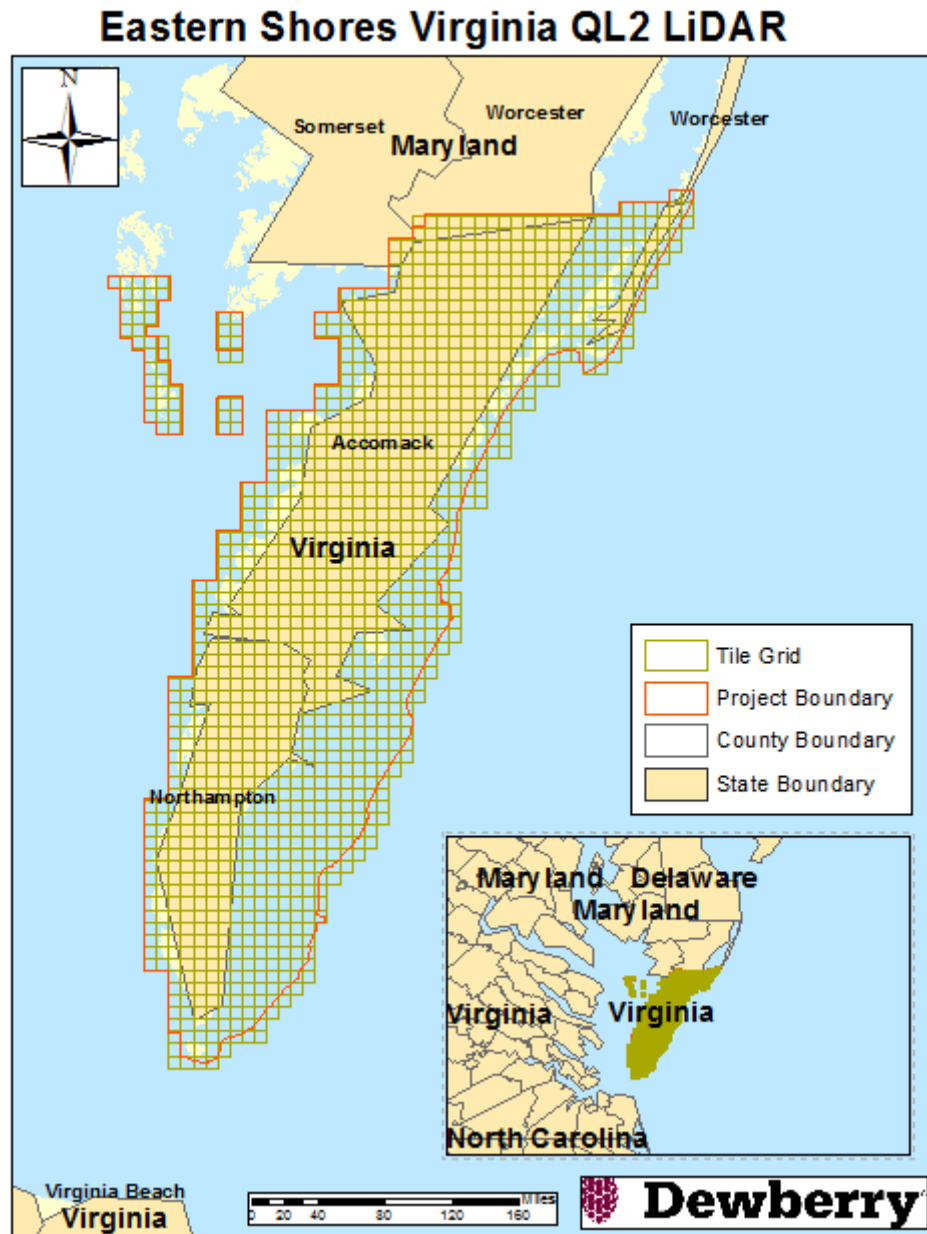


Figure 1: Project Map

Edit Calls

SWATH INTENSITY

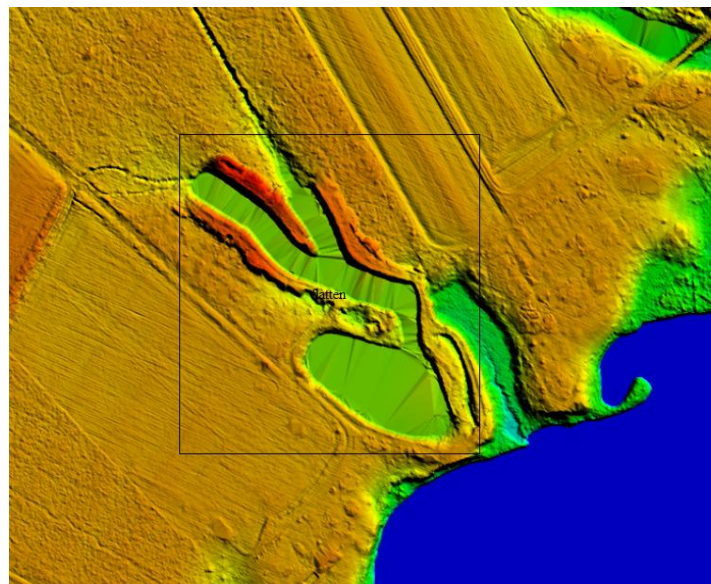
USGS stated one hundred and ten swaths were not normalized to 16-bit. 16-bit intensity values have a range of 0 to 65535. Dewberry reran swath stats using LP360 and confirmed that the swaths were within the 16-bit range.

LAS HEADER INFORMATION

USGS stated 9 tiles had invalid GPS times and/or 0 min-max intensity values. Dewberry has corrected the issue.

HYDRO-FLATTENING

