



LiDAR Data Extraction

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AYRES
ASSOCIATES

Topics

Brief overview of Lidar and platforms

Building Extraction

Vegetation/Trees

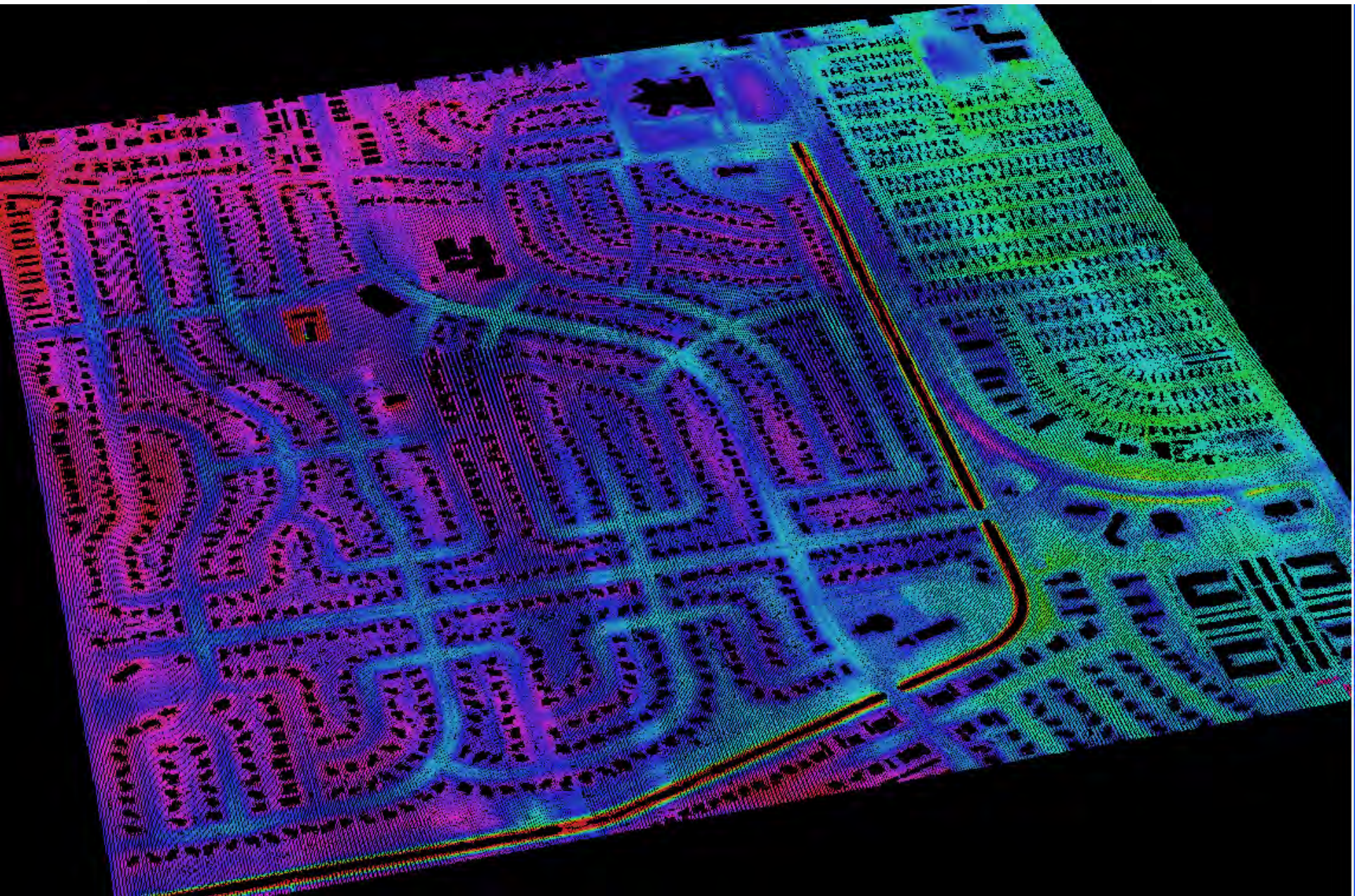
Transmission/Distribution Lines

Design-grade Feature Extraction

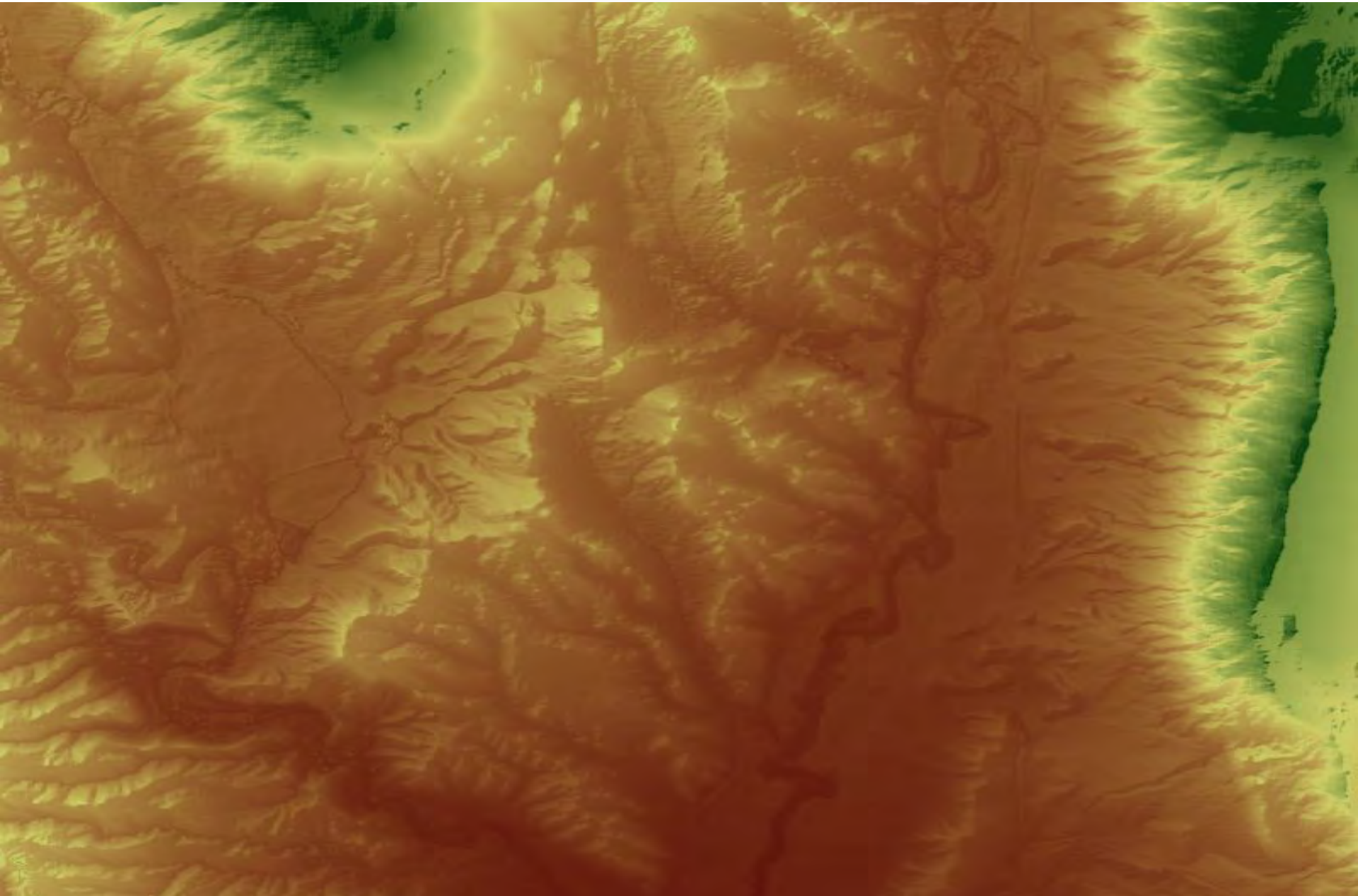
Classified Point Cloud



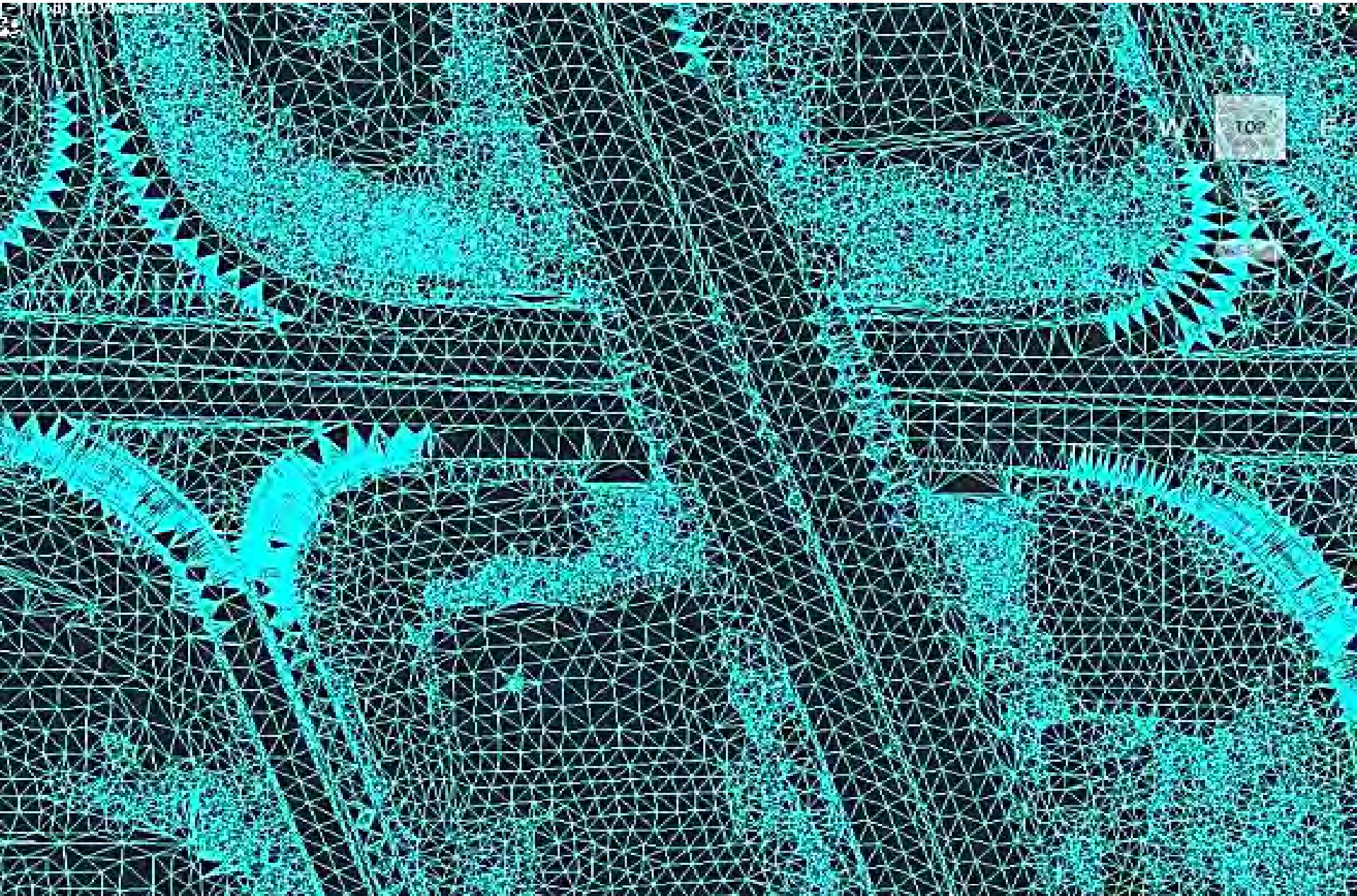
Bare Earth Point Cloud



Digital Elevation Model (DEM)



