

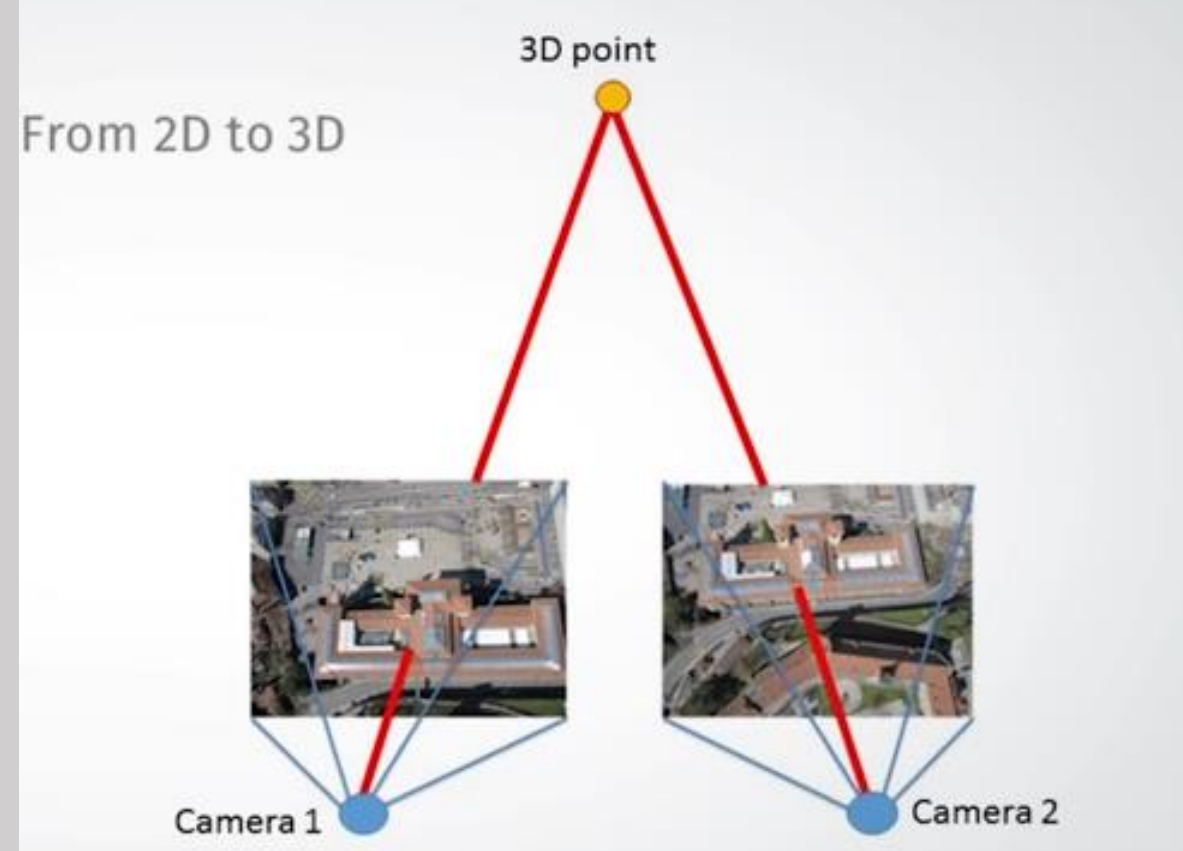
Exploring 3D Mapping Utilizing Drone Technology

An **Unmanned Aircraft System (UAS)** or **Drone**, is an aircraft without a human pilot onboard. The UAS is controlled from an operator on the ground. Drones capture high-resolution imagery of local areas. Once photos are field captured post process programs such as Drone2Map (3) and PIX4D Mapper (4) convert raw drone imagery into **3D GIS data**. 3D GIS data is generated from a process called **Structure From Motion**. This is a photogrammetric range imaging technique for estimating three-dimensional structures from two-dimensional image sequences (5).

Drone 3D Applications: include 3D Visualization, 3D Water Modeling, 3D Volumetric Measurements, 3D Transect Measurements, Change Detection for Built and Natural Environments.