USGS made twenty four hydro-flatten calls. Fifteen of those calls were of lakes greater than two acres that need to be flattened. Dewberry agrees with these instances and they have been corrected. An example is shown below.



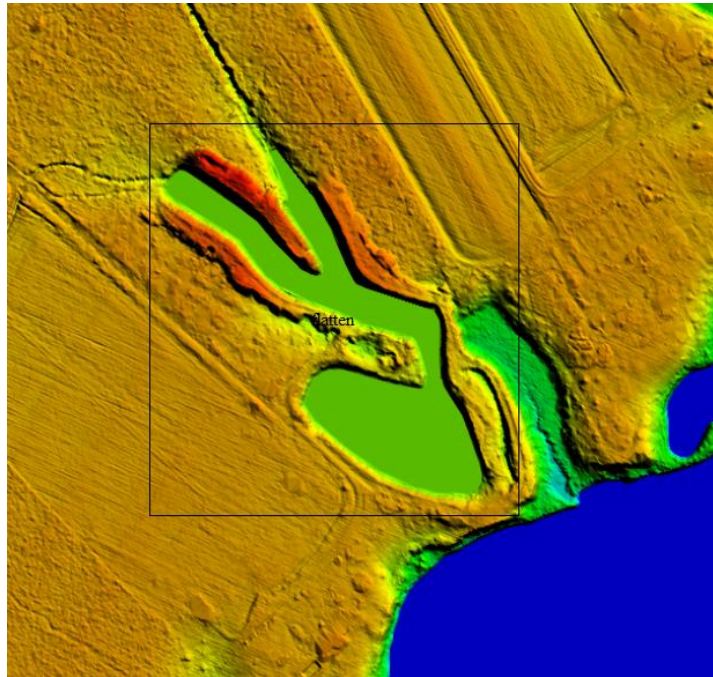
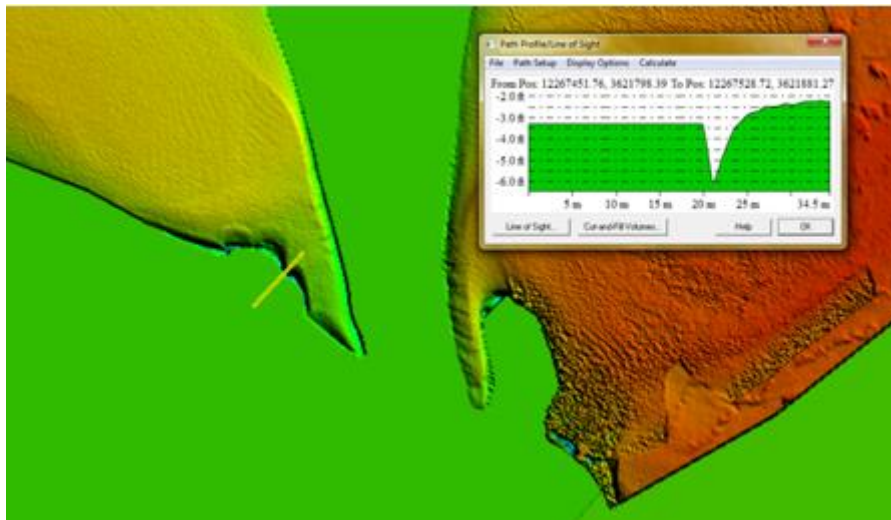


Figure 2- DEM_S23_2767_20. The above image is an overview of the DEM where USGS made a call to hydro-flatten a lake greater than 2 acres in size. The bottom image shows an overview of the DEM after Dewberry hydro-flattened the lake.