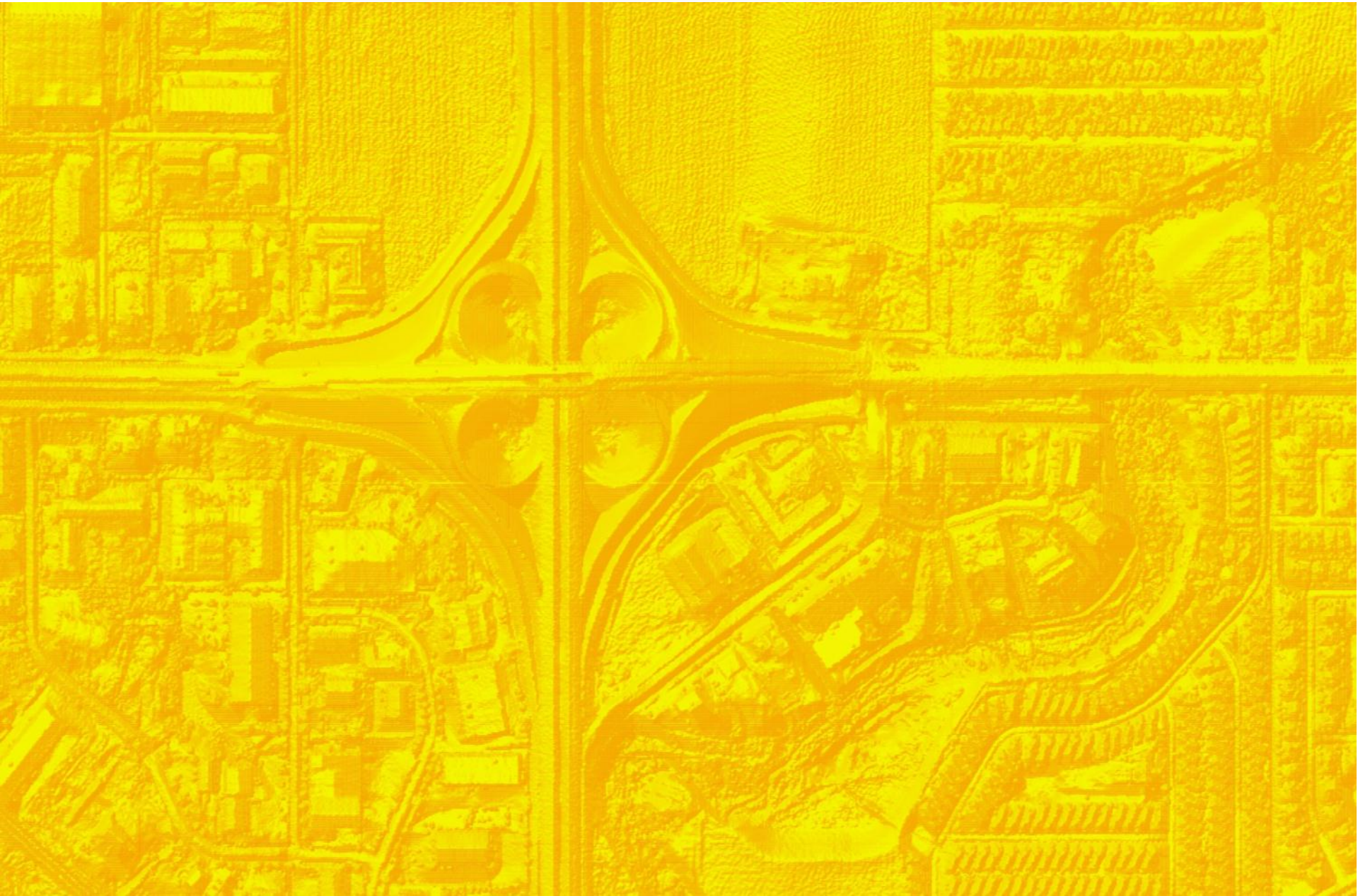
Triangulated Irregular Network (TIN)



Contours



Digital Surface Model



Intensity Images



Fixed-wing Aerial Lidar

Point Density

1 pt/sq meter = Standard 2-ft Contour Lidar

3-4 pts/sq meter = Standard 1-ft Contour LiDAR

4+ pts/sq meter = 3D buildings & tree canopy extents

15 pts/sq meter = detailed veg. analysis

**20+ pts/sq meter = elec/distribution lines, general
planimetrics (1' = 50' scale)**

40 pts/sq meter = curb & gutter, small utilities

~ 1pt / M²

~ 4 pt / M²



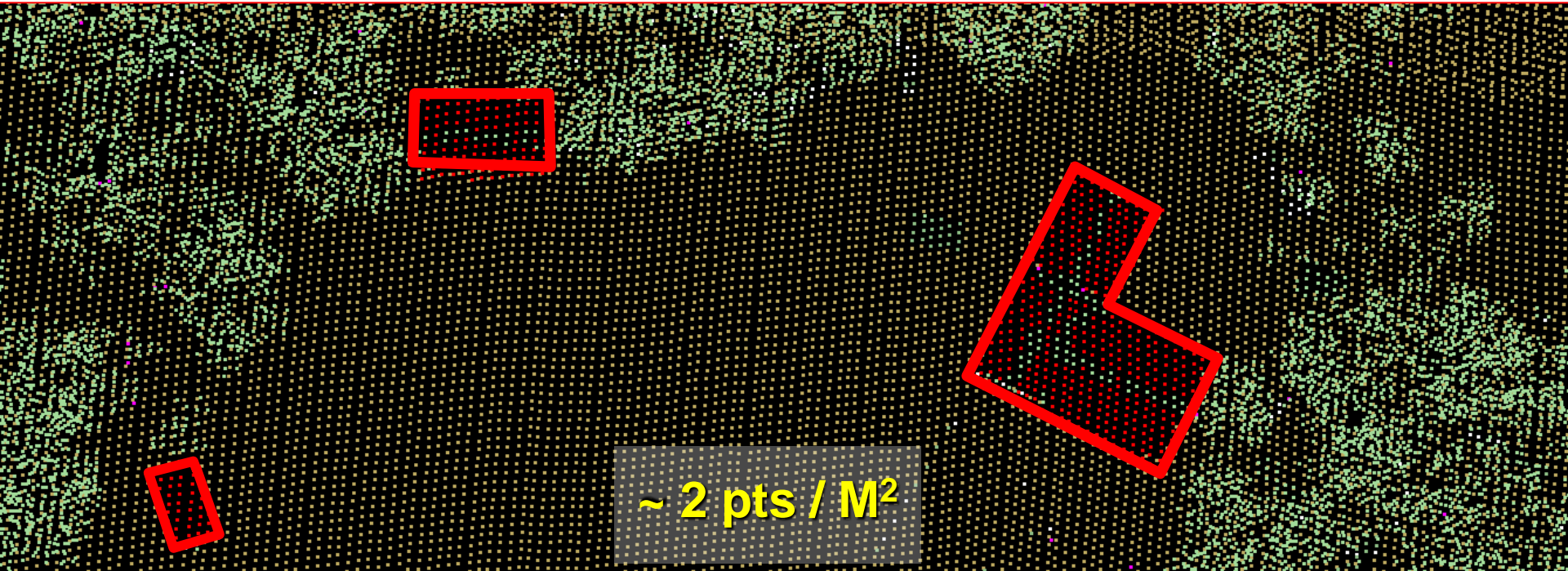
~ 10 pts / M²

~ 40 pts / M²

Building Extraction

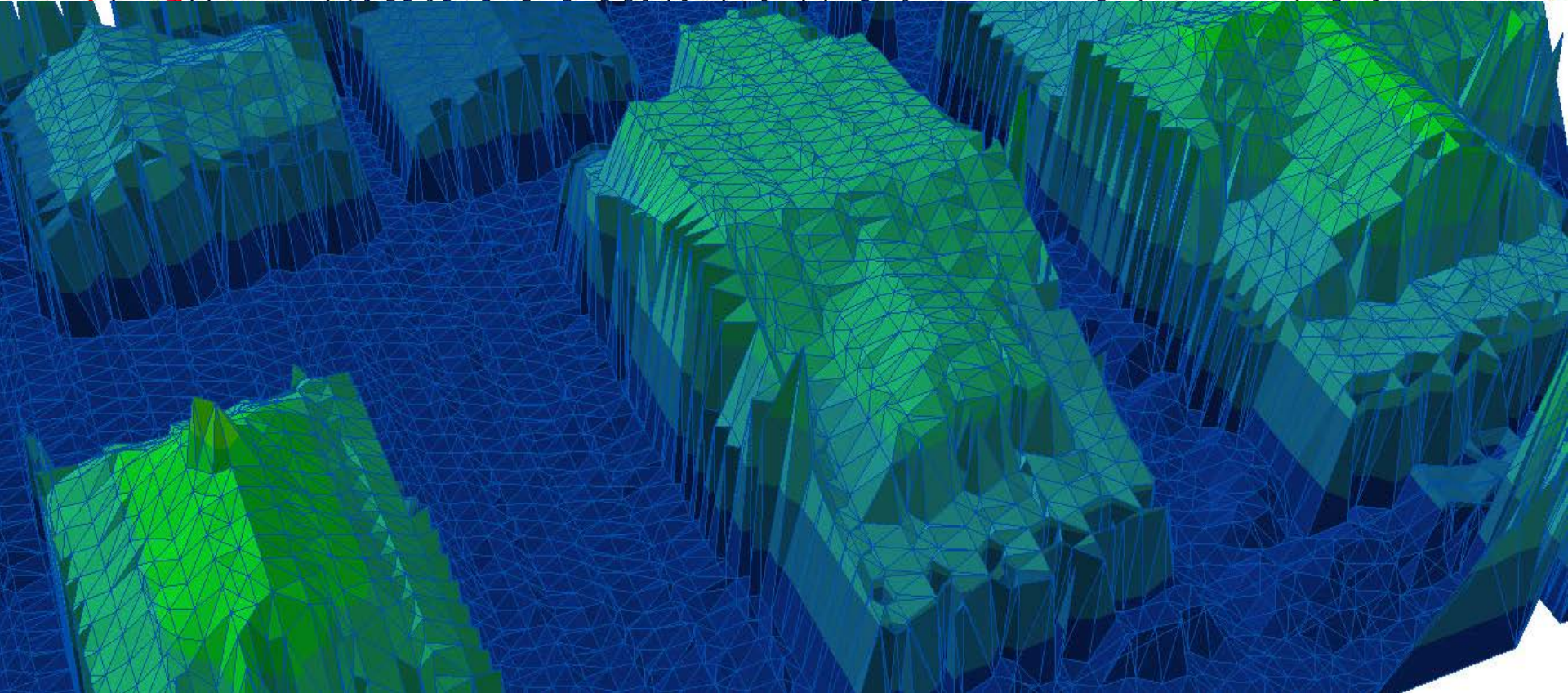
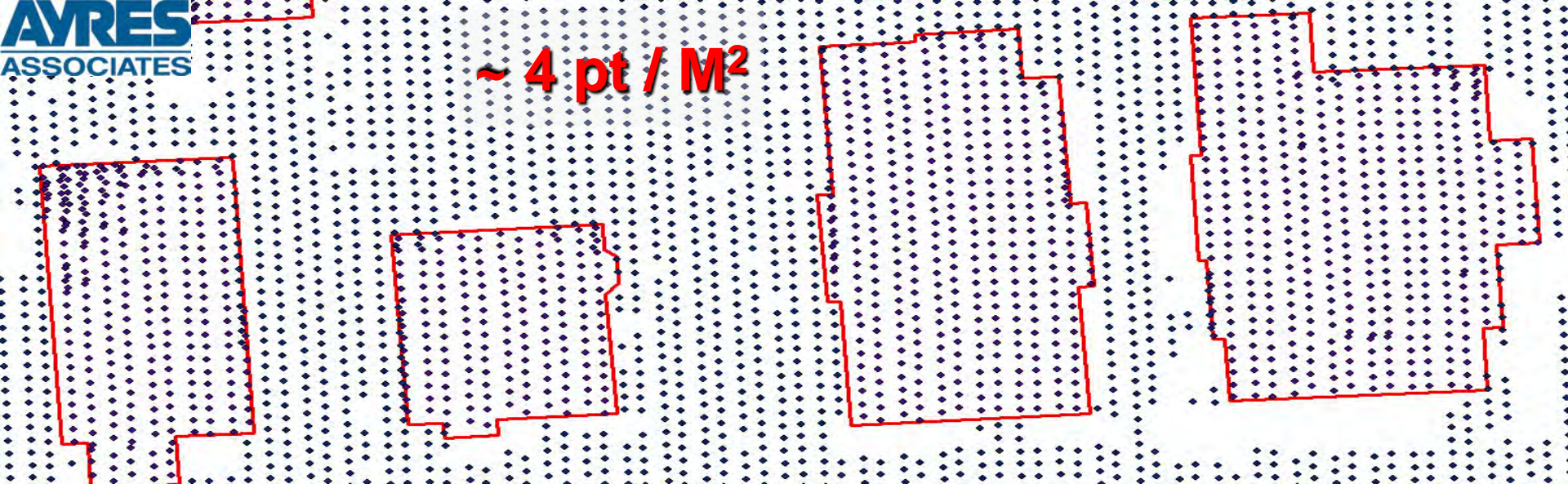