Structure from Motion Concept

Structure from Motion photogrammetry generates a 3D point cloud similar to LiDAR

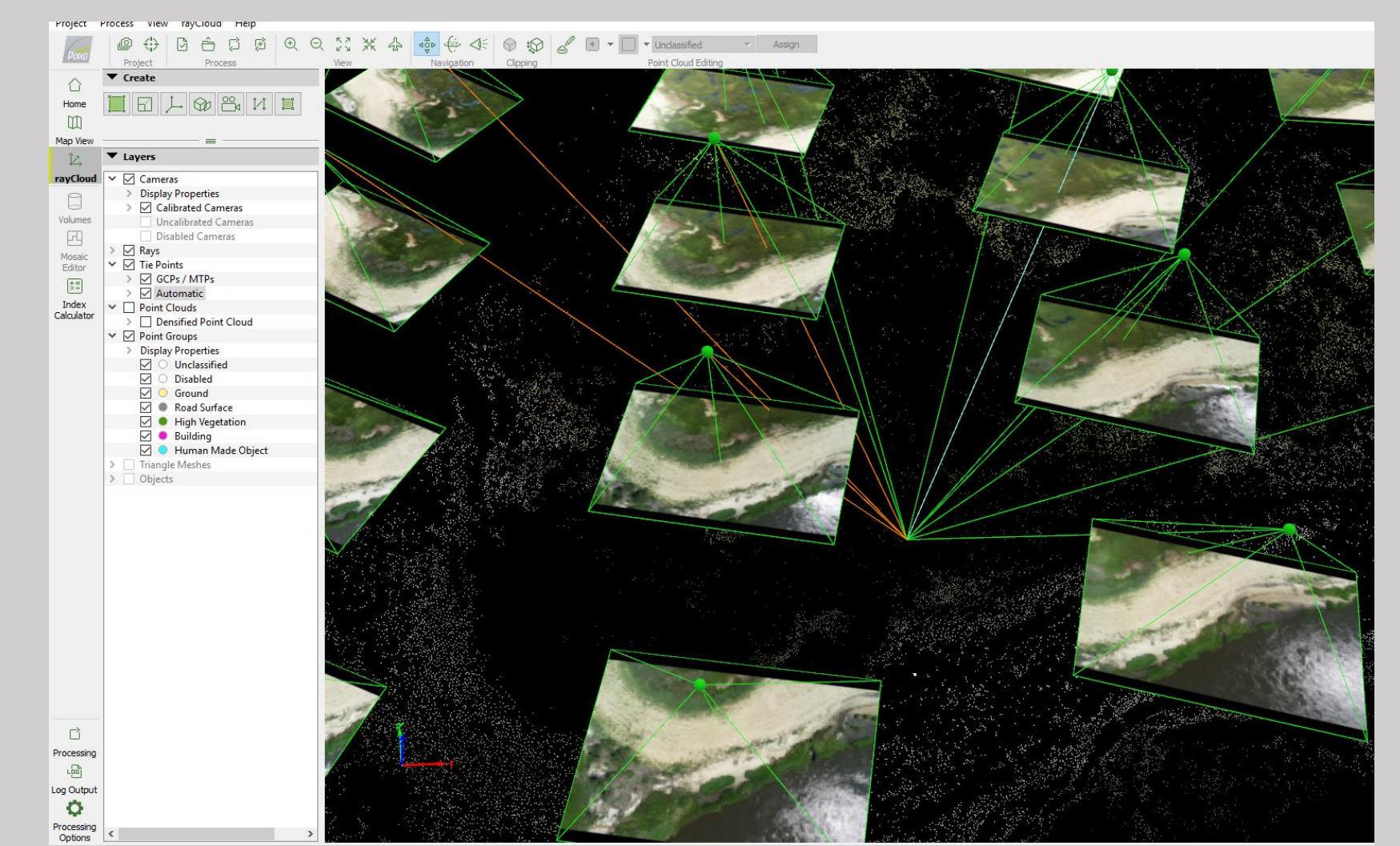


Generating 3D Mapping Utilizing Drones

Drone Field Image Capture (1)

