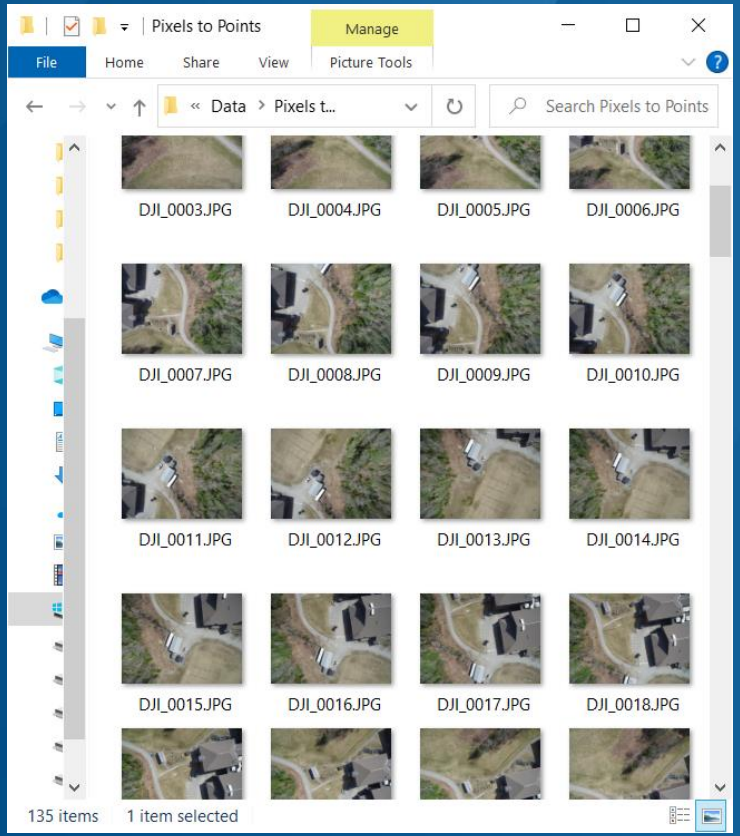
Creating a Digital Twin with UAV-collected Data

BLUE MARBLE GEOGRAPHICS



Agenda

- Data Requirements
- Data Preparation
- Create high-density 3D point cloud using SfM
- Data thinning
- Identify points for ground classification
- Vertical rectification
- Identify buildings with segmentation classification method
- Extract building features
- Create digital terrain model

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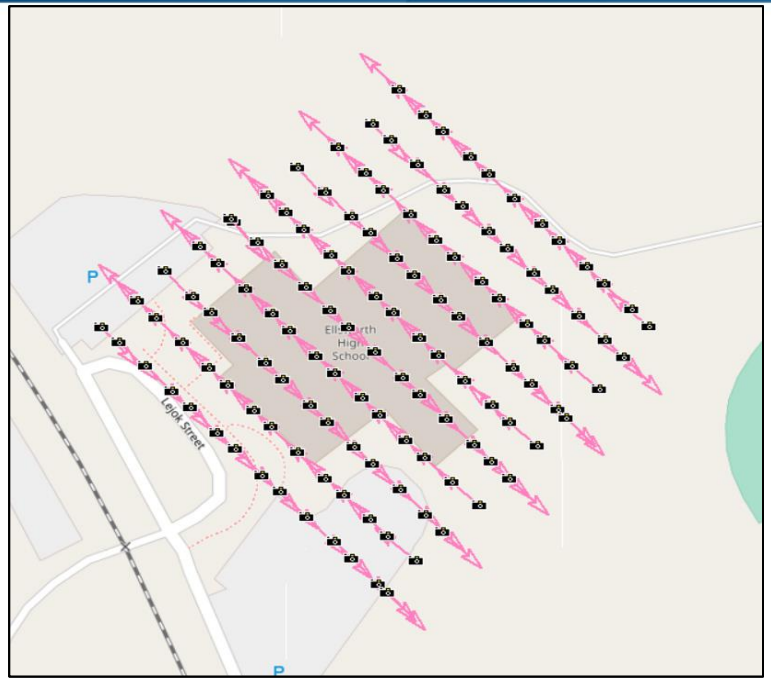