~ 1pt / M²

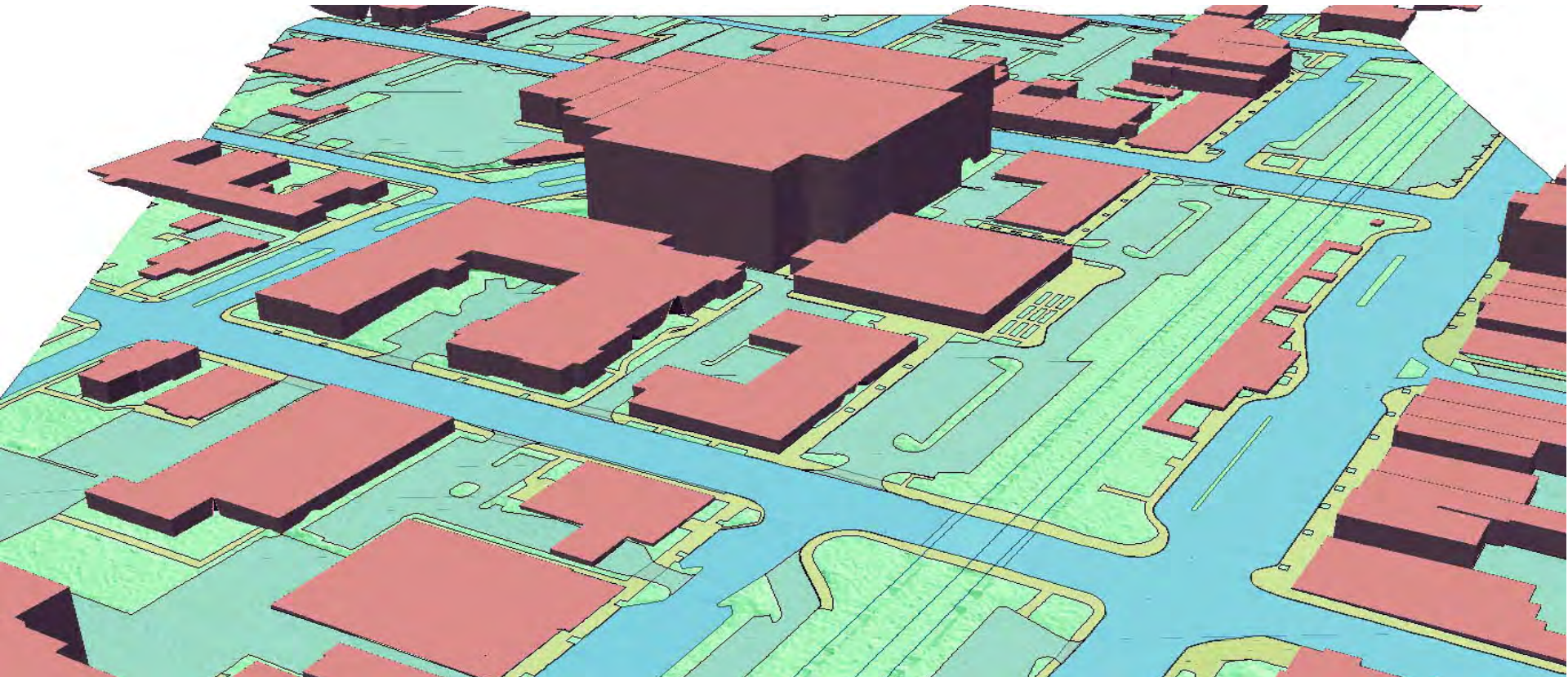
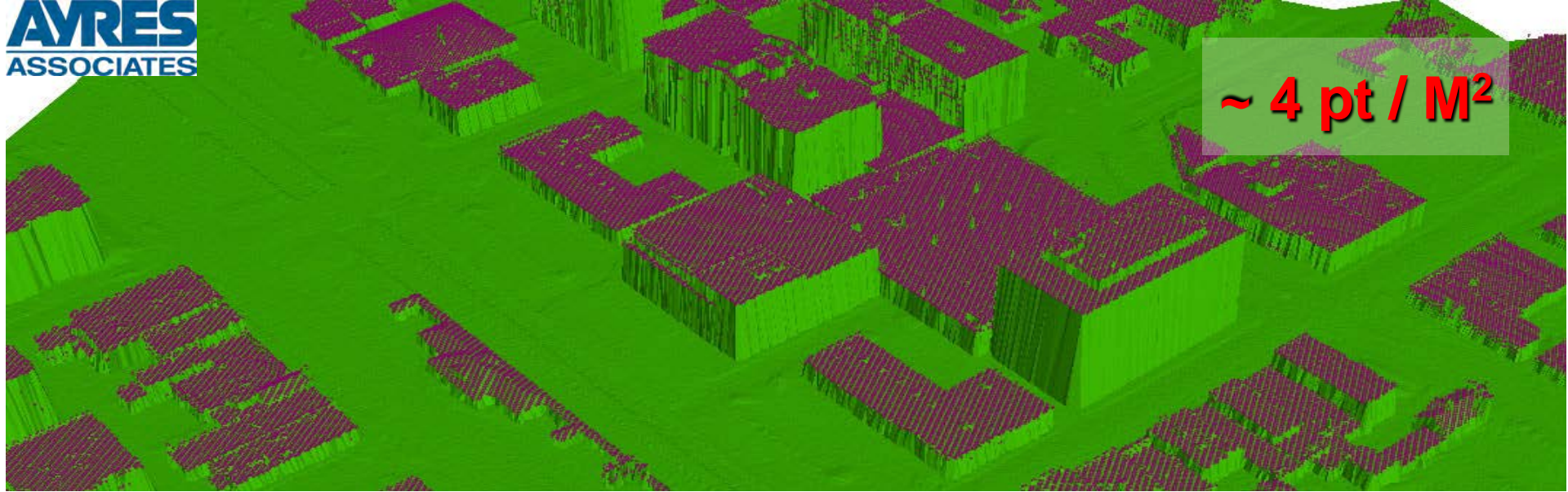


~ 2 pts / M²

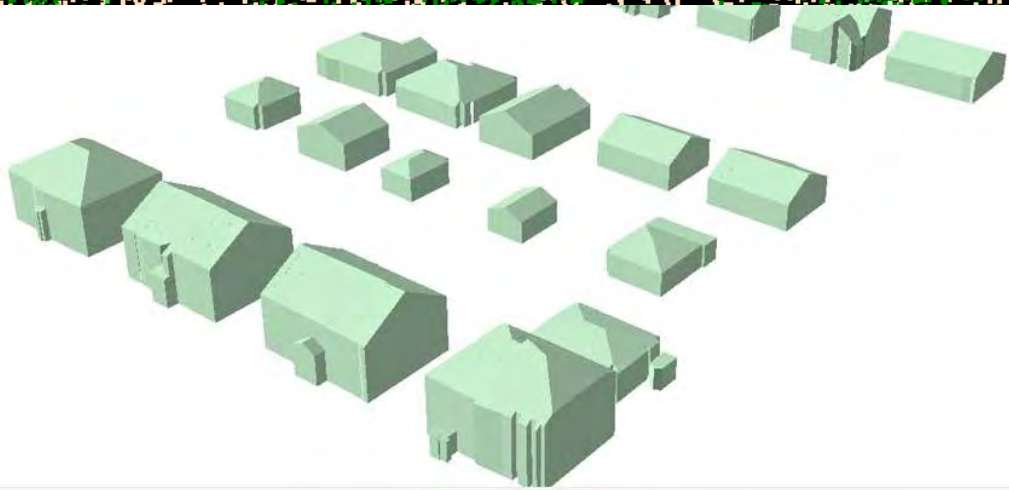
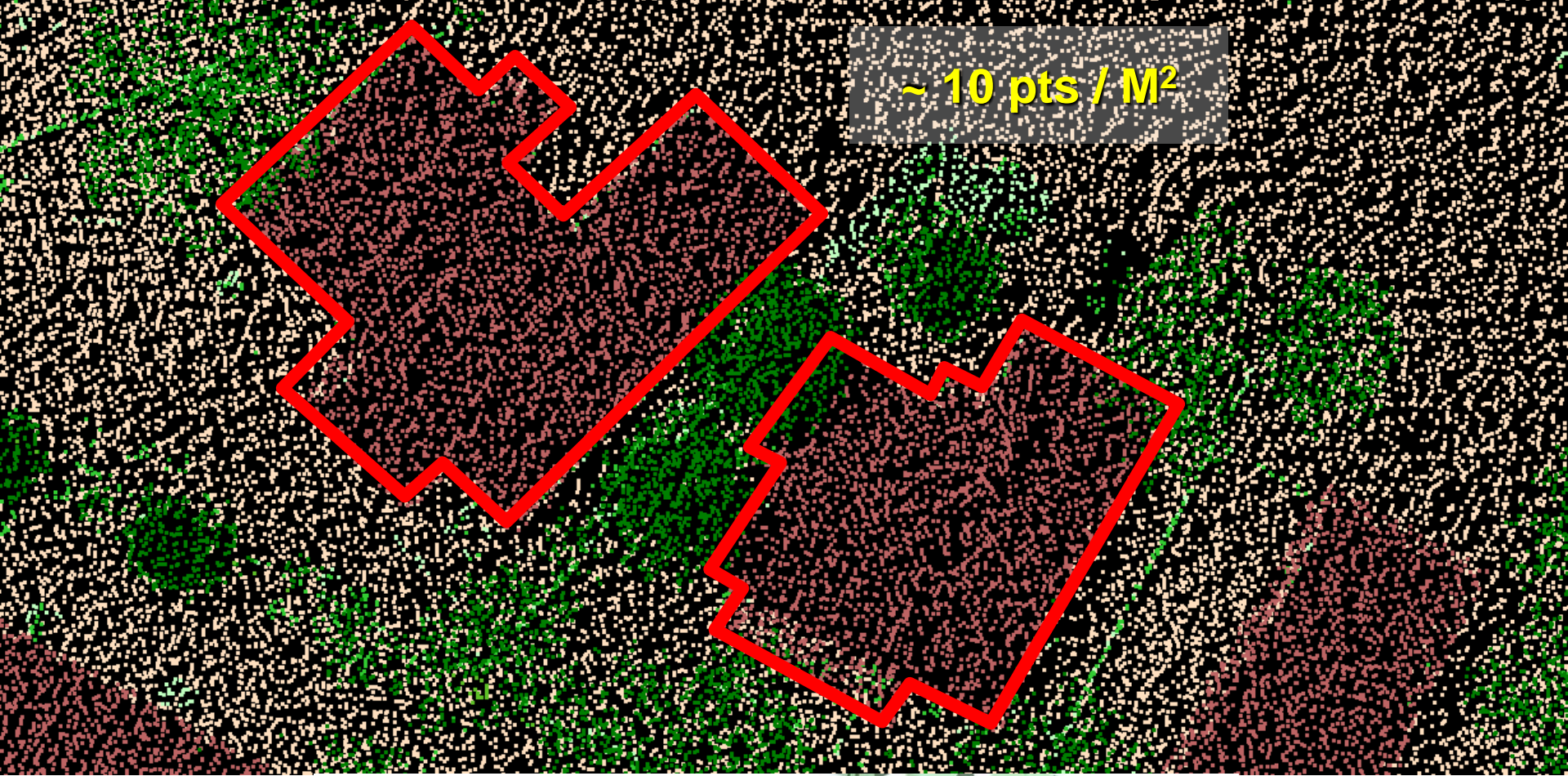
~ 4 pt / M²