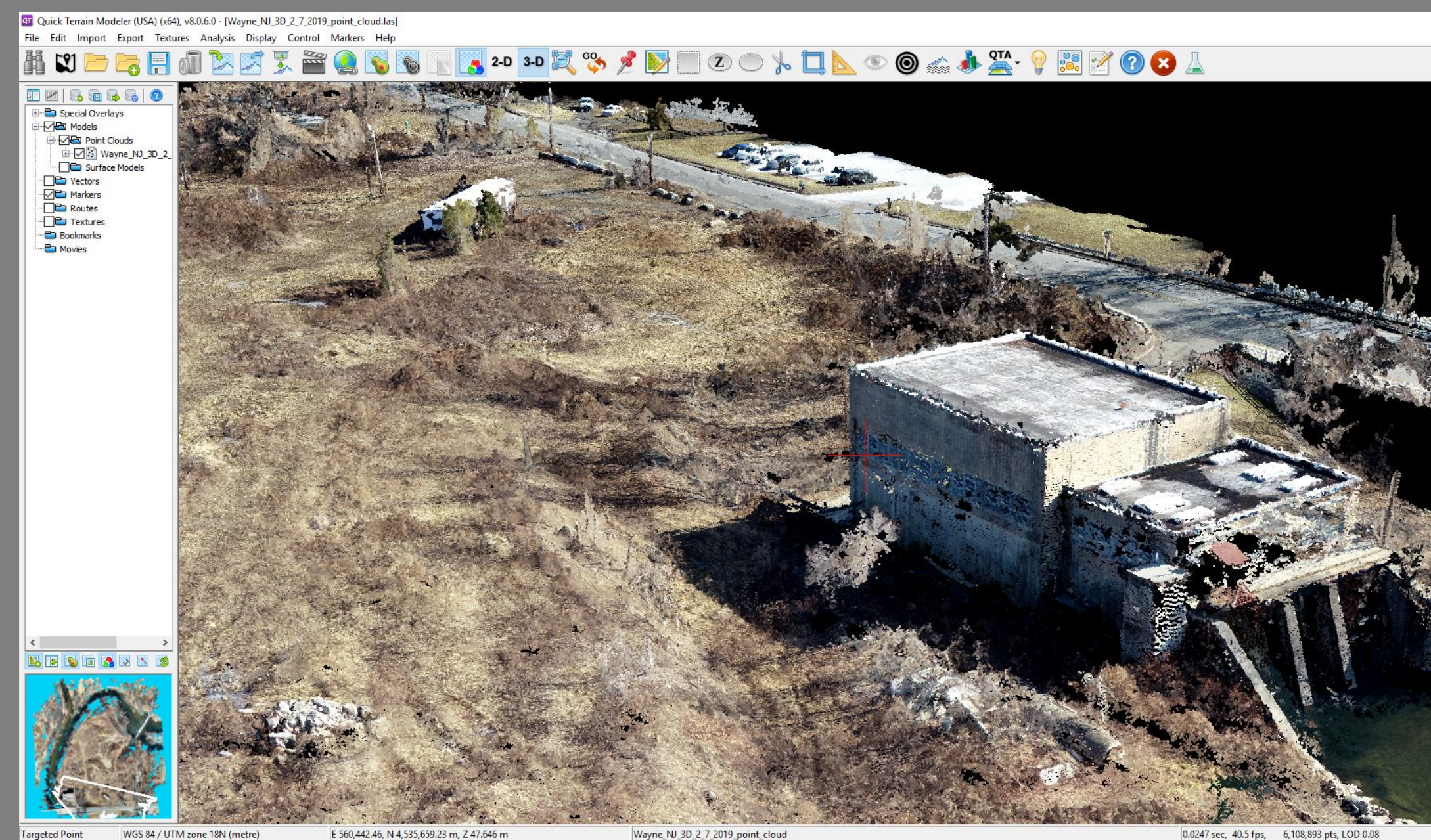


PIX4D Post Processing – 3D Point Cloud, Digital Elevation Model (4)