USGS made nine additional hydro-flatten calls with requested elevations. Dewberry adjusted the elevation to USGS' request which caused areas of the waterbody to be floating. Dewberry decided to keep the original stair stepped elevations in the tidal. The USGS Lidar Base Specification v1.2 allows for vertical discontinuities within the tidal waterbodies that can be retained in the DEM.



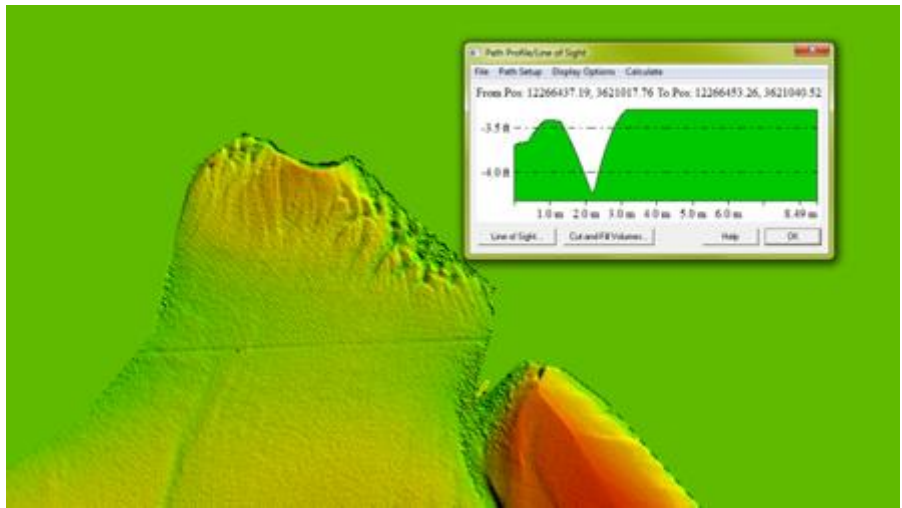


Figure 3- DEM_S23_2662_40. The above images is an overview of the DEM where USGS made a call to hydro-flatten a tidal area to an elevation of -3.3. This elevation change caused floating in two areas.