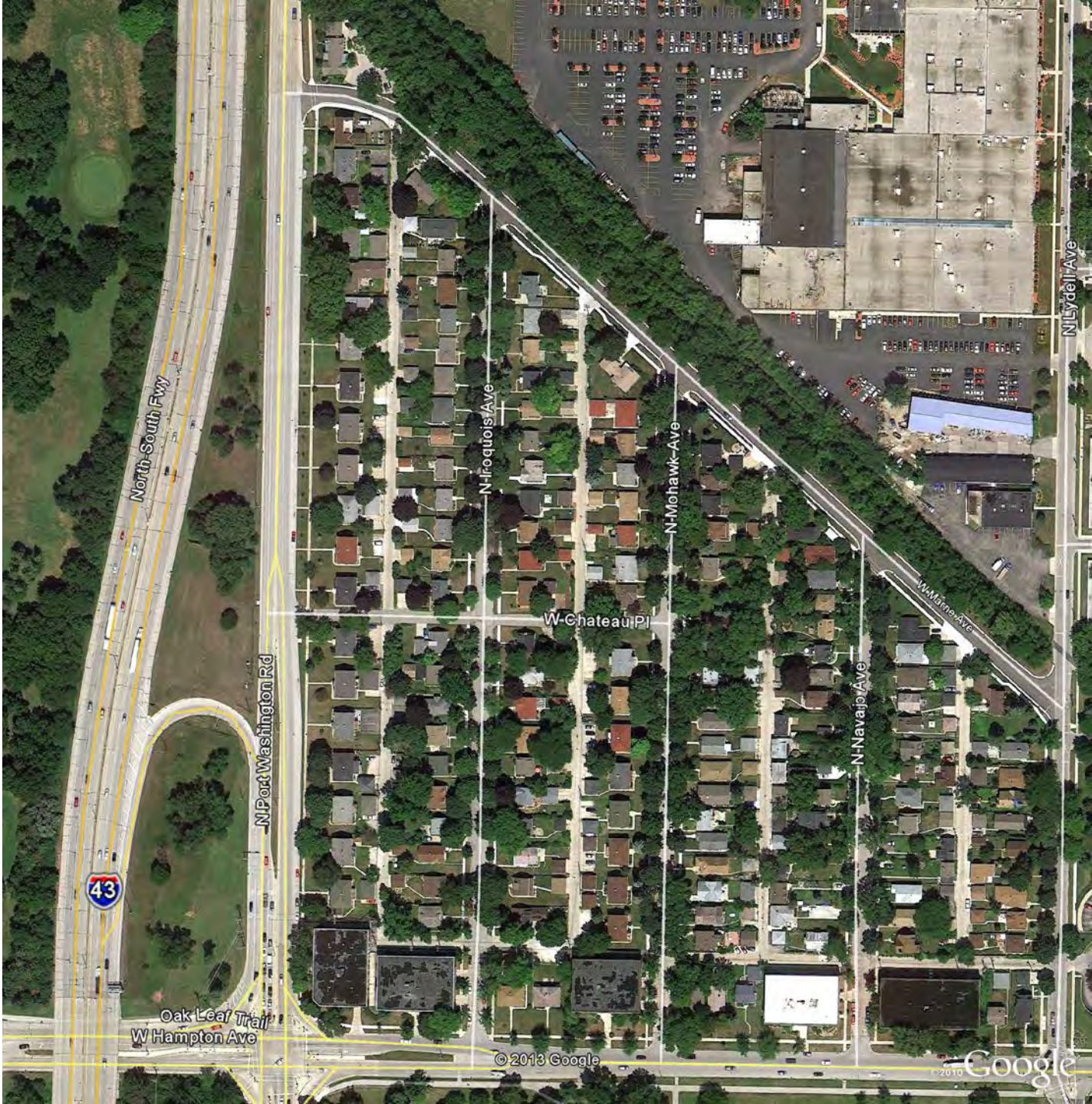
~ 4 pt / M²

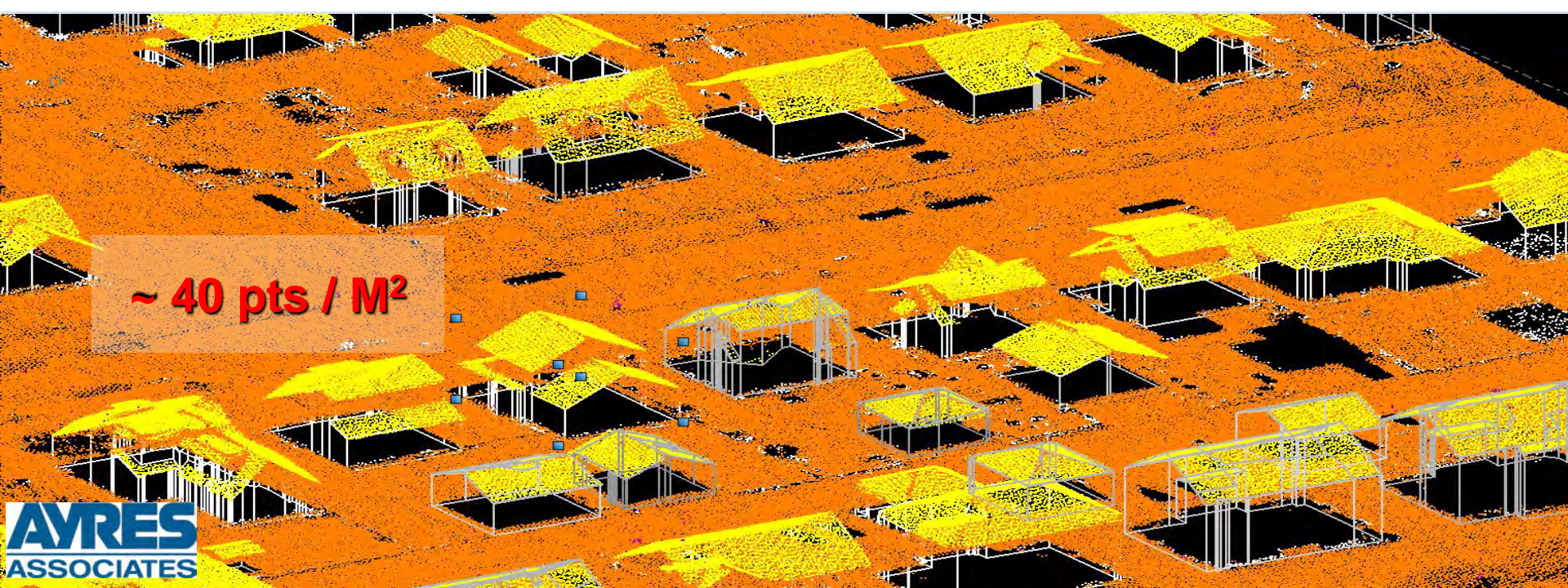
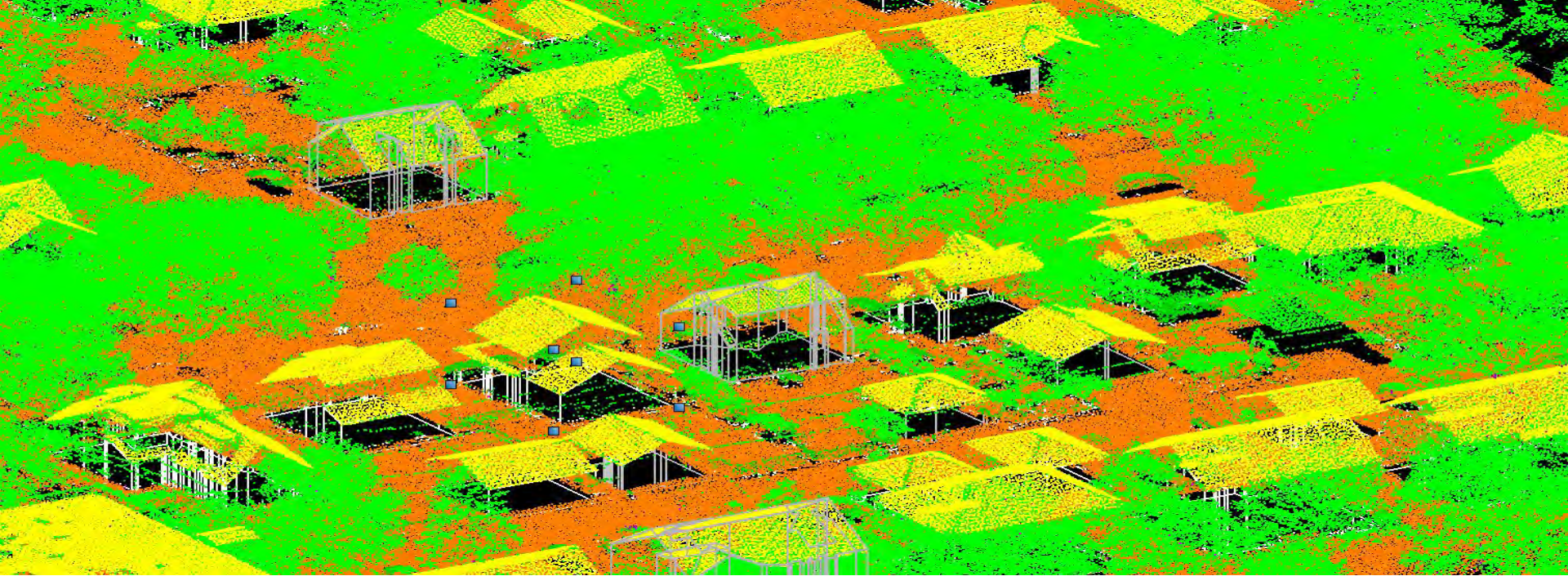


~ 10 pts / M²

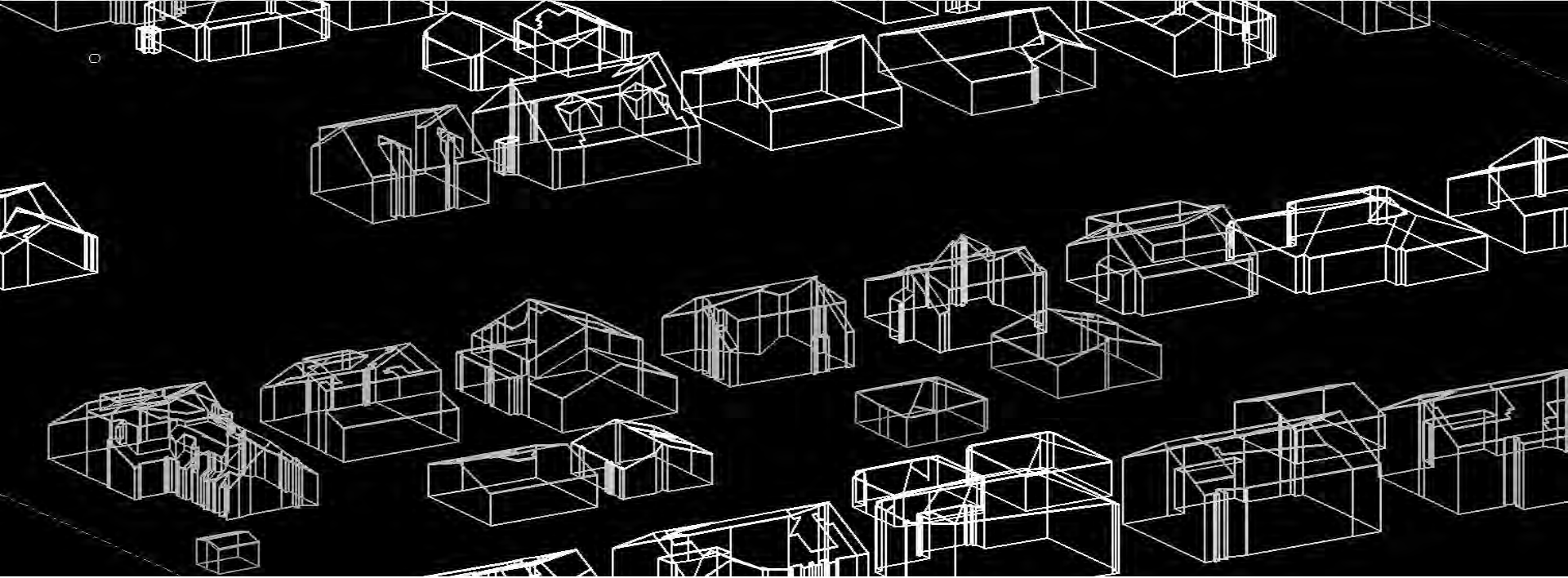


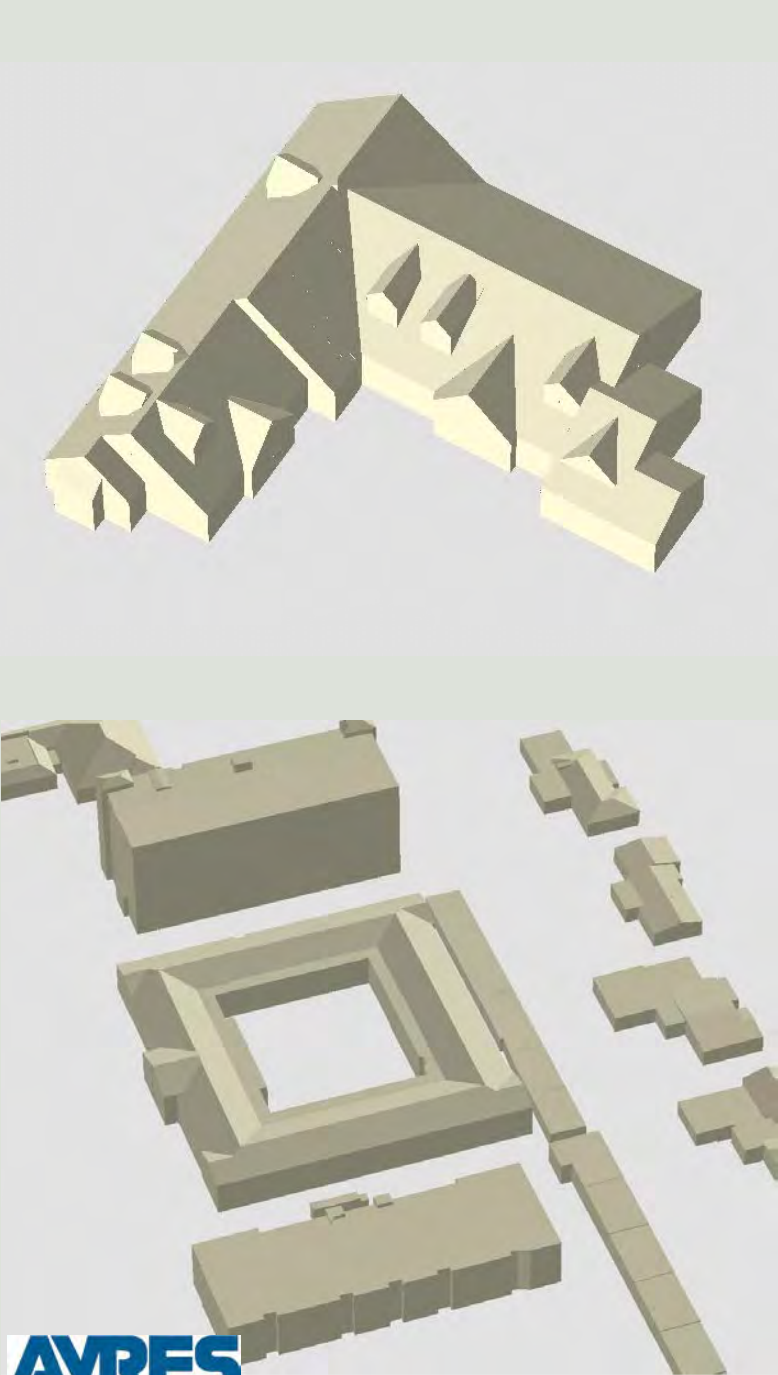
Whitefish Bay/ Glendale (Milwaukee)