Images collected by Kelly Bellis

Available Data

- Publicly Available Data
  - USGS 3DEP
  - Open Street Maps
- UAV-collected image set
  - Geotagged
  - Overlapping

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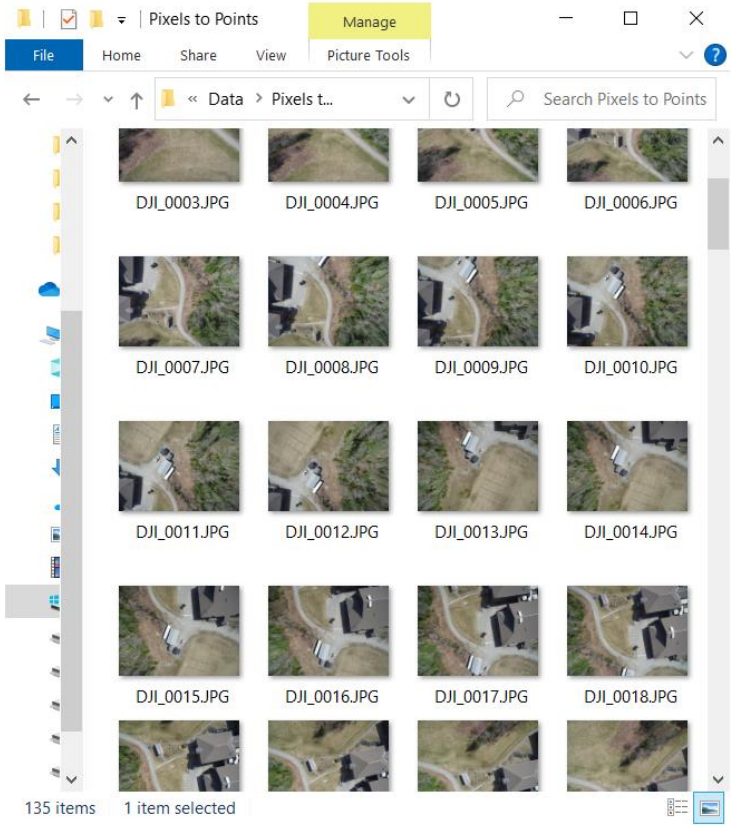