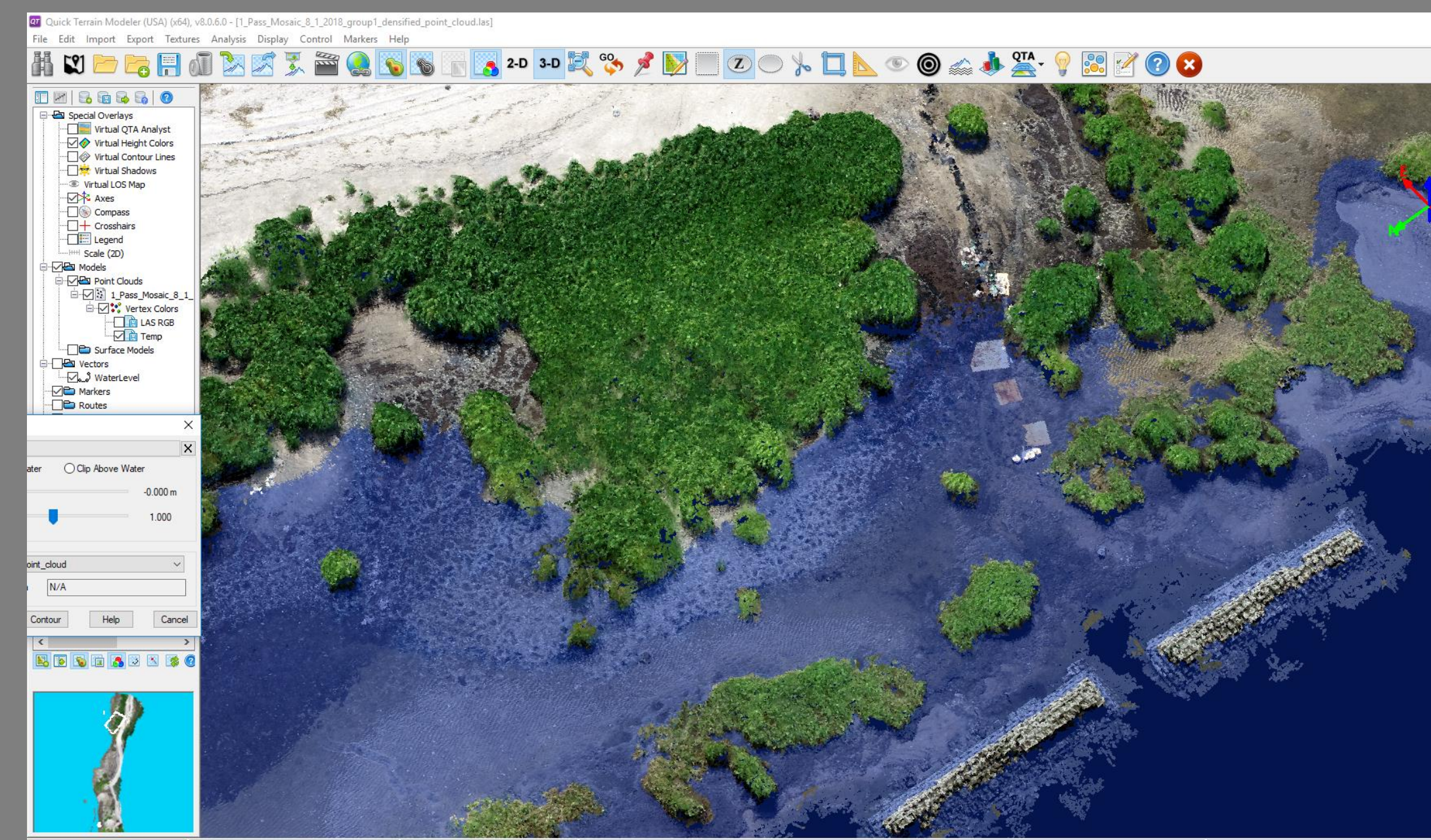


3D Point Cloud Analysis in Quick Terrain Modeler (6)