~ 40 pts / M²





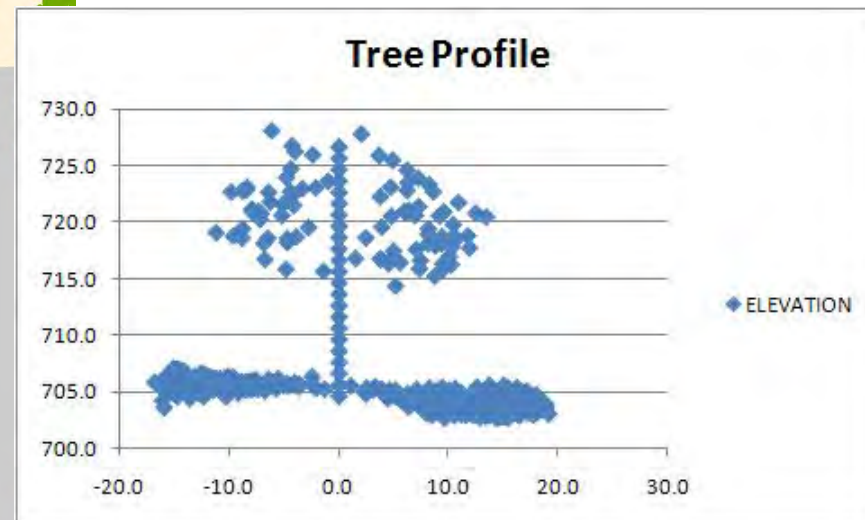
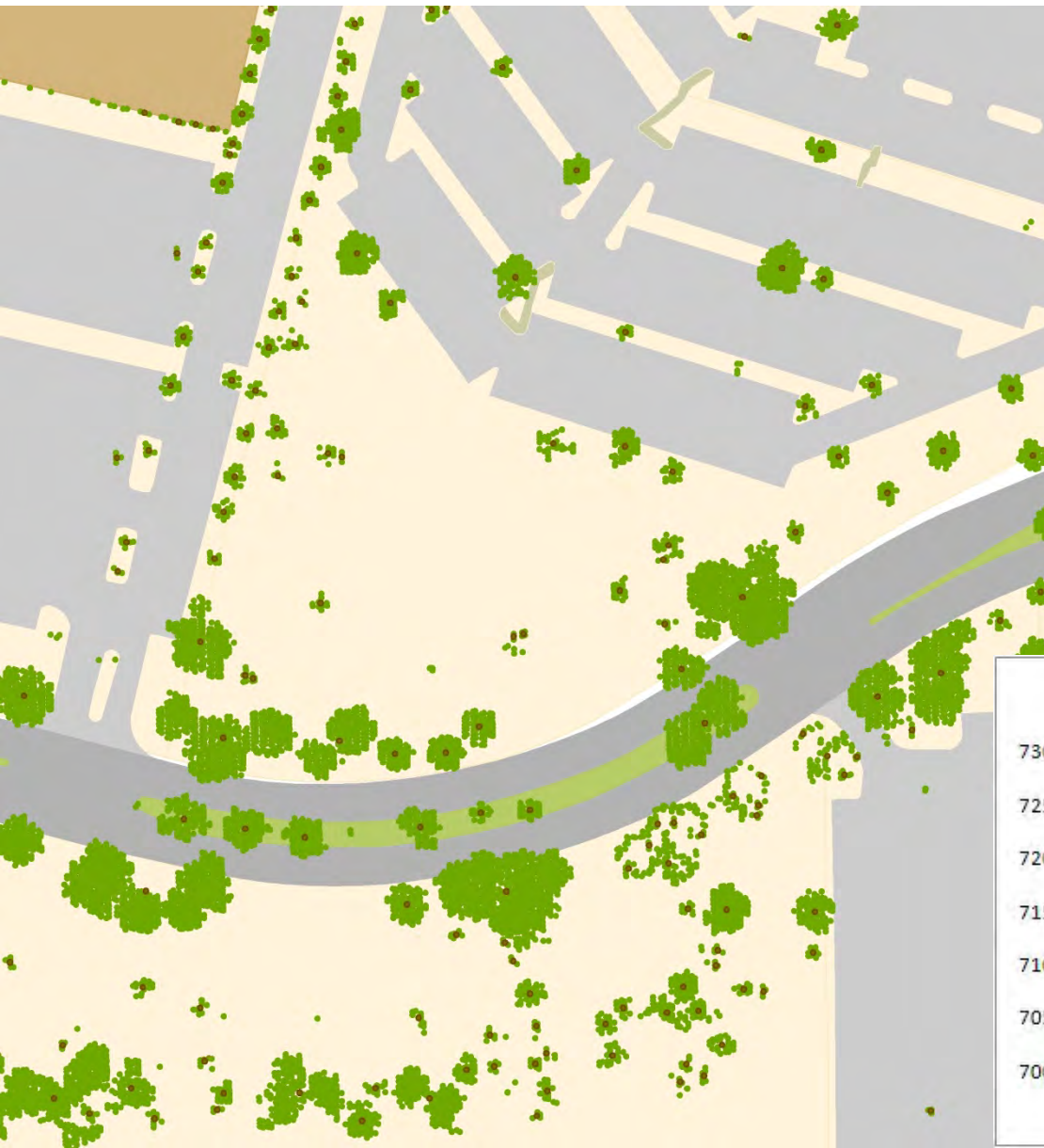
Building Extraction

- For 3D extraction to shapefile: 4-16 pts/sq mtr is recommended. More points = better roof definition
- Although automated, still requires manual editing to clean up the polygons & roof planes
- Tree obstructions can cause problems with classification & extraction