Data Requirements

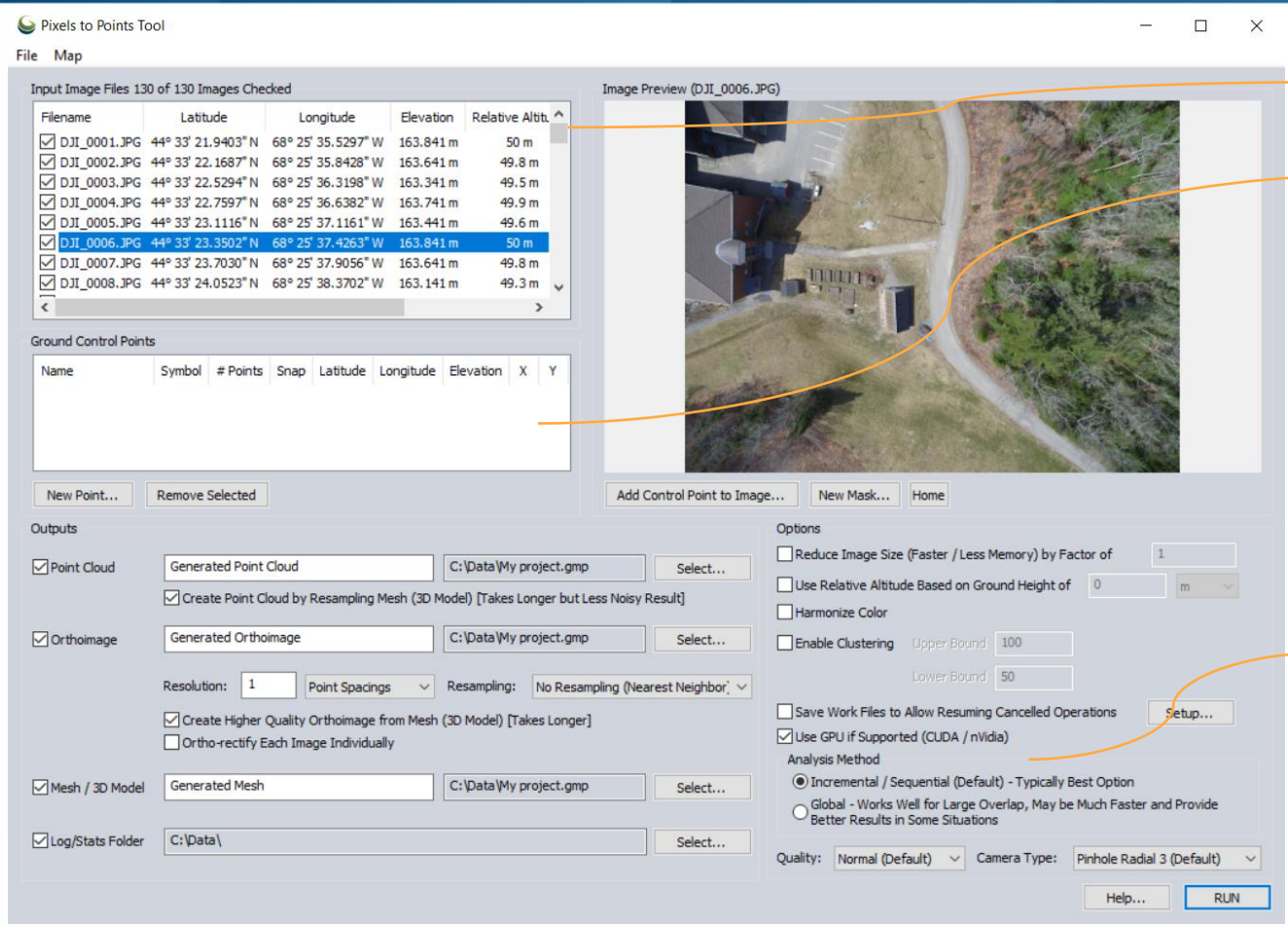
- Static
- Identifiable Features
- Image Overlap

Optimal conditions for data collection:

- High visibility
- Low wind

Data Preparation

- Evaluate Image overlap
- Image clarity
- Remove erroneous images (apply masks if needed)