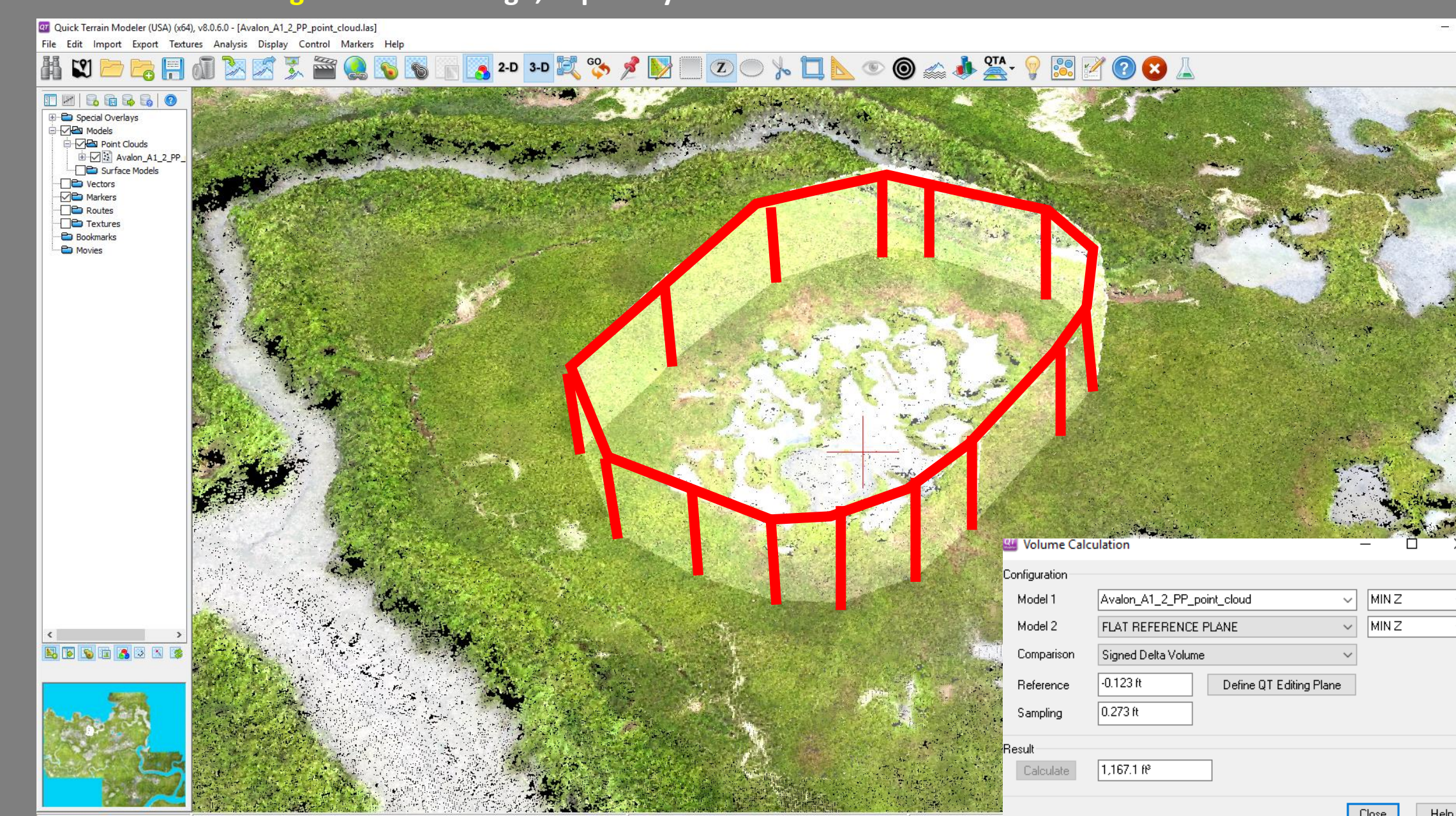
3D Visualization - Wayne Twp, Passaic