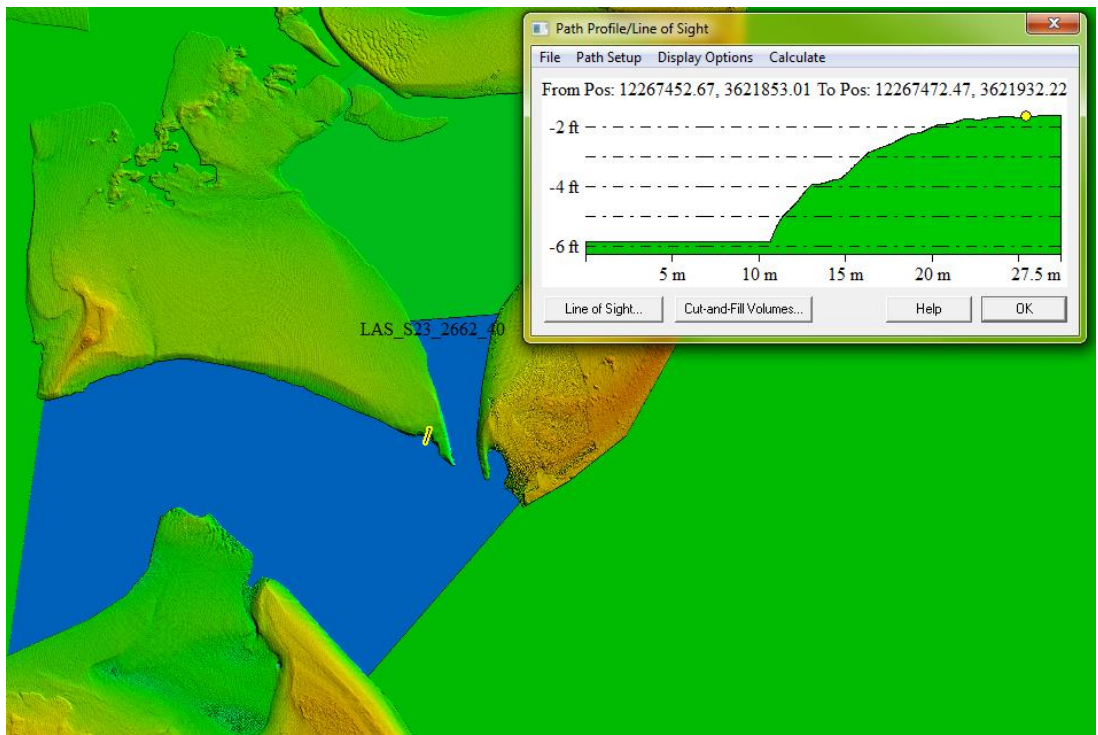


Figure 4- DEM_S23_2662_40. The above image is an overview of Dewberry's DEM set with the original elevations.

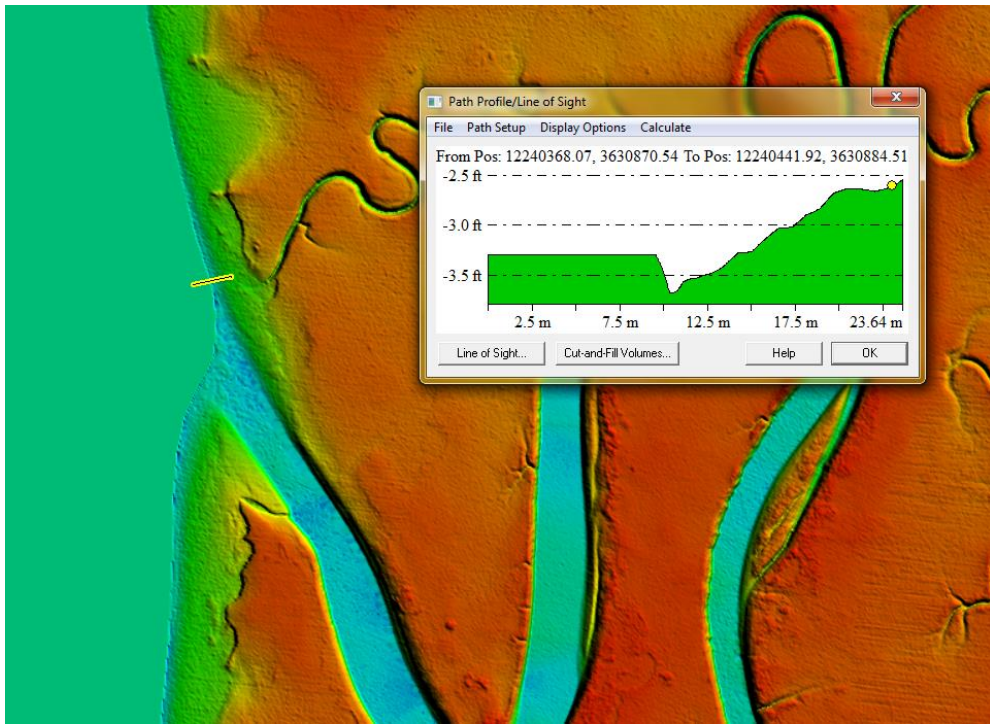


Figure 5- DEM_S23_2643_10. The above image is another overview of the DEM where USGS made a call to hydro-flatten a tidal area to an elevation of -3.3 feet. This elevation change caused floating.