Import Images

Ground Control Points

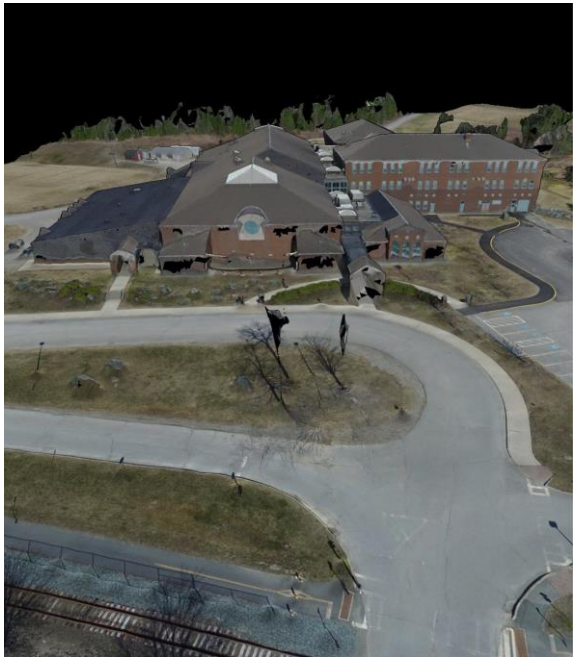
Analysis Methods

Pixels to Points in Global Mapper Pro

Point Cloud

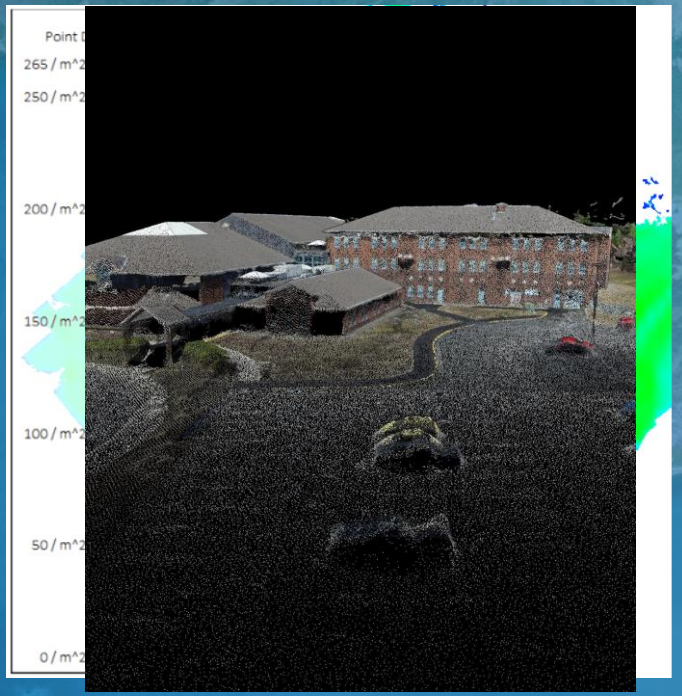
Orthoimage

3D Model



458.82 samples/m^2

69.565 samples/m^2



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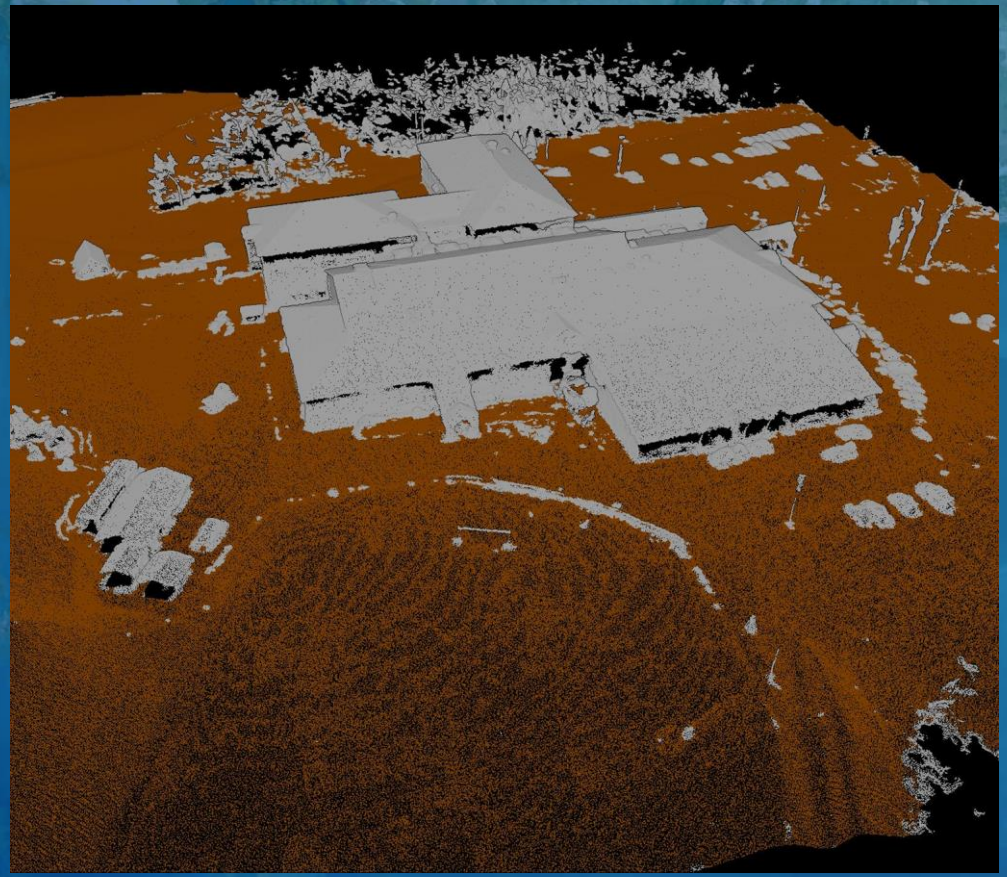