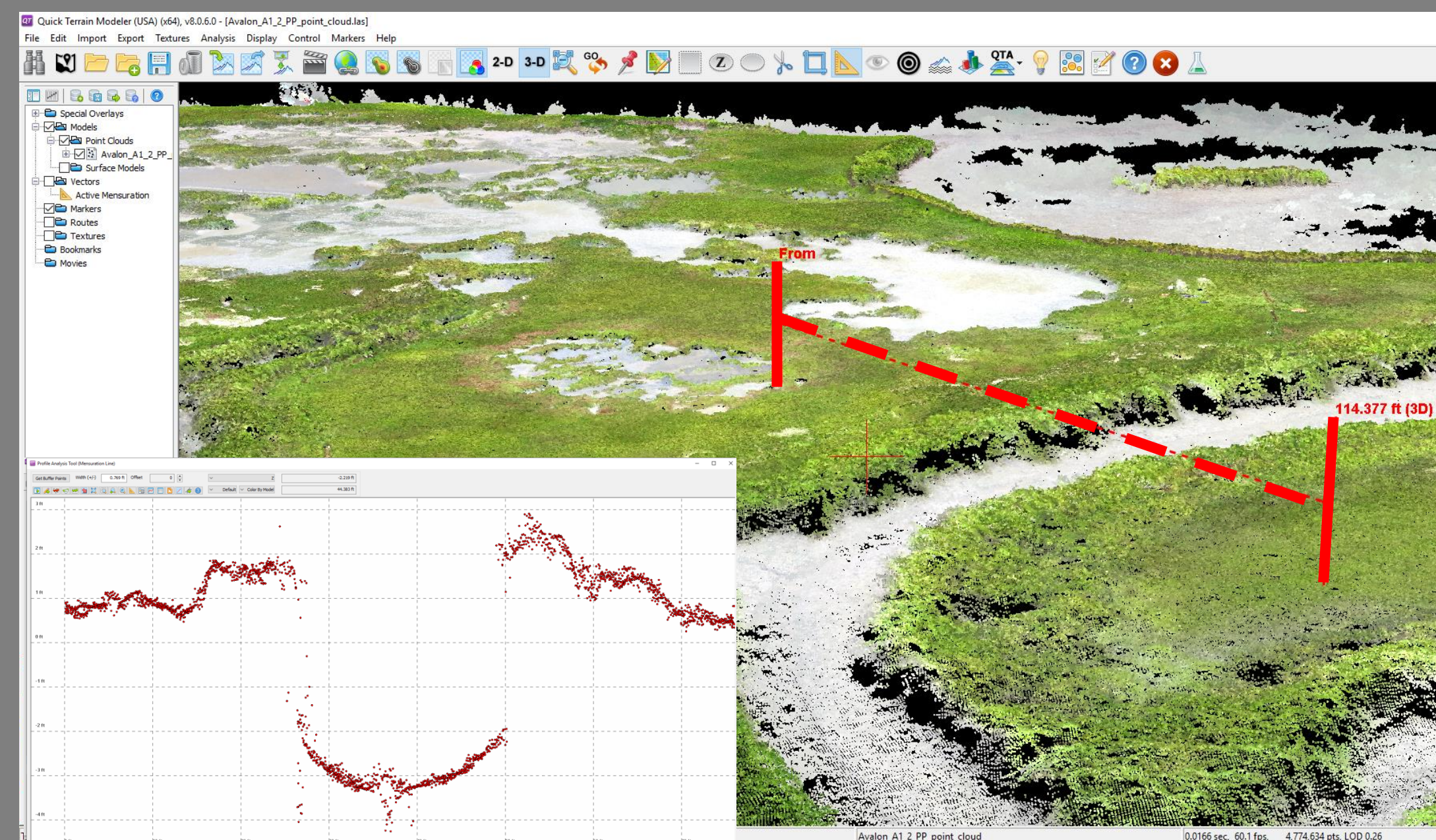
3D Water Modeling – Gandys Beach, Downe Twp., Cumberland