Vegetation Extraction



Vegetation Extraction

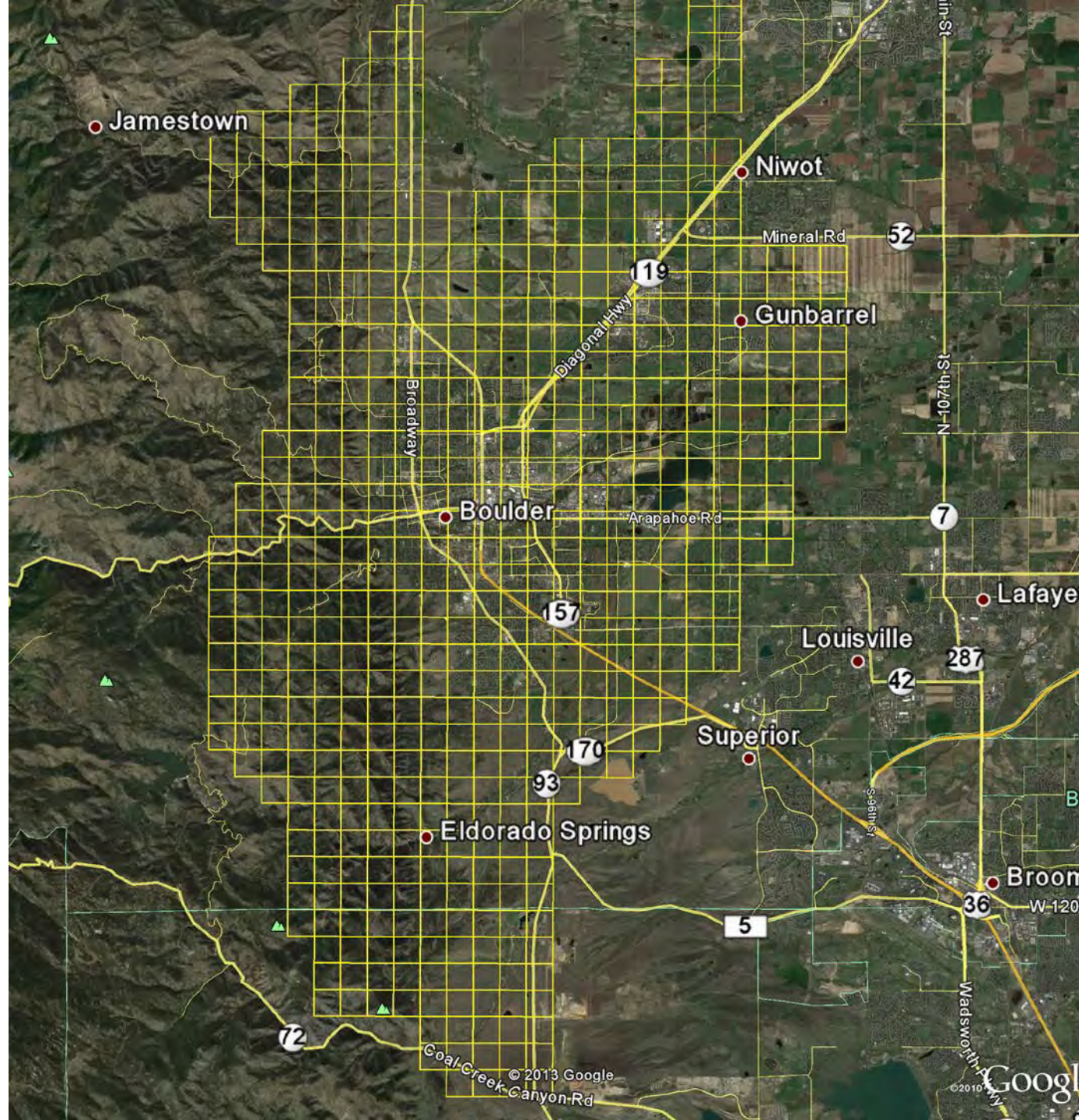


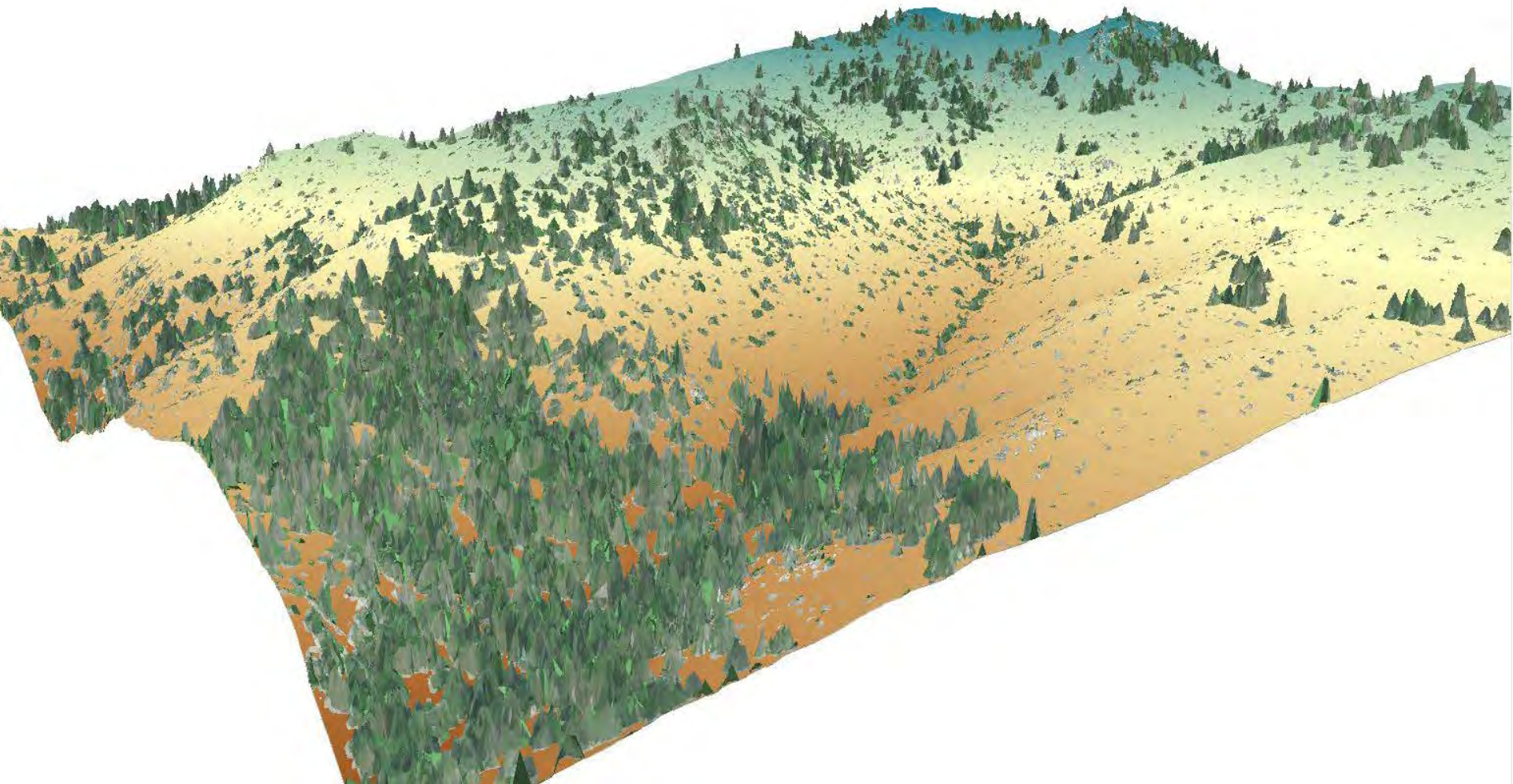
Boulder, CO

20 pts/sq meter

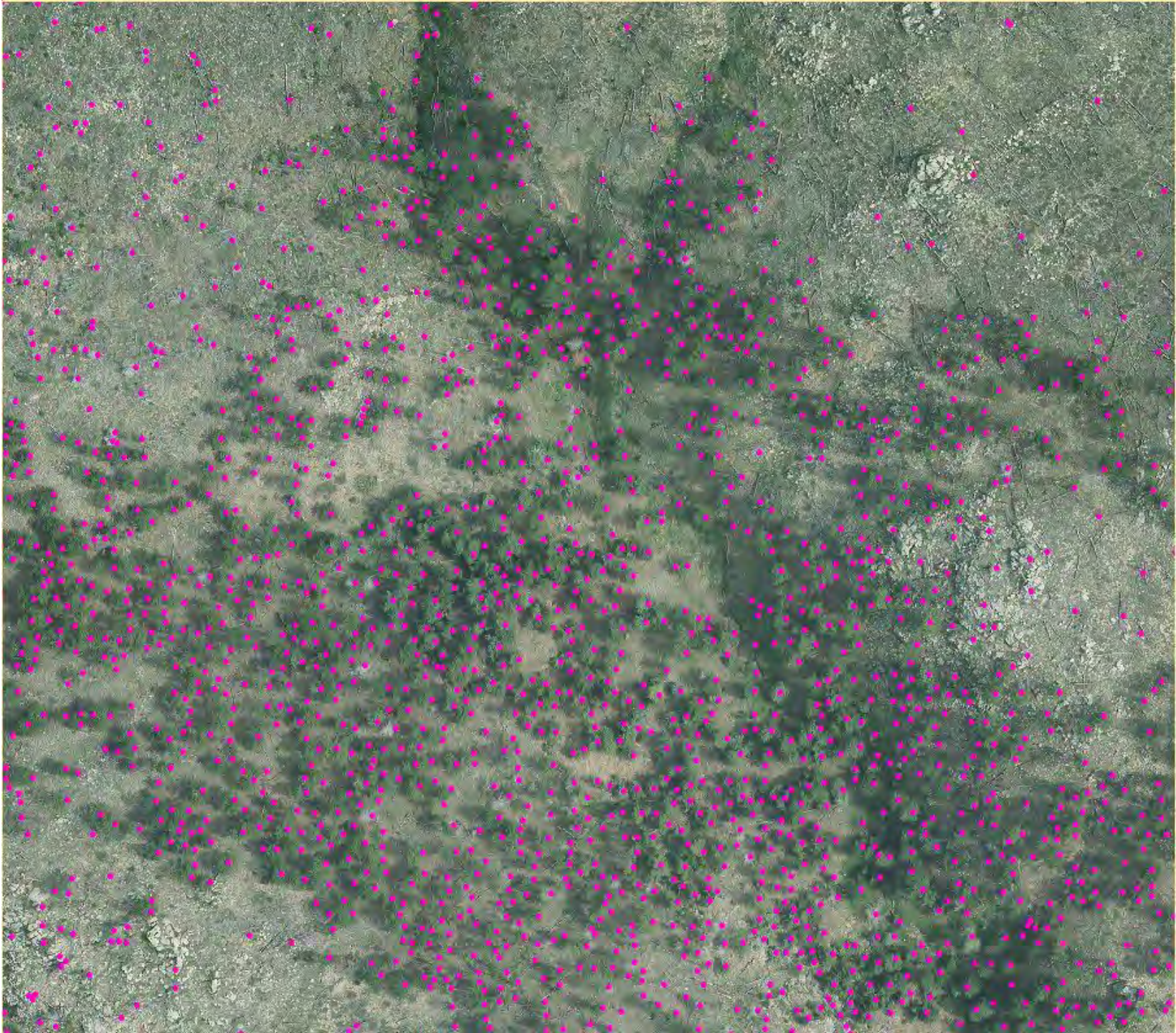
1-ft contours

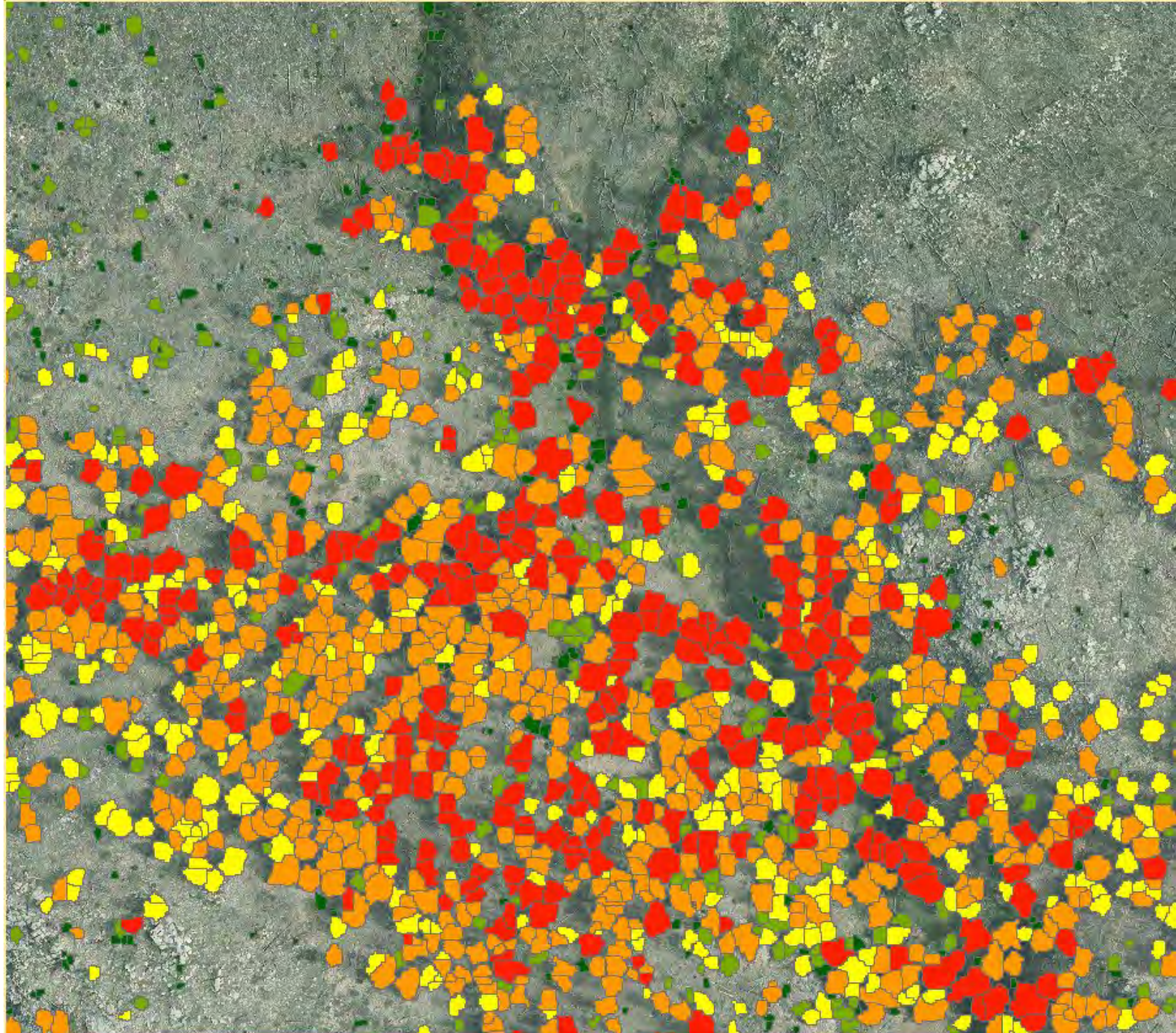
Electric Distribution
Vegetation Analysis











Identify

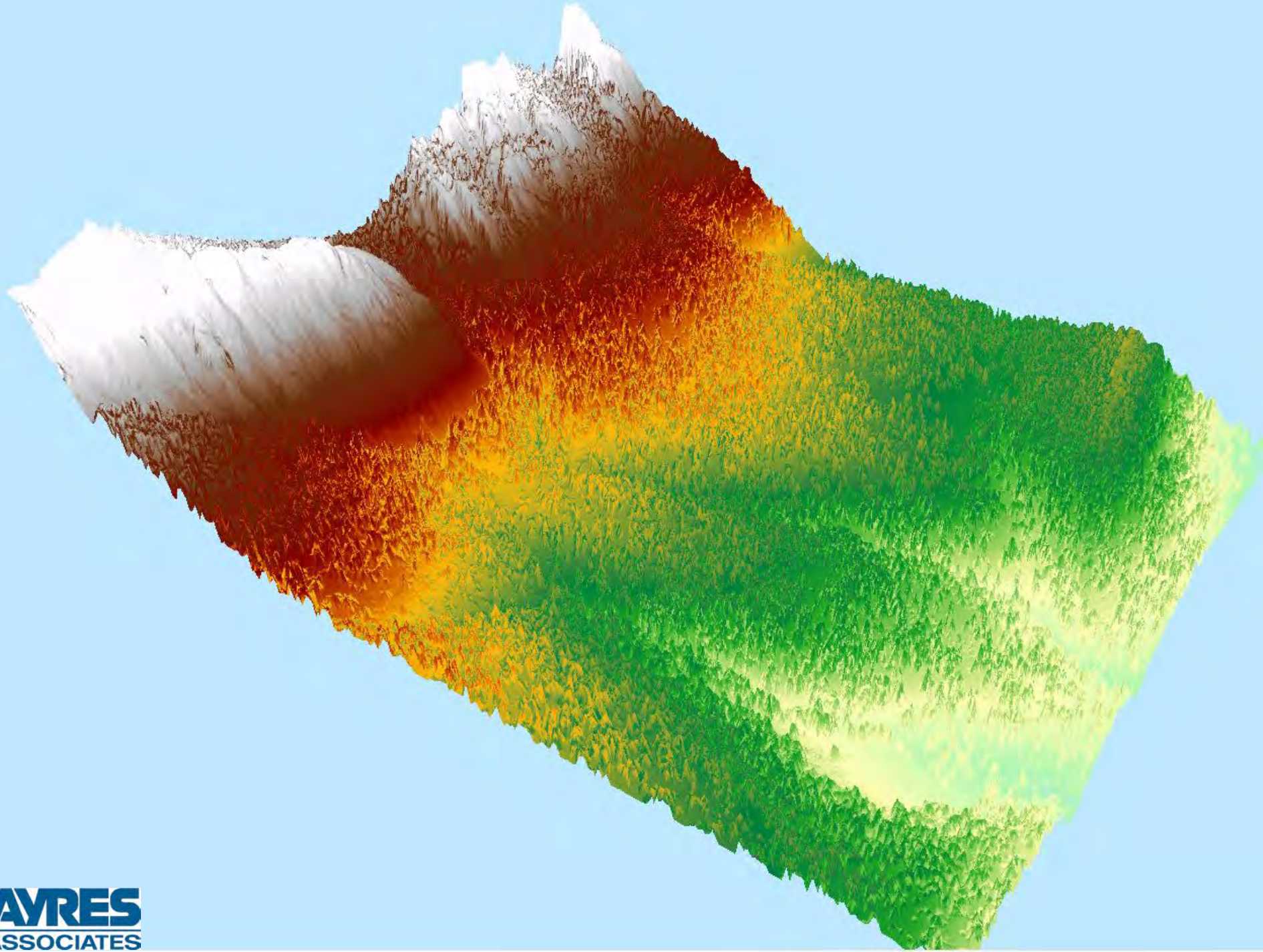
Identify from: <Top-most layer>

Location: 3,048,522.048 1,222,026.287 Feet

Field	Value
FID	3079
Shape	Point
OBJECTID	1249651
XCoord	3048522.36468
YCoord	1222024.42431
ID	6707
crownRad	11.448323
treeHt	53.186007
canopyVol	4772.675916
meanHt	28.264316
stdHt	10.86871
skewnessHt	-0.211585
kurtosisHt	2.174057
quadMeanHt	30.746348
count	1157
pctHt100	50.73096
Z	6860.067334