Ground Classification

- Segmentation classification

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Vertical Rectification

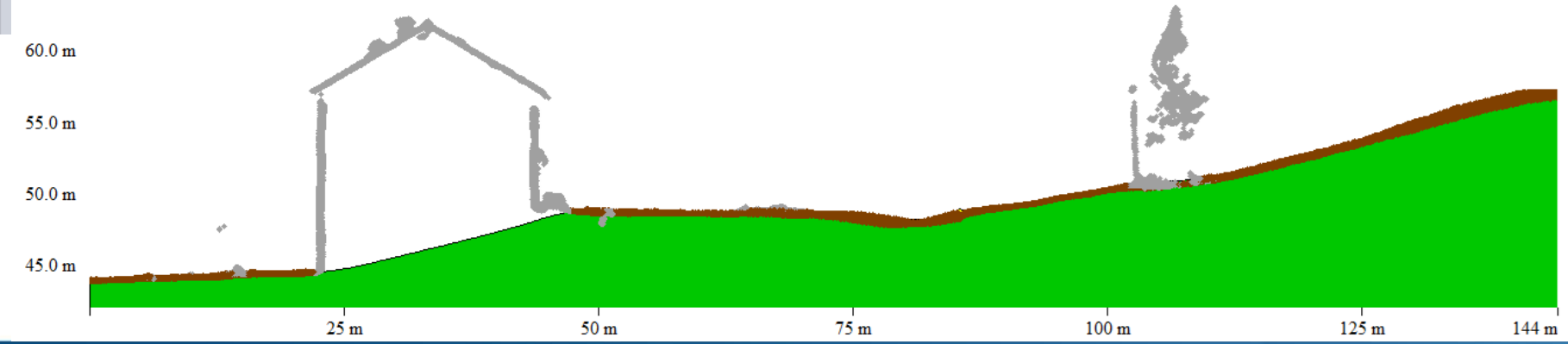
Feature Measurement Information

Selected Feature Information

<Feature Type>	RMSE	LIDAR_ELEV	ELEV_DIFF	ELEV_DIFF_ABS	ELEVATION	LIDAR_POINT_COUNT
Unknown Point Feature	53.1277 m	97.061 m	53.1277 m	53.1277 m	43.9333	20
Unknown Point Feature	53.0436 m	101.543 m	53.0436 m	53.0436 m	48.4994	20
Unknown Point Feature	52.7817 m	94.0023 m	52.7817 m	52.7817 m	41.2206	20
Unknown Point Feature	52.7007 m	95.7992 m	52.7007 m	52.7007 m	43.0985	20
Unknown Point Feature	52.565 m	94.9357 m	52.565 m	52.565 m	42.3707	20
Unknown Point Feature	52.5083 m	95.2579 m	52.5083 m	52.5083 m	42.7496	20
Unknown Point Feature	52.3157 m	95.9949 m	52.3157 m	52.3157 m	43.6792	20
Unknown Point Feature	52.0816 m	109.1571 m	52.0816 m	52.0816 m	57.0755	20

