Point Cloud Extraction for Infrastructure Projects WF20432

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Class summary

How to more effectively utilize point cloud data for infrastructure projects

Key learning objectives

At the end of this class, you will be able to:

- Use point cloud visualization for analysis
- Generate a terrain/surface from point cloud data
- Use point cloud data between InfraWorks and AutoCAD Civil
- Model infrastructure assets in InfraWorks using point clouds

How to use point cloud visualization for analysis

Laser scanning technology

Not going to bore you with the collection technology!!

- Terrestrial
- Mobile
- ~~Handheld~~
- ~~Aerial~~
- ~~UAV (most aren't lidar anyways, but people seem to think they are)~~

Terrestrial vs. Mobile for Infrastructure Projects

Terrestrial

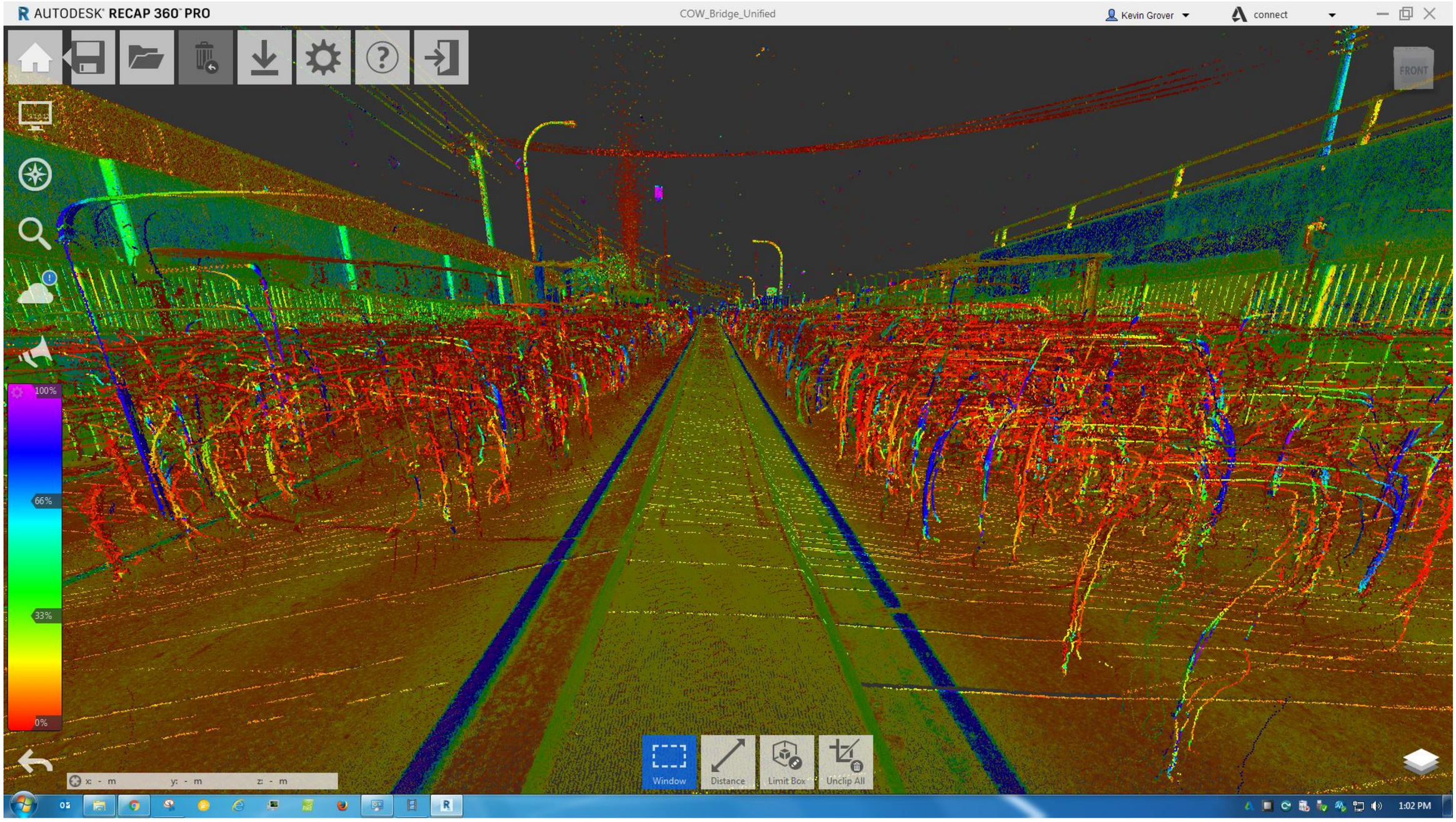
- Cheaper hardware
- More data providers
- Higher accuracy (with proper methods and control)