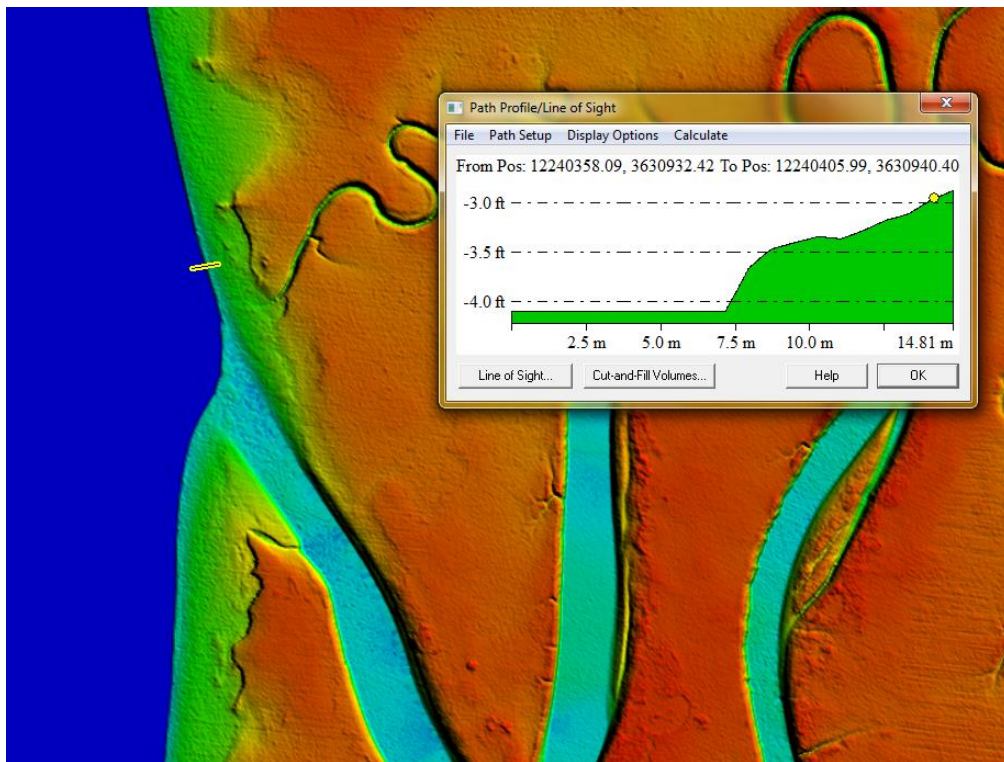


Figure 6- DEM_S23_2643_10. The above image is an overview of Dewberry's DEM set with the original elevations.

FLOATING

USGS identified twenty two areas that needed breakline adjustments due to floating areas of water. Dewberry agrees with these instances and they have been corrected. Below is an example.