Identified 1 feature



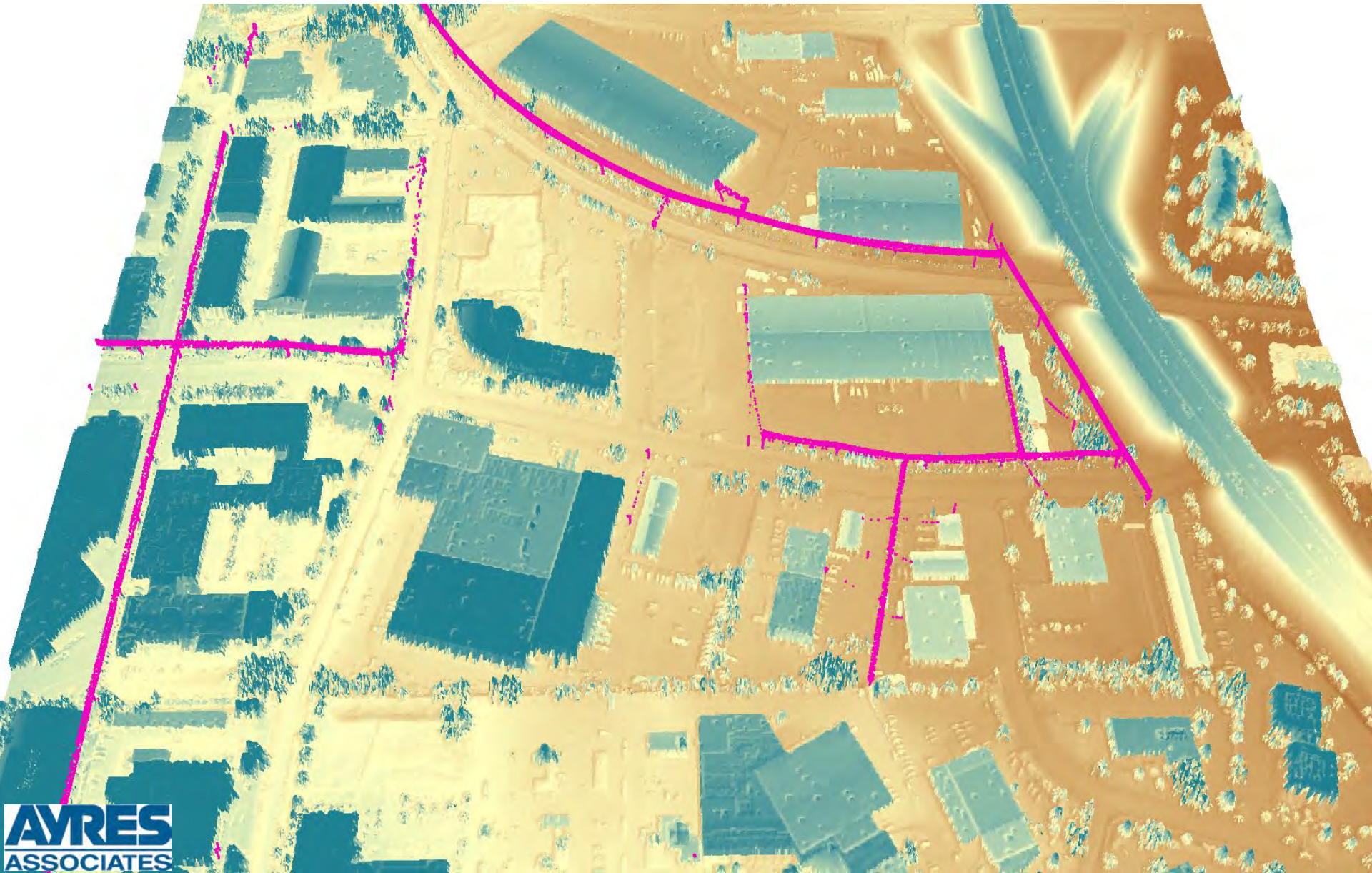




Vegetation Extraction

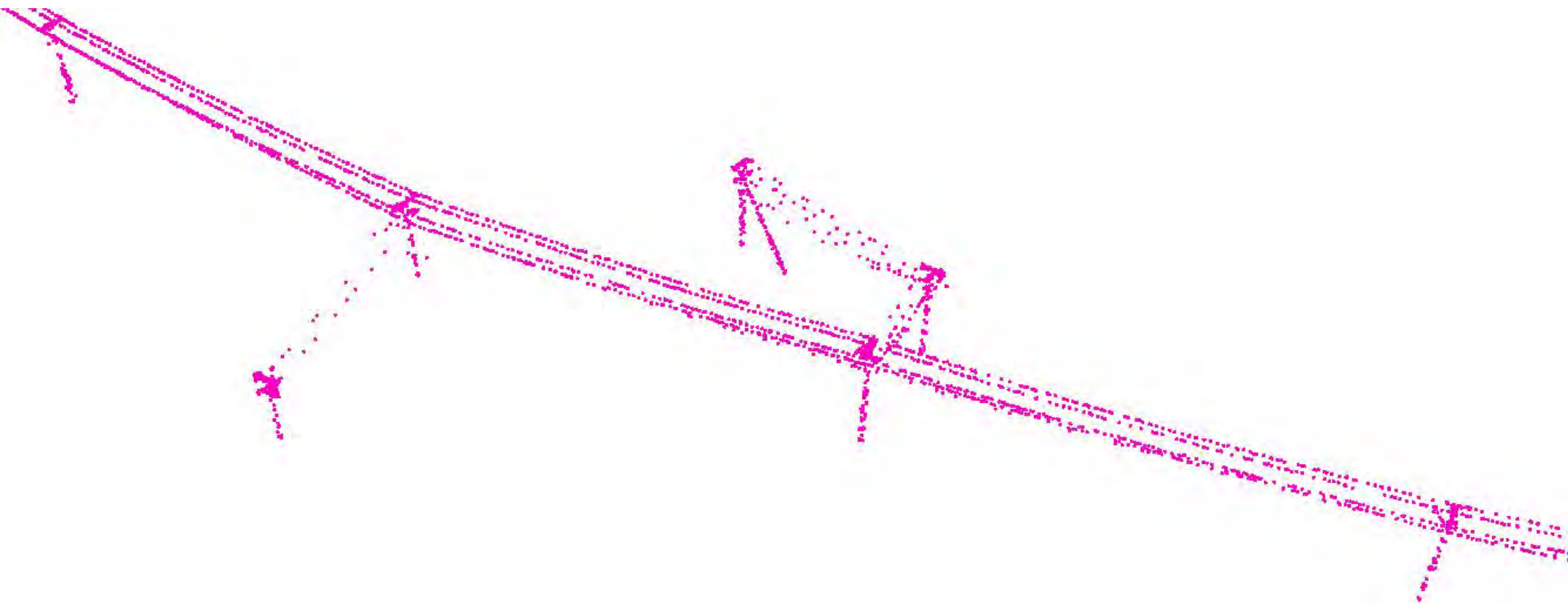
- For mapping tree canopy/veg. height class extents:
~ 4-8 pts/sq mtr is recommended
- For calculating forestry statistics: ~ 8-20 pts/sq mtr
is recommended
- Extreme terrain (mountains) adds complications