- Line of sight issues
- Safety issues along corridors
- Longer time to collect

Mobile

- Expensive hardware
- Fewer data providers
- Accuracies are dependent on methods, hardware and control

- More seamless dataset
- Ability to collect at road speeds
- Fast data acquisition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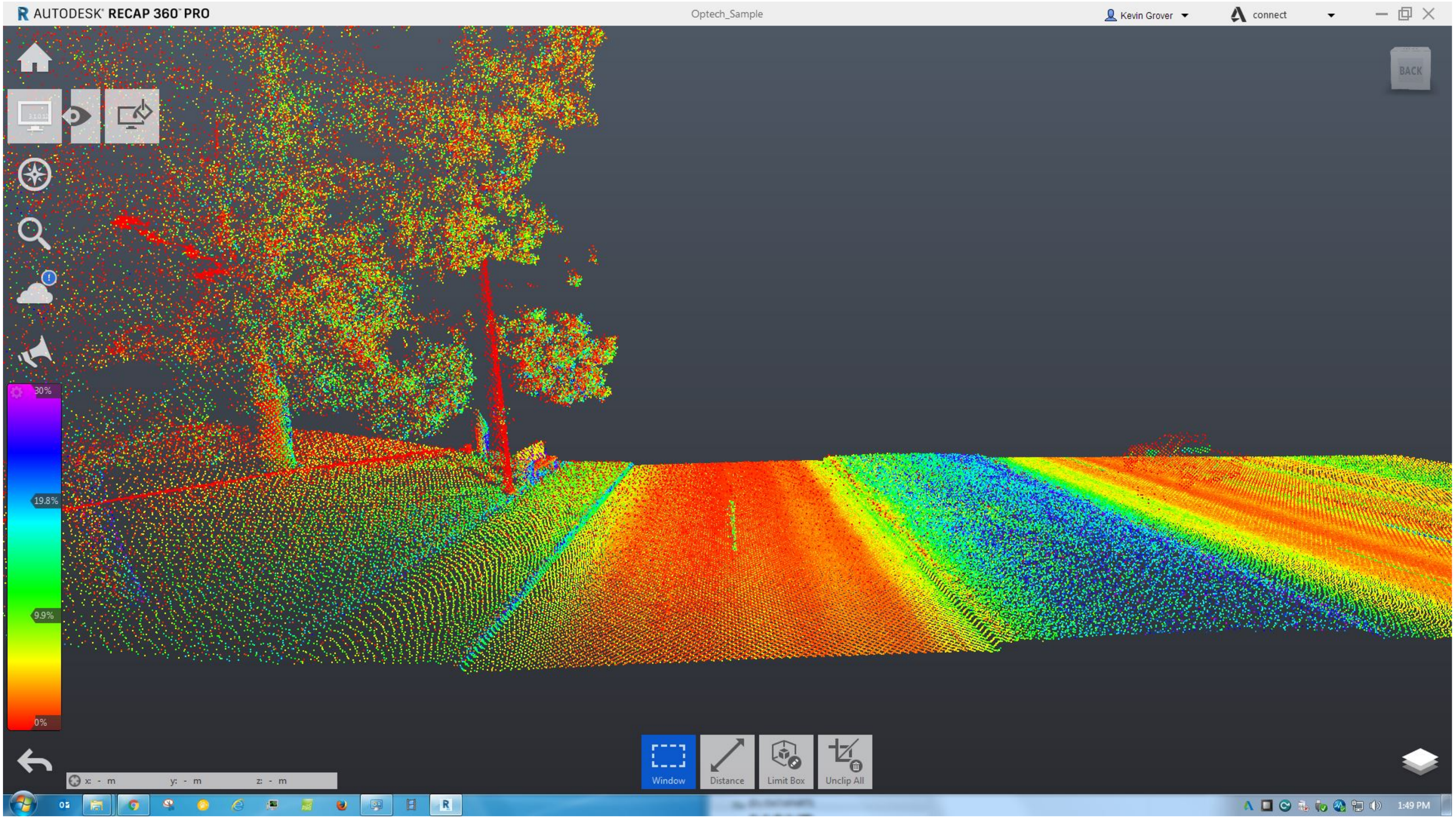
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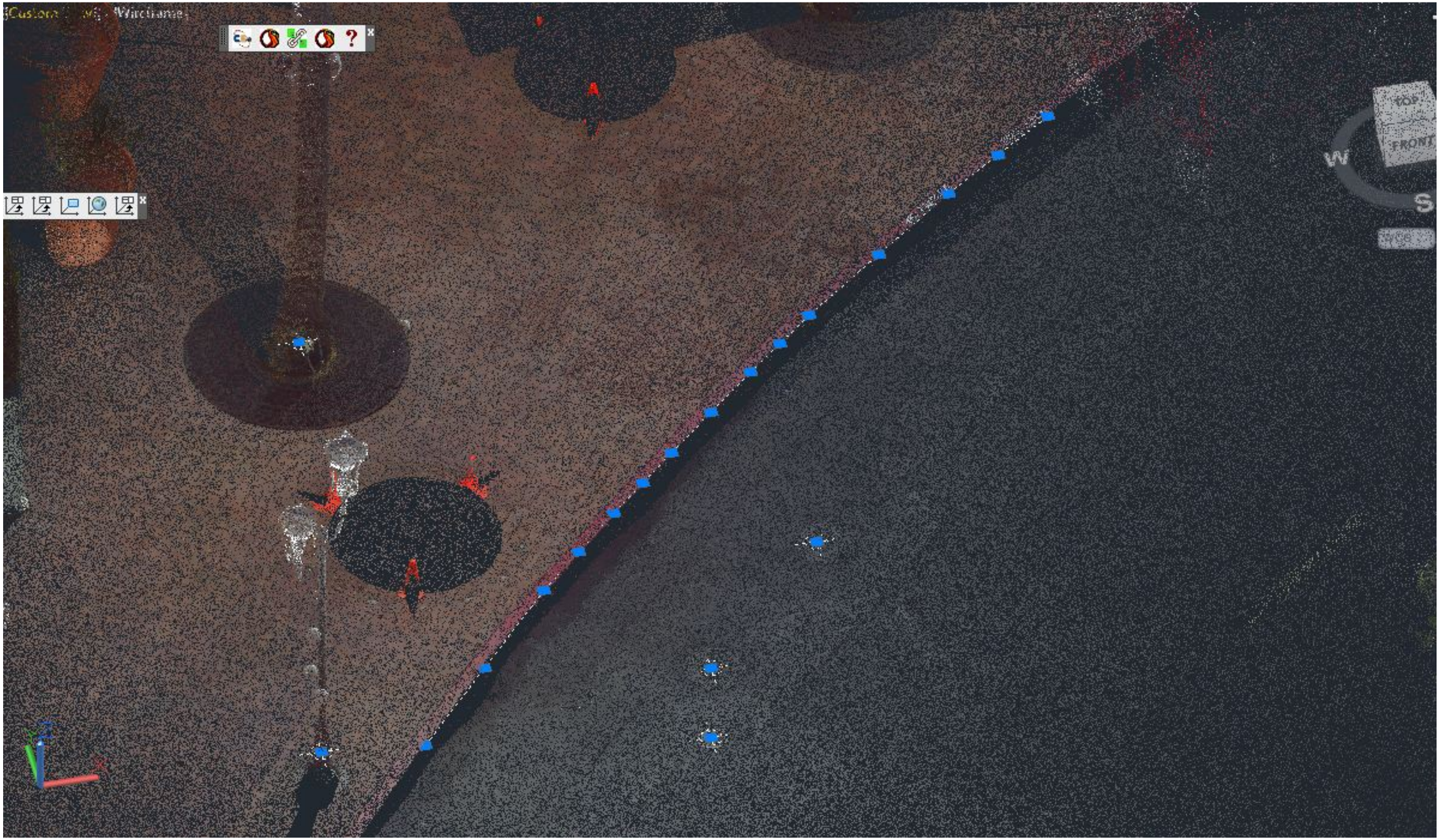
Point Cloud Best Practices