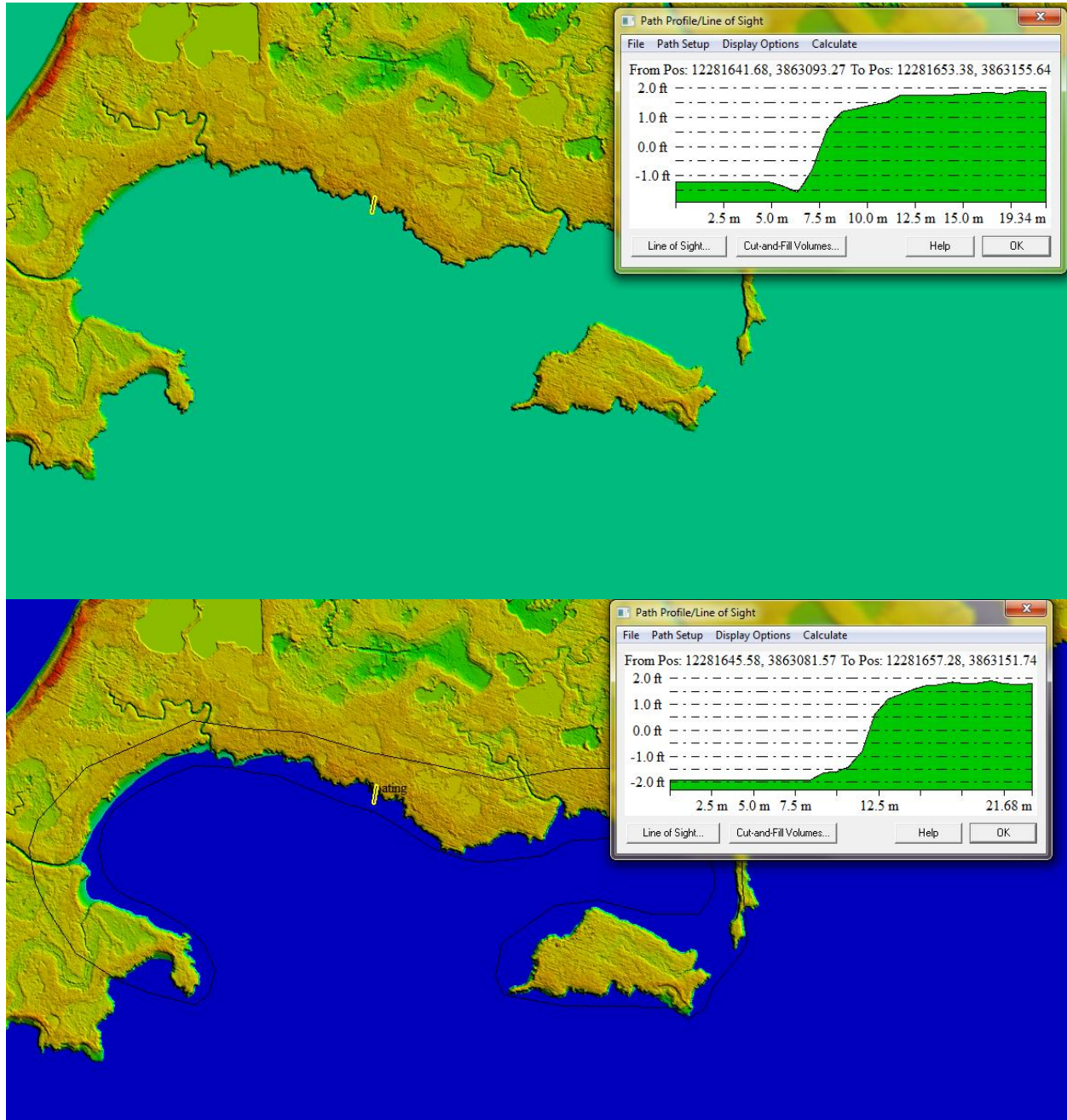


Figure 7- DEM_S23_2886_10. The top image is an overview of the DEM where USGS made a call to fix a floating waterbody. The bottom image is an overview of the DEM with the adjusted breakline elevation.

VOID

USGS made fifty eight data void calls. Dewberry confirmed that the voids were created during processing and have recreated the DEM tiles that contained voids.

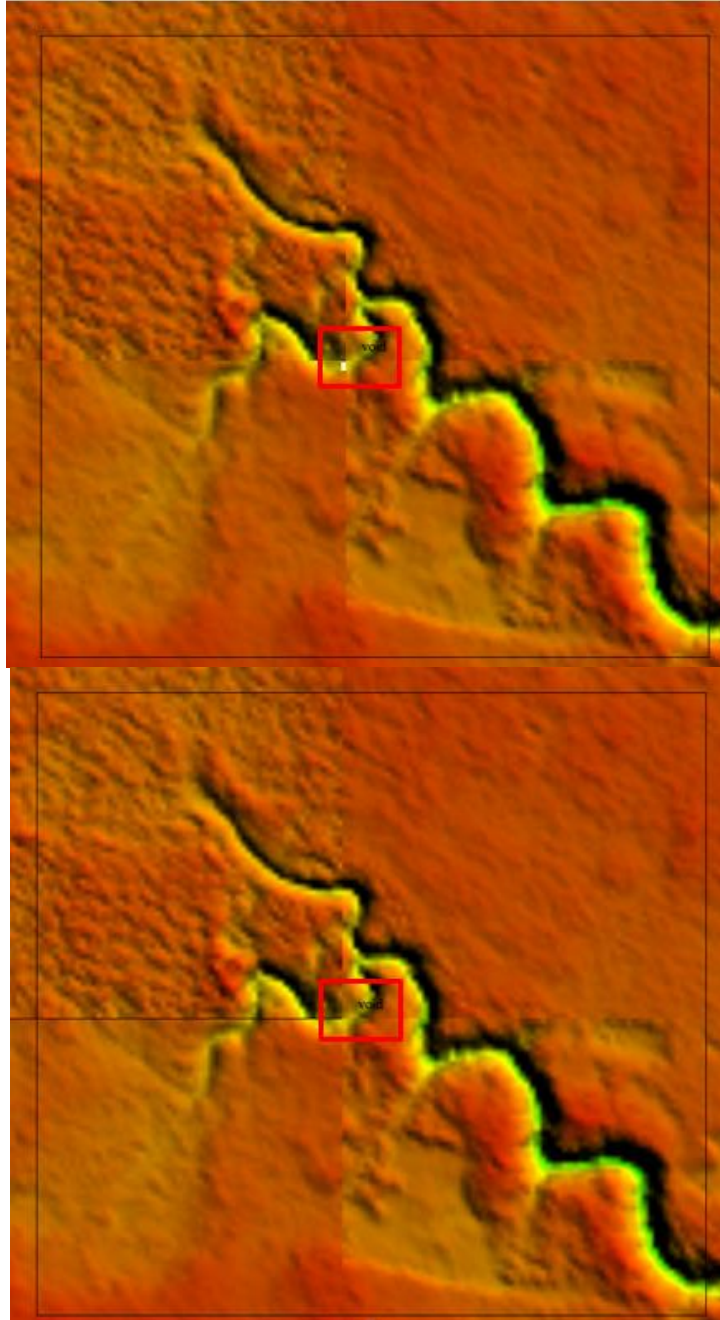


Figure 8- DEM_S23_2783_30. The above image is an overview of the DEM where USGS made a data void call. The below image is an overview of the reprocessed DEM with the data void removed.