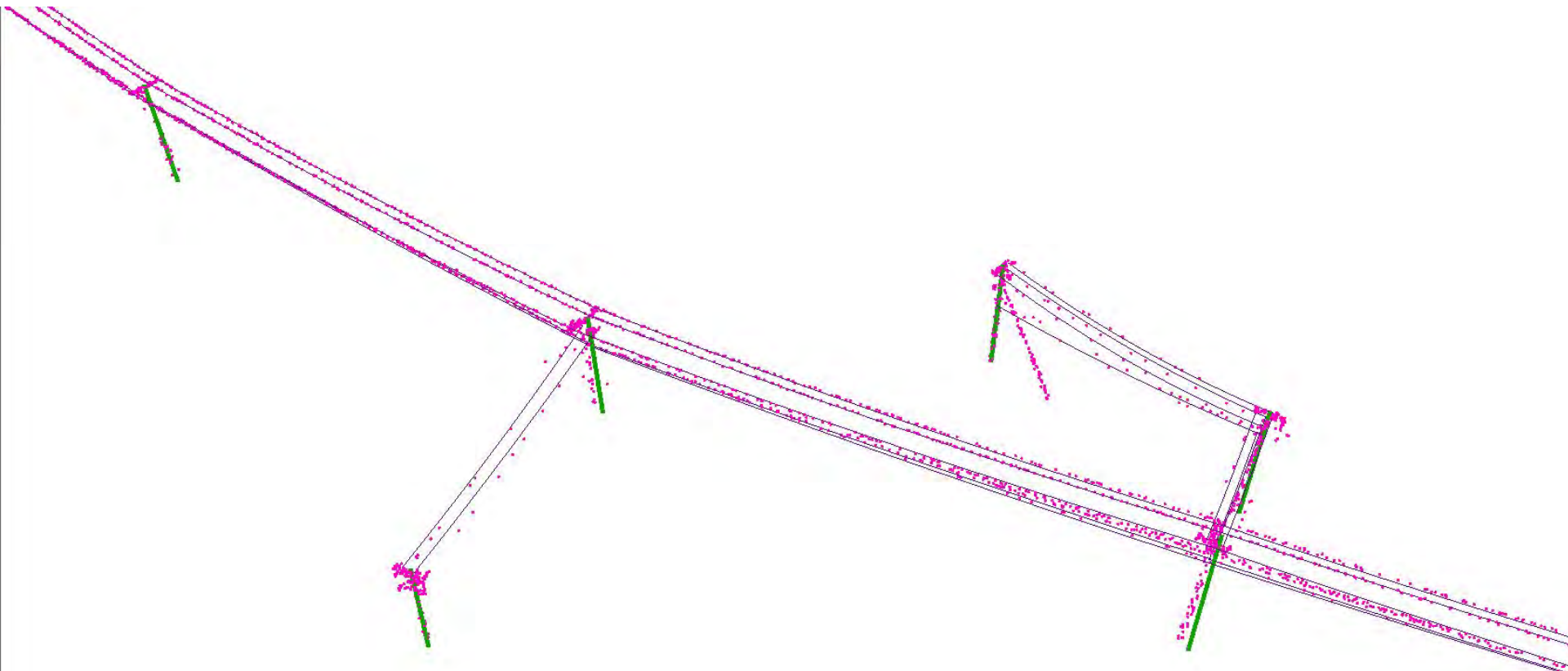
Electric Transmission/Distribution

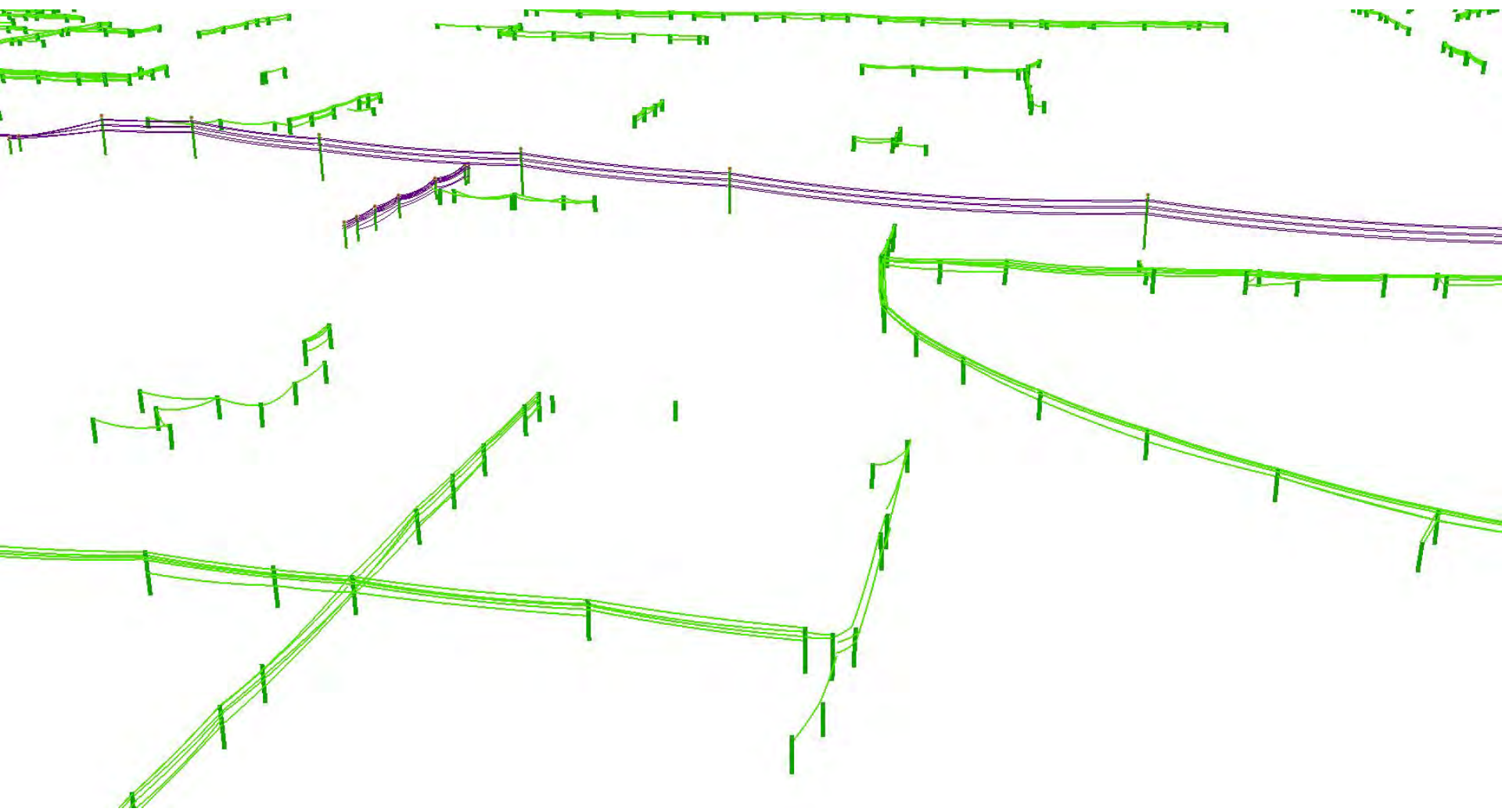


Electric Transmission/Distribution



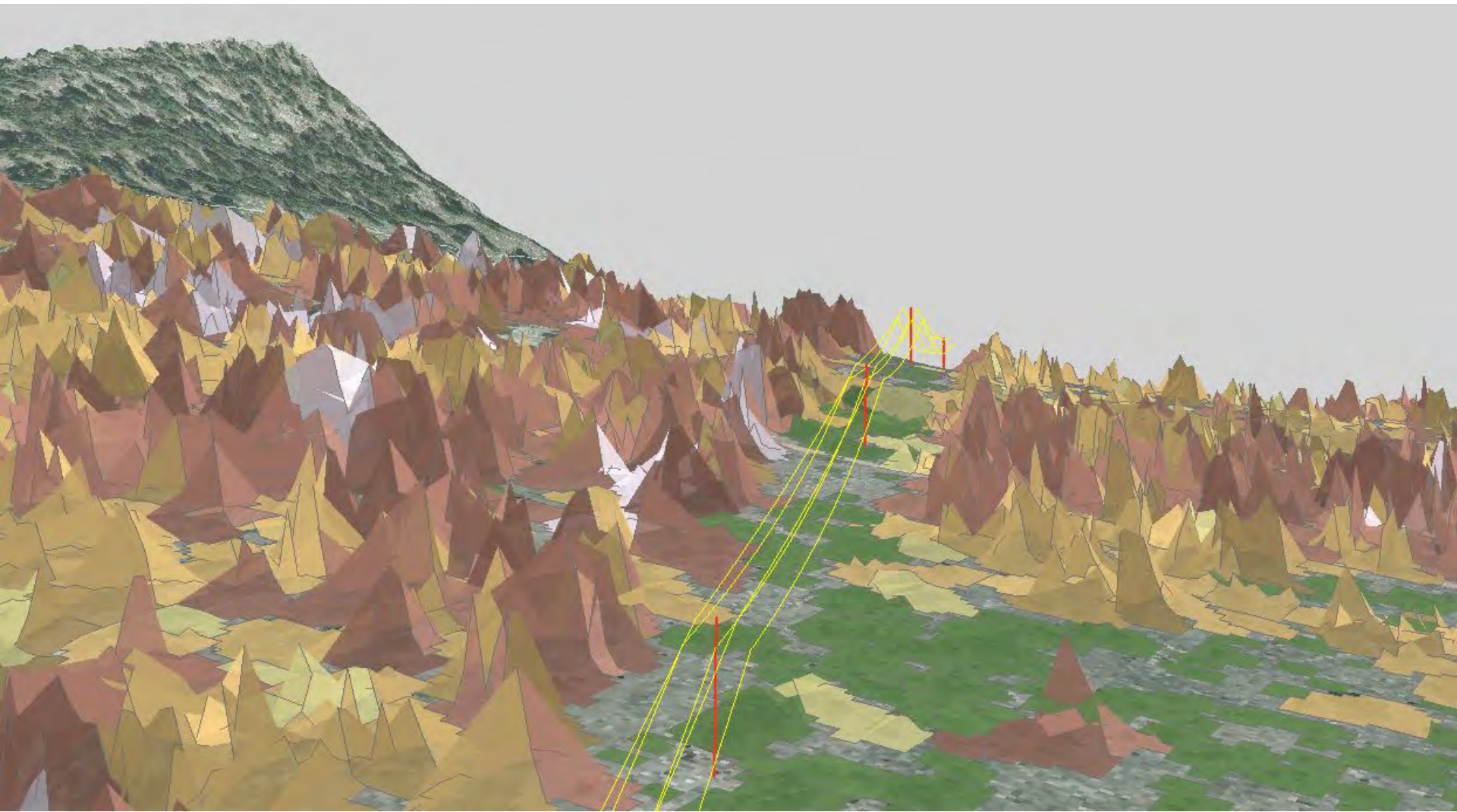












Electric Transmission/Distribution

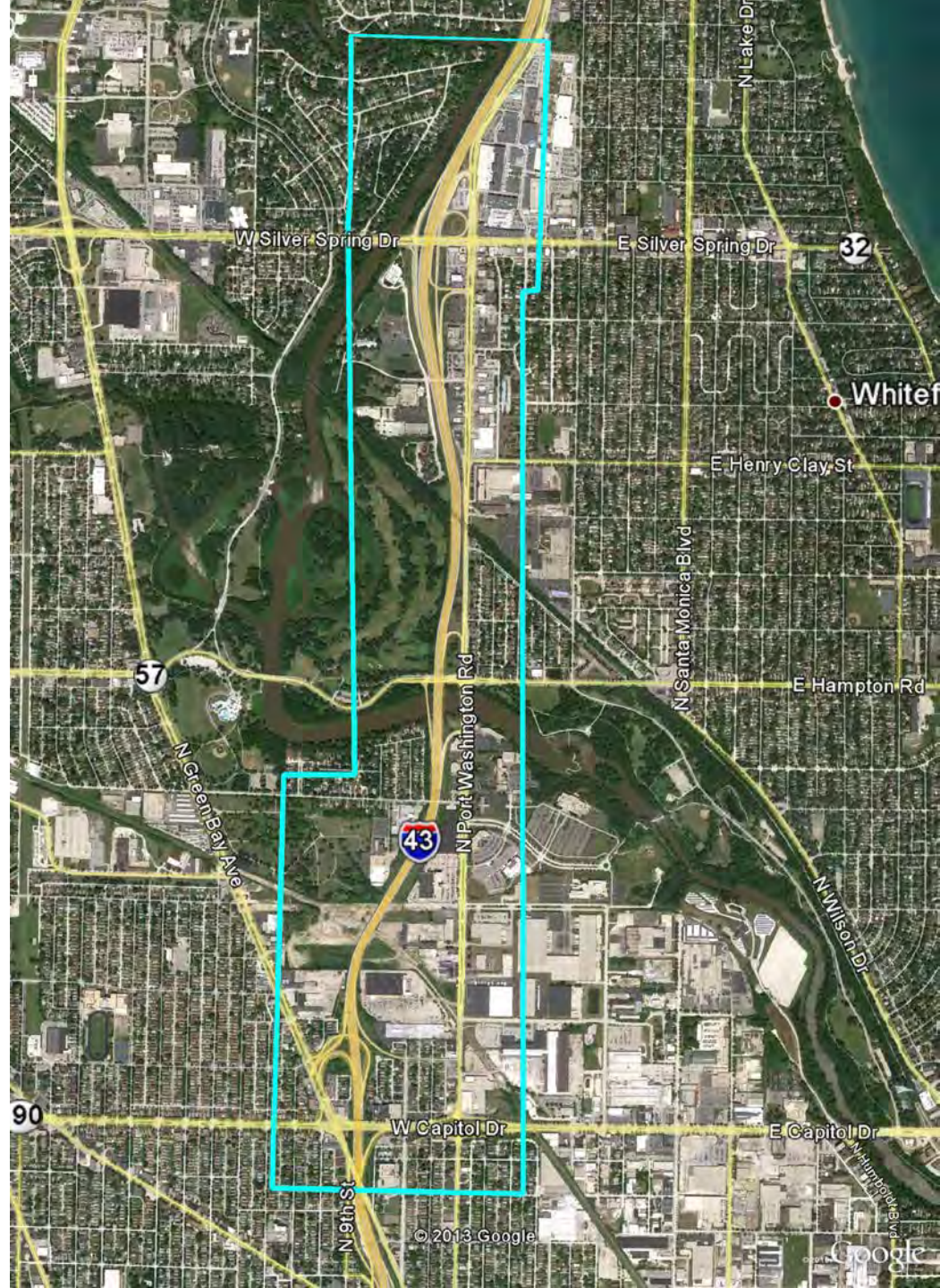
- **Recommended Pt Density: 20pts/sq mtr (minimum) for transmission/distribution network mapping**
 - Limitations in high vegetation
 - Difficult to extract smaller features for asset management (transformers, fiber optics, etc).

Engineering-Grade Planimetrics

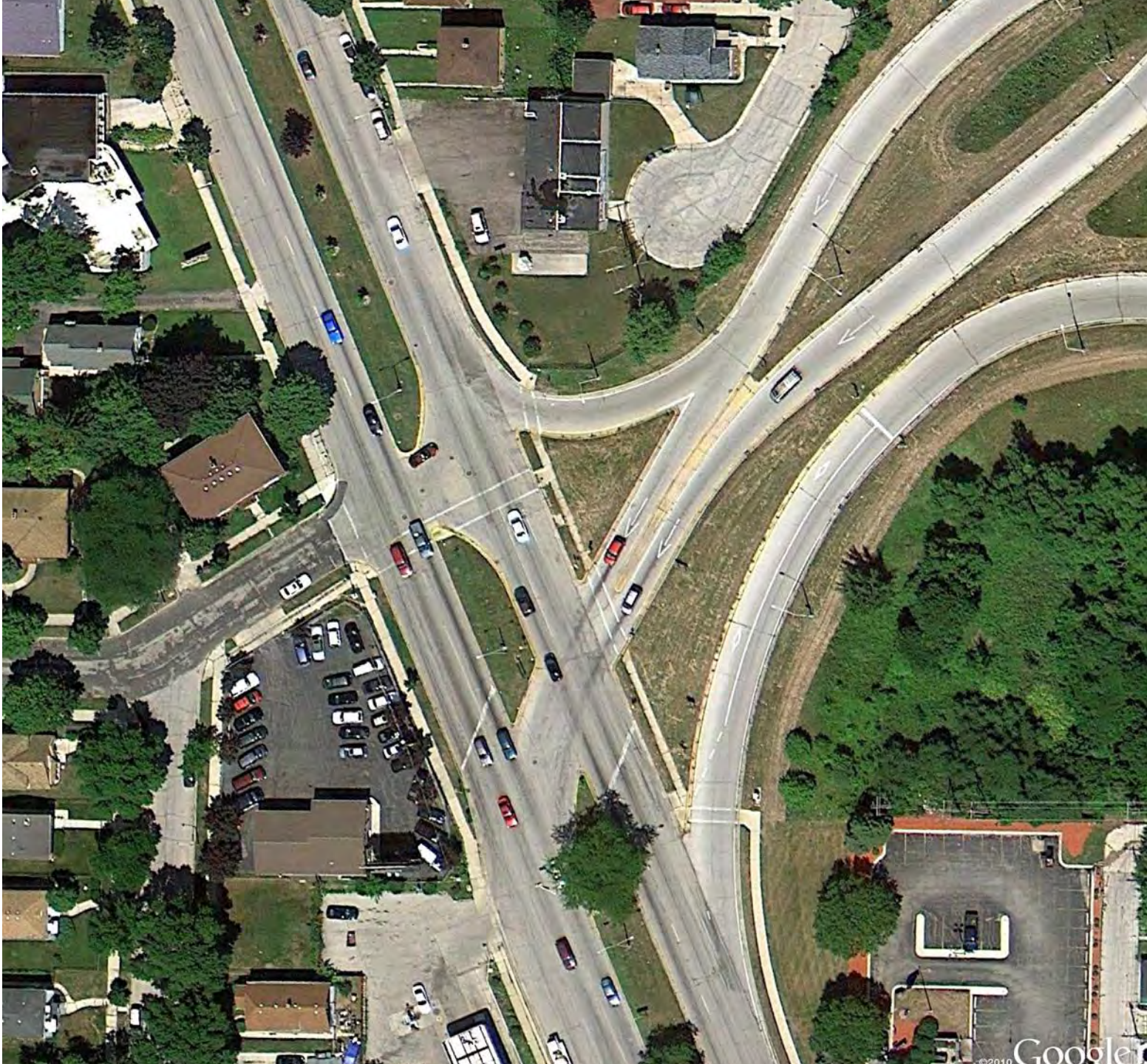


IH-43, Milwaukee

40 pts/sq meter
Plan & DTM to DOT Specs

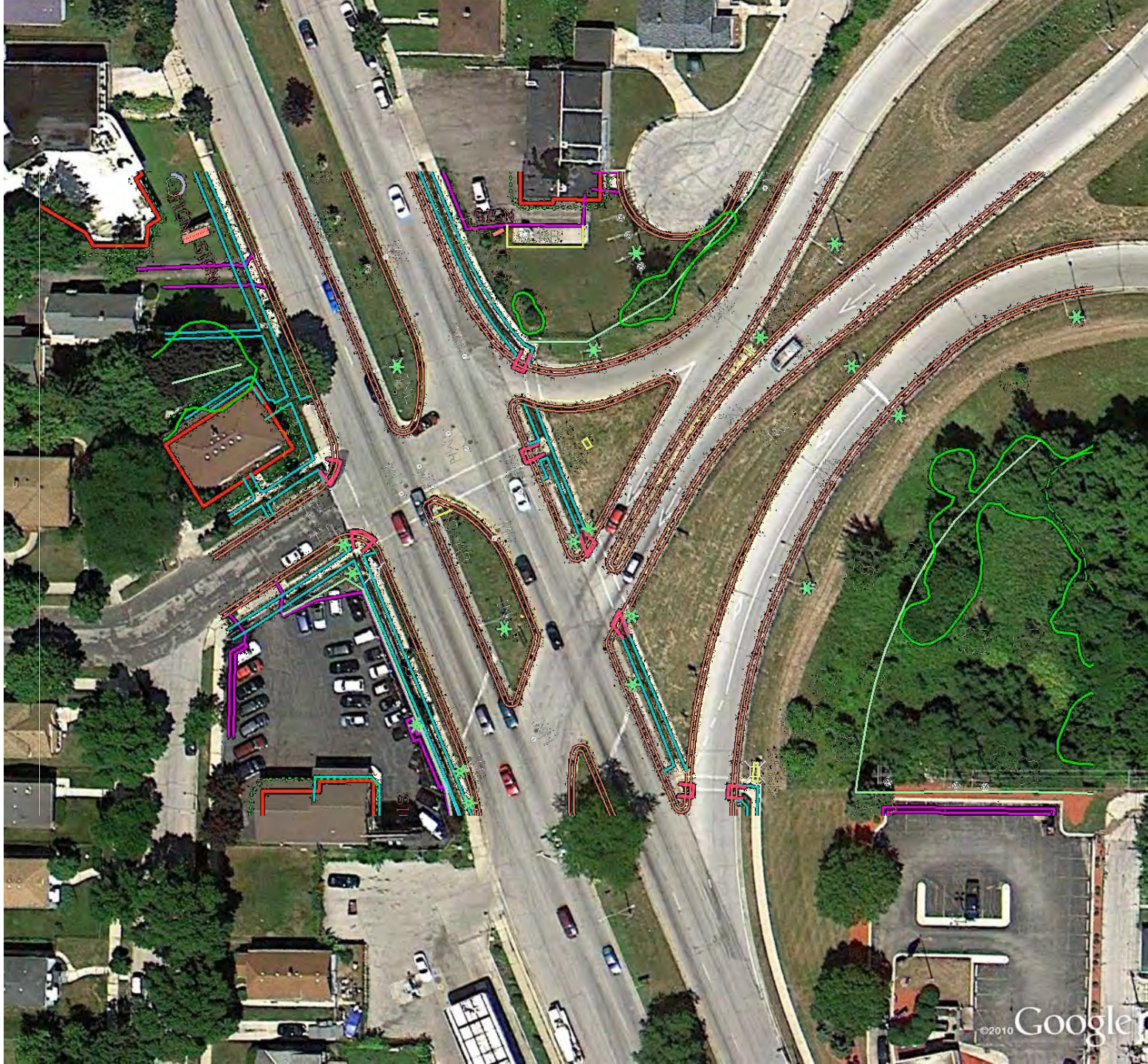








West Fiebrantz Avenue







Consider this...

Maybe you don't need all these bells and whistles, but maybe someone else in your organization can benefit.

Understanding the capabilities of Lidar and sharing ideas may help you secure funding from partners:

Other Municipal Departments?

Parks & Forestry?

Private Companies?

Utilities?

Academic Institutions?