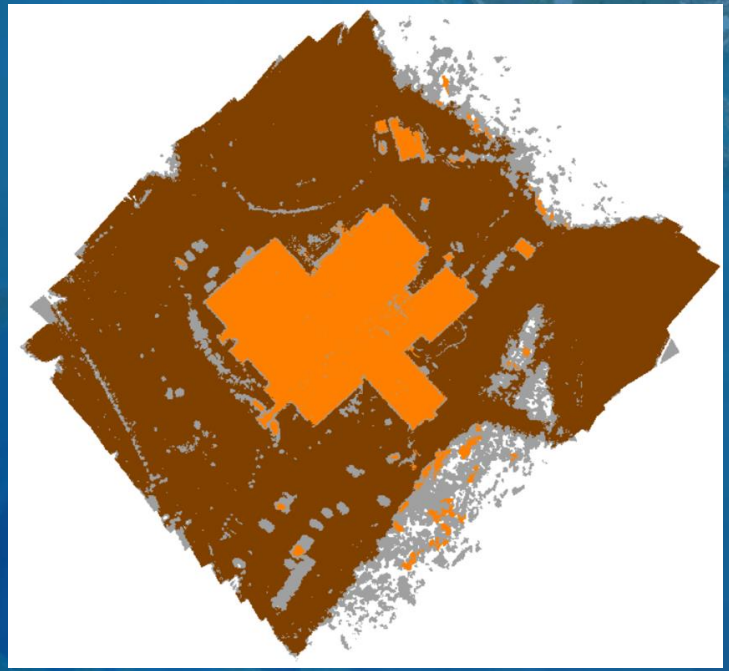
ELEV_DIFF

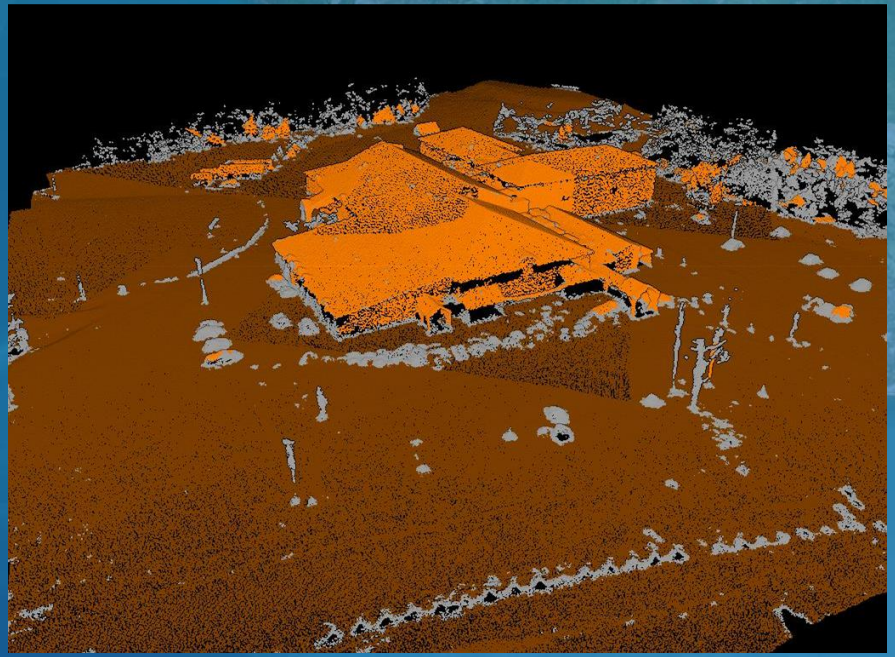
53.128 m



Building Classification

Segmentation non-ground classification





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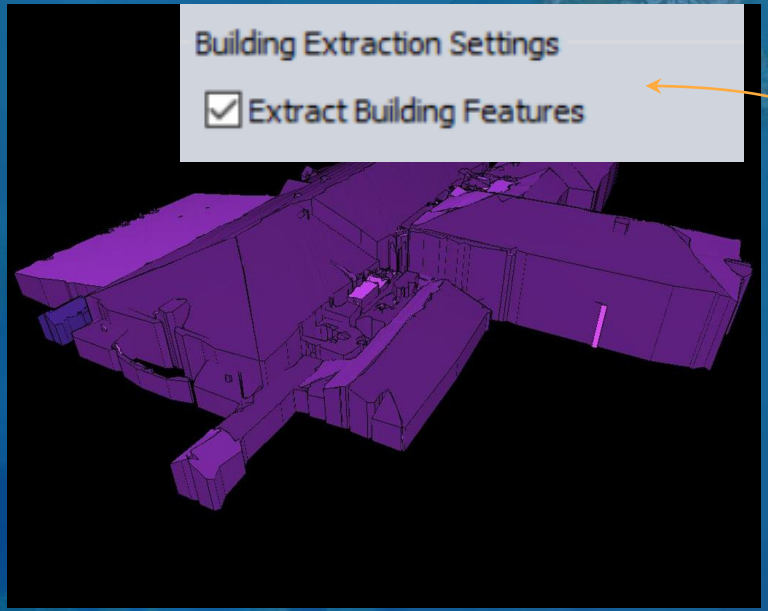
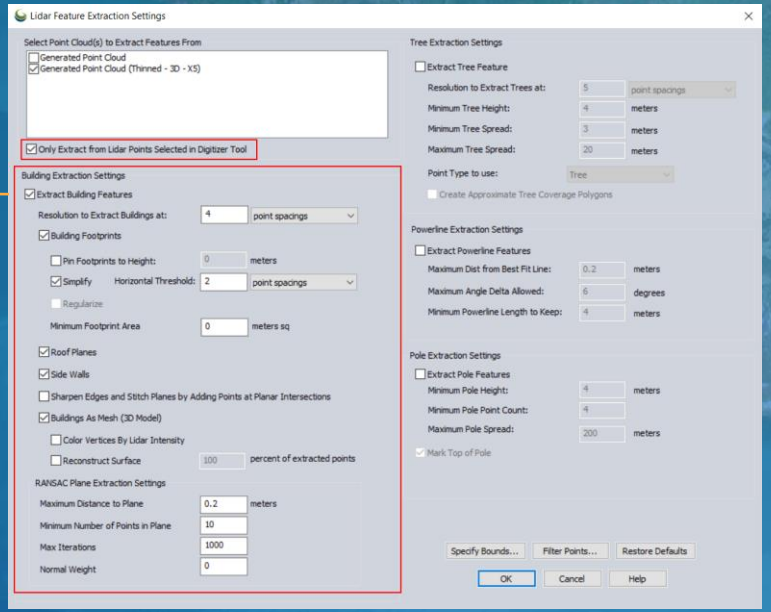
3D Vector Extraction