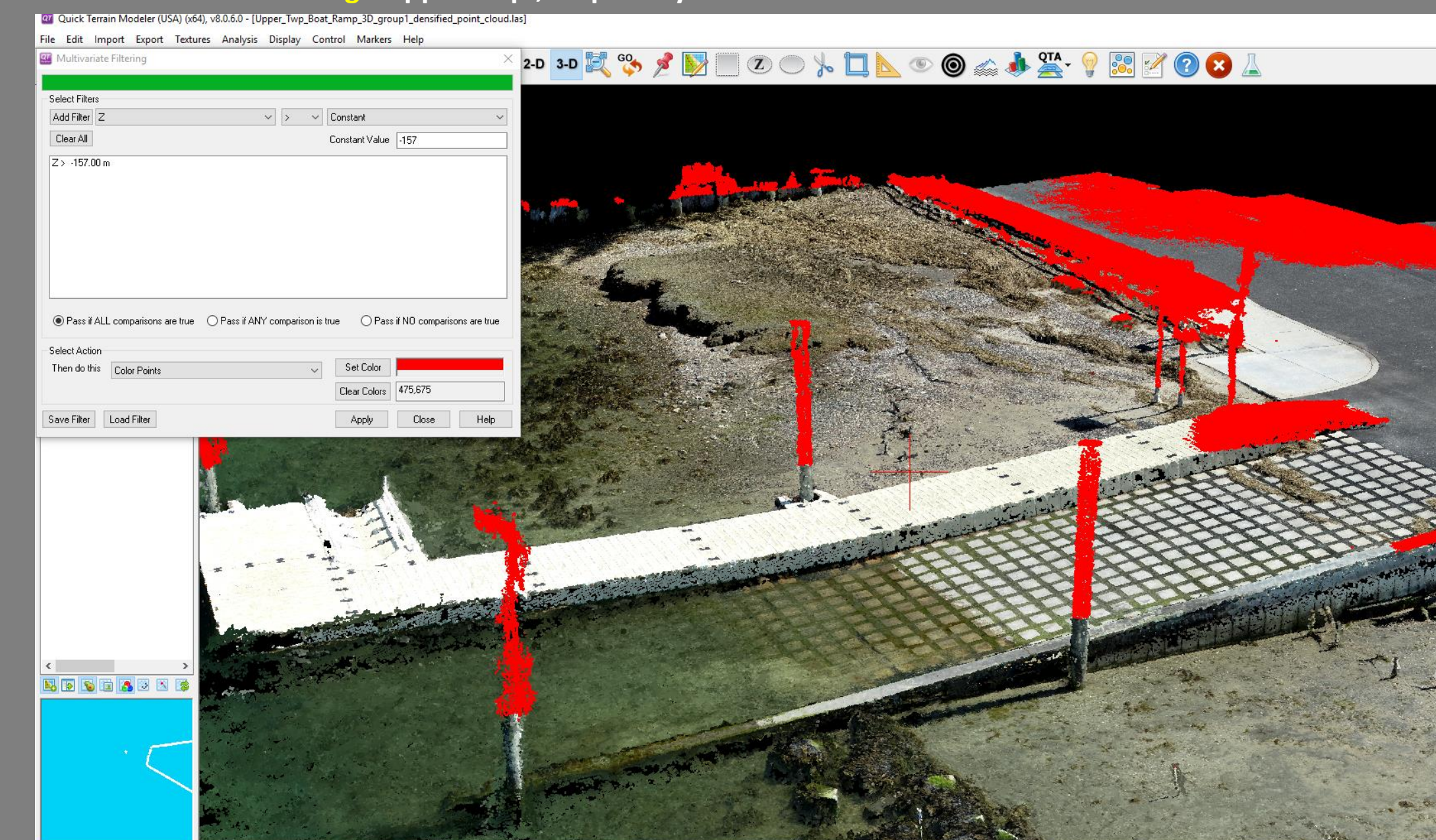
3D Volume Modeling – Avalon Borough, Cape May