DEM REVIEW

USGS made eleven DEM calls. Dewberry has corrected all the locations. Examples are provided below.



Figure 9- DEM_S23_3854_20. The above image is an overview of the DEM where USGS made two processing error calls. The below image is an overview of the reprocessed DEM with the processing error removed.

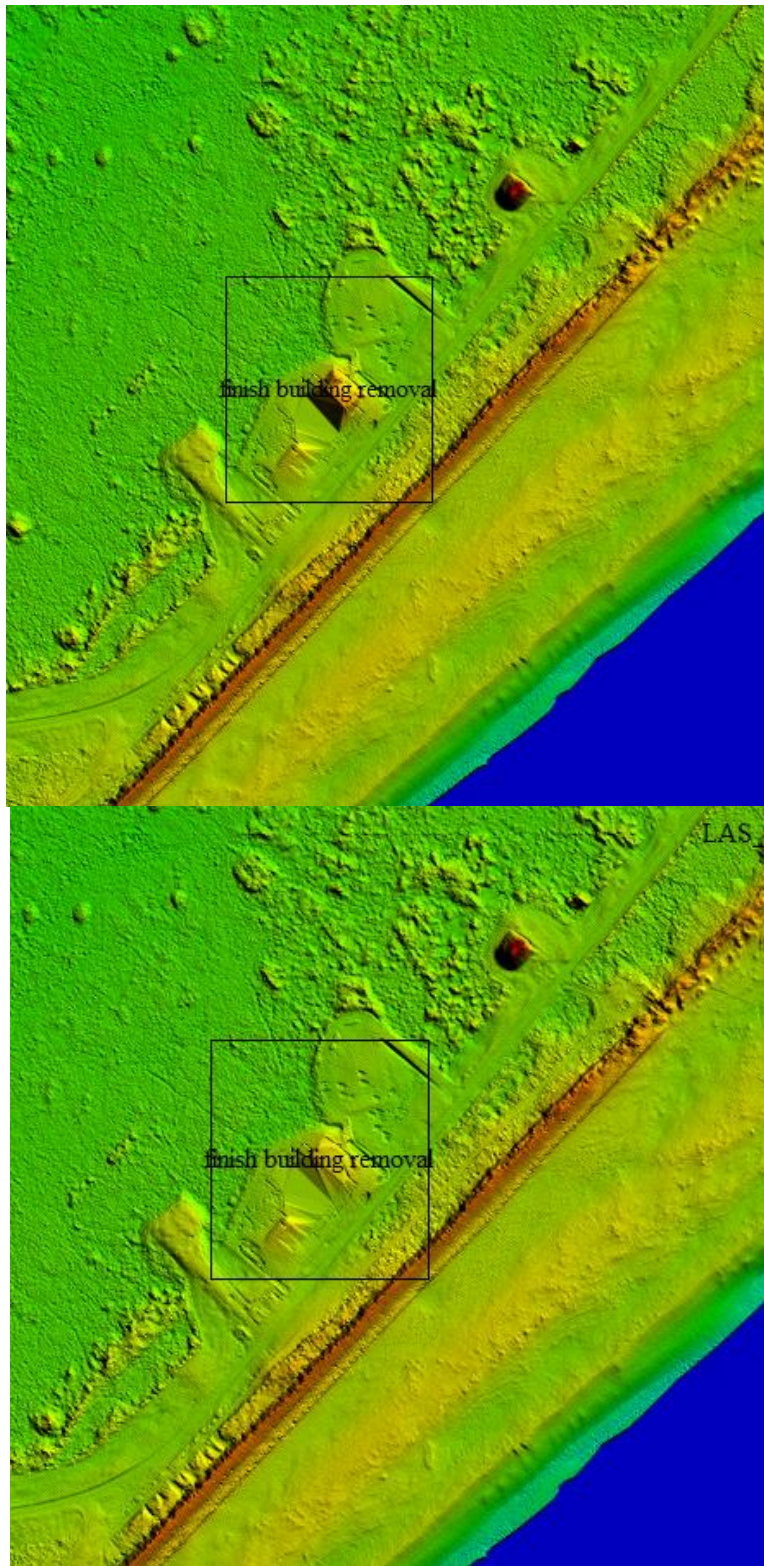


Figure 10- DEM_S23_3865_10. The above image is an overview of the DEM where USGS made a building removal call. The below image is an overview of the reprocessed DEM with the building completely removed.