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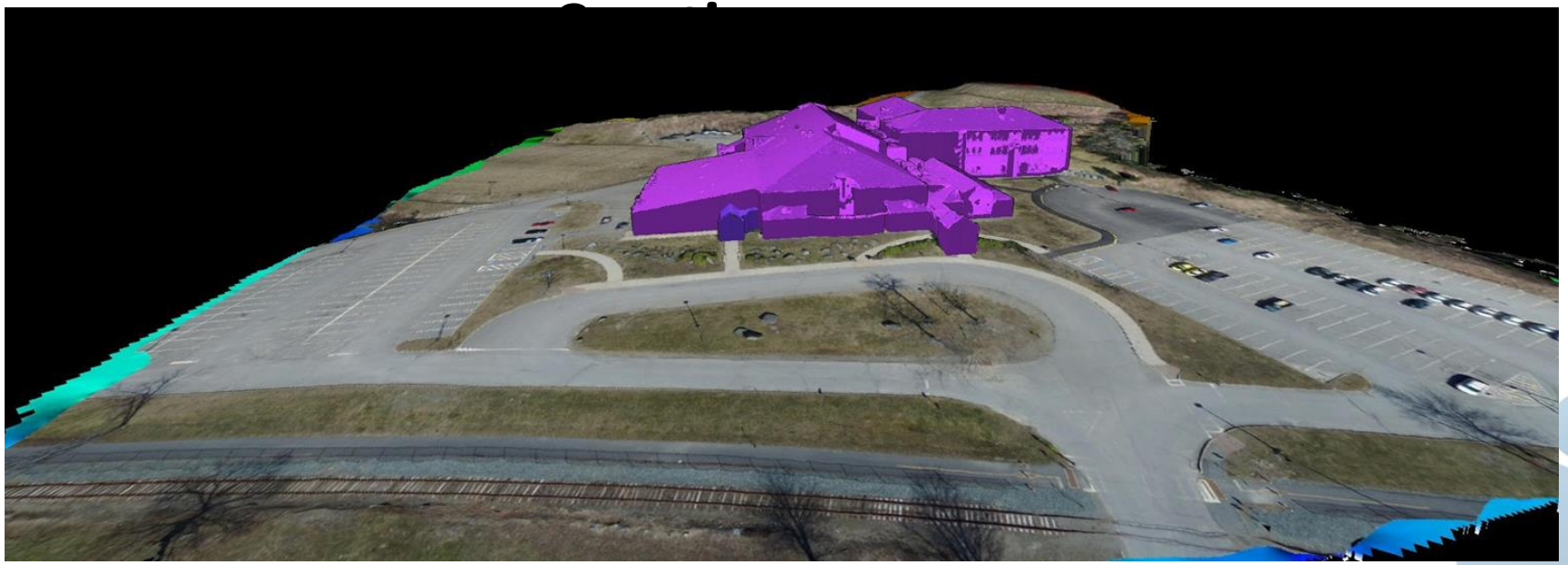
Terrain



Thank you!

Questions? Comments?

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