- To unify or not to unify
  - Benefits – easier to handle, smaller datasets
  - Downsides – lose scan locations, long time to convert
- Tile datasets – makes the easier to manage. Only load the data actually needed at any given time
- Open and link to Recap project files on local SSD, with backup copy saved elsewhere

How to generate a terrain/surface from point cloud data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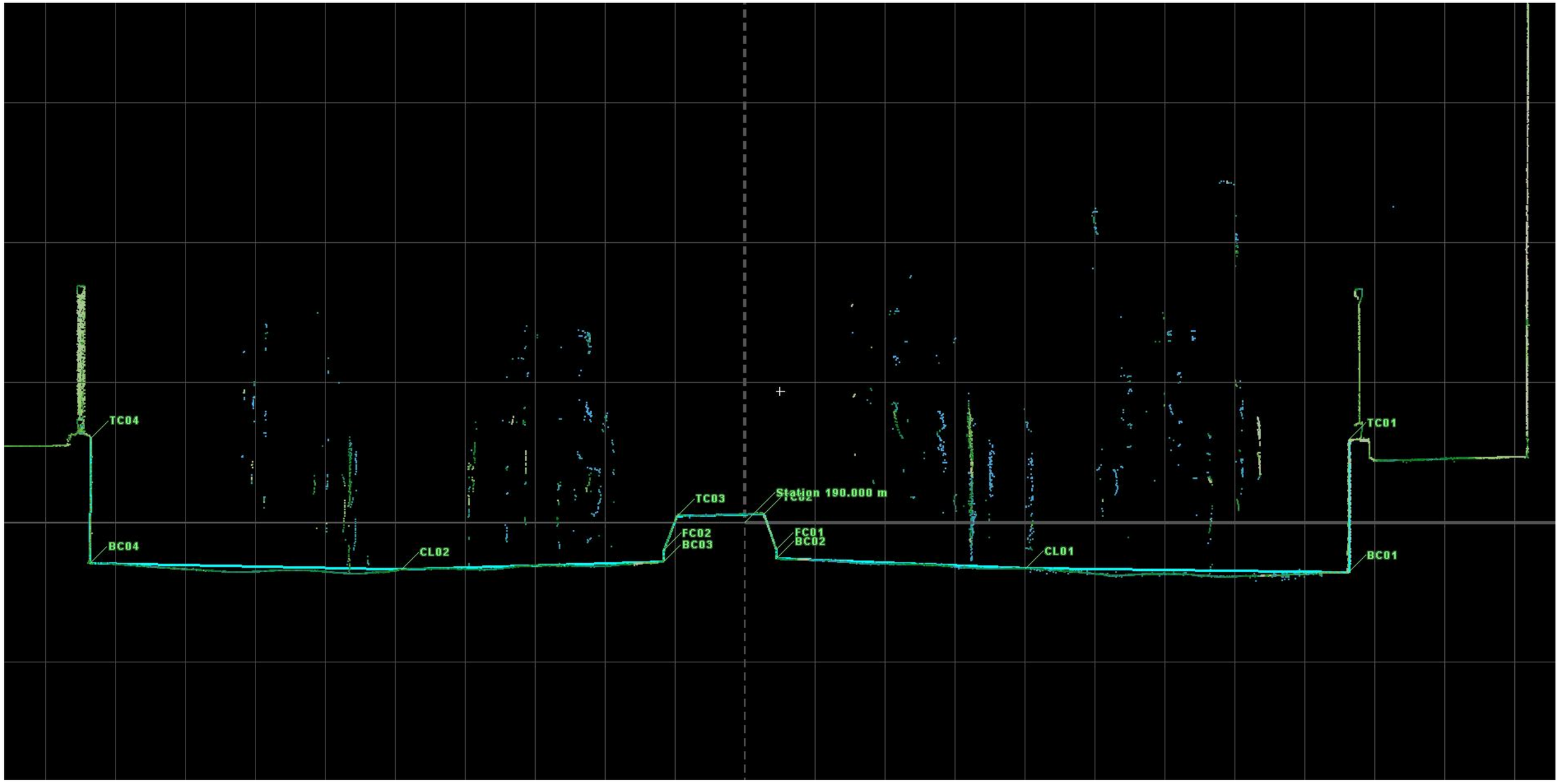
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Terrain Generation

- Create a C3D surface from extracted points, breaklines
  - Lightweight, clean surface, but time consuming
- Create a C3D surface from point cloud
  - Cleaning surface is time-consuming
  - Cleaning tools in C3D work okay, but always have to edit
- Create a C3D surface from a grid of points
  - Misses detailed terrain features (curbs, etc.)

Automated Workflow

(Ramesh's magical computer vision)

How to use point cloud information between InfraWorks and Civil3D

How to model infrastructure assets in Infraworks using point clouds

Conclusion

- Point cloud data for infrastructure projects can be challenging
  - Large datasets
  - Multiple data collection formats
  - Not every point cloud data is create equal – many are less accurate
  - Challenging to create deliverables efficiently

- Autodesk is working on tools to make this more efficient
  - Full automation is the holy grail, but does not negate the need for a skilled person to edit and QA all deliverables
  - Need to add more assisted manual modes of data extraction

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