TEMPORAL

USGS made one call to confirm a location was temporal. Dewberry reviewed the call and determined that the area is temporal and cannot be adjusted. Dewberry added this area to the Temporal Calls shapefile located in the Other Ancillary Data folder.

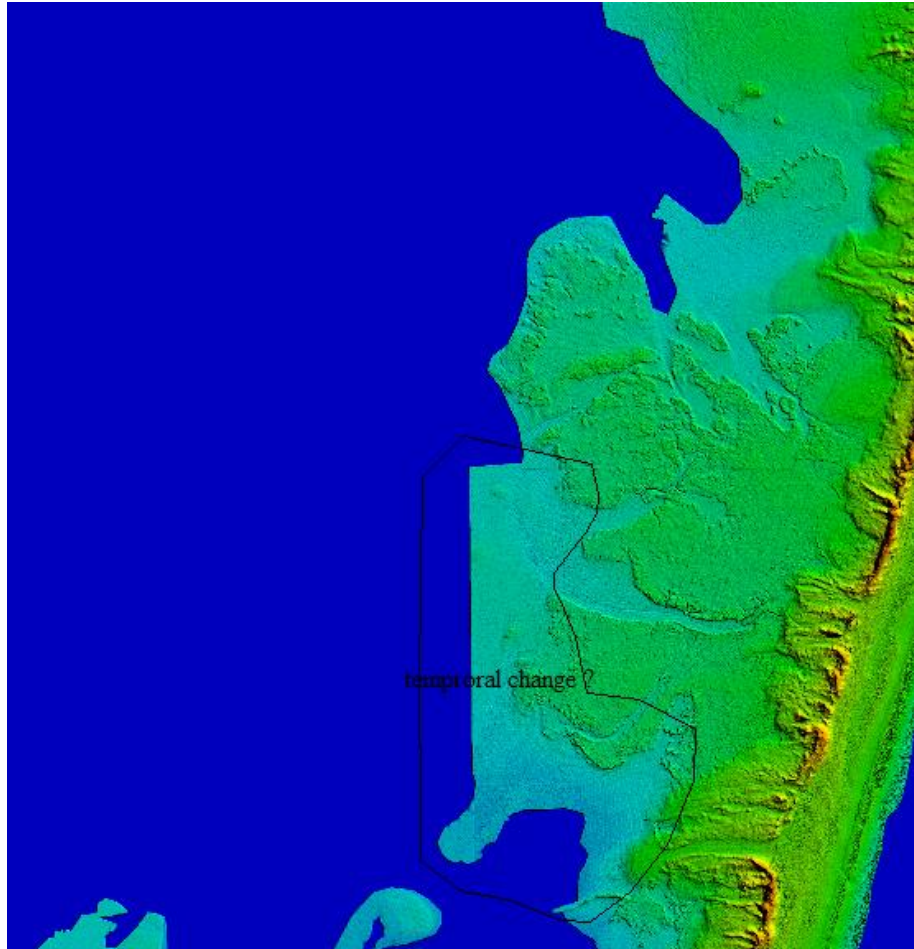


Figure 11- DEM_S23_3729_30. The above image is an overview of the DEM where USGS made a temporal call.

Summary of Edit Calls

- There were one hundred and ten swath calls regarding 16-bit intensity values.
 - Dewberry has confirmed that all the swaths have 16-bit intensity values.
- There were nine calls regarding LAS header information.
 - Dewberry has resolved all nine issues
- There were twenty four hydro-flatten calls
 - Fifteen of these calls have been corrected. The remaining nine were not adjusted due to potential floating.
- There were twenty two floating calls.
 - All of these issues have been corrected.
- There were fifty eight areas with calls regarding data voids.
 - The fifty eight affected DEM tiles were reprocessed and redelivered.
- There were eleven DEM review calls.
 - The eleven calls have been corrected.
- There was one temporal call
 - Dewberry has confirmed the call to be temporal.