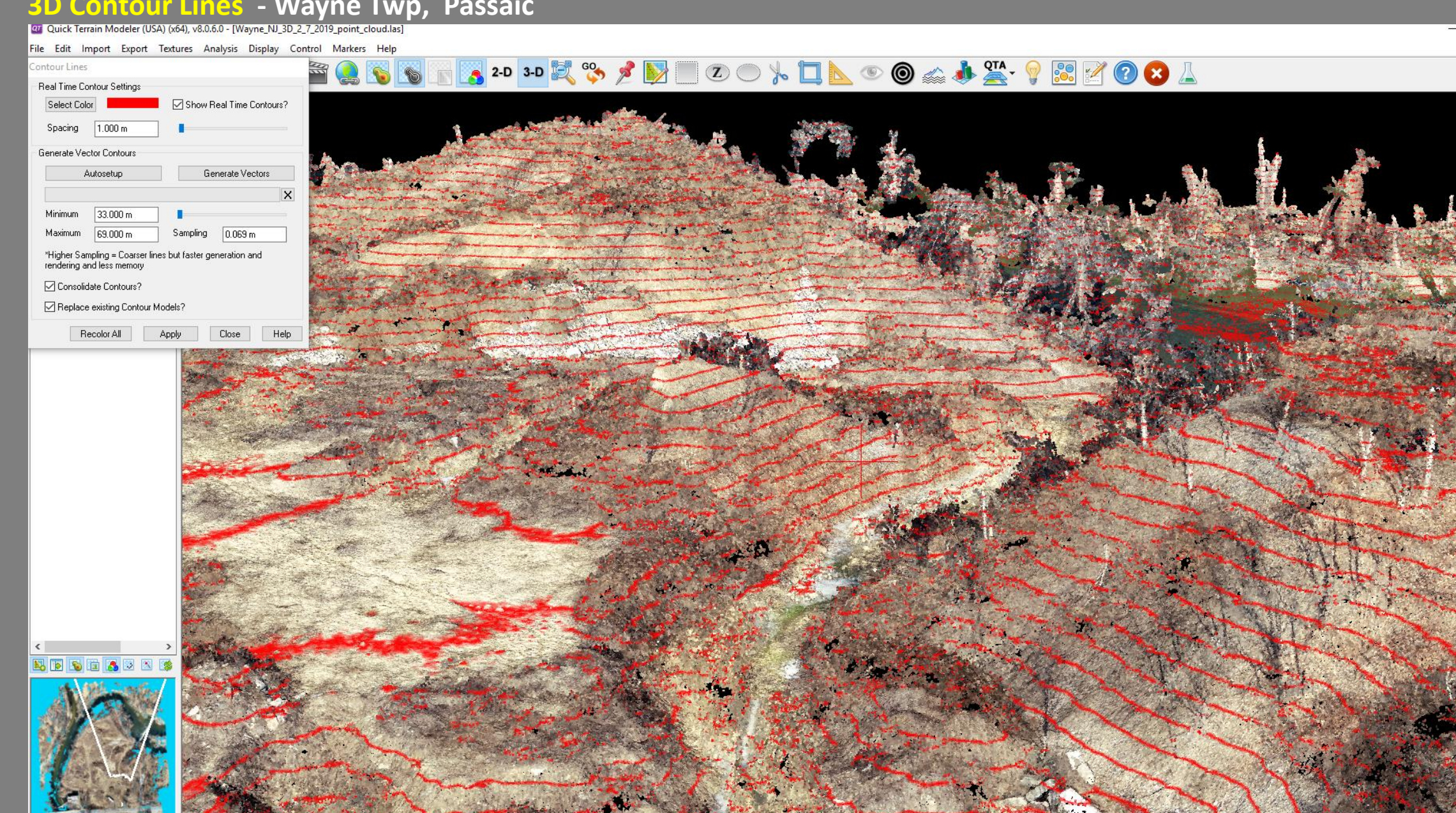
3D Transect Measurement - Avalon Boro, Cape May



3D Multivariate Filtering - Upper Twp., Cape May



3D Contour Lines - Wayne Twp, Passaic



3D Drone Specifications: DJI Phantom 4 Pro: Weight 1388 g; Max Speed 45 mph; Flight Time 28 mins; Camera still photo 20 MP; video 4k, 60 fps; Obstacle Avoid –Yes; Return Home – Yes.

Poster Development: Dave DuMont, NJDEP OCR

References:

- 1) Drone Field Photos - Steve Jacobus, NJDEP
- 2) Drone Field Photos - Dave DuMont, NJDEP
- 3) Drone2Map ESRI
- 4) PIX4D
- 5) Wikipedia
- 6) Quick Terrain Modeler – Applied Imagery