O-Calc® Pro 8.0 – LiDAR Viewer Plugin

User Guide

©2025 Osmose Utilities Services, Inc.

Osmose O-Calc® Pro 8.0 – LiDAR Viewer Plugin User Guide

October 2025

Copyright

© 2002-2025 Osmose Utilities Services, Inc. All rights reserved.

The contents of this publication are intended for distribution to and use by the licensed owner of the related software, and copies and reproductions of the document may be made solely for use by the owner. Licensee agrees to reproduce and incorporate Osmose Utilities Services Inc.'s copyright notice in any copy or partial copy. The publication may not be distributed, transmitted, sold, published, or otherwise provided, in paper, electronic, or any other format, to any third party without the prior written permission of Osmose Utilities Services, Inc. Licensee shall not modify, translate, decompile, disassemble, or create derivative works based on the contents of this publication. Information in this document is subject to change without notice. Some screens and functions depicted here may differ from those you see in the interface.

Trademarks

Osmose is a registered trademark of Osmose, Inc.

O-Calc® Pro is a registered trademark of Osmose Utilities Services, Inc.

Microsoft Windows is a registered trademark of Microsoft Corporation. Any other trademarks mentioned are the property of their respective owners.

Osmose Utilities Services, Inc.
191 Peachtree Street NE Suite 500
Atlanta, GA 30303
1-770-632-6700
www.Osmose.com

©2025 Osmose Utilities Services, Inc.

LiDAR Viewer Plugin

This O-Calc Pro LiDAR Viewer Plugin User Guide is a detailed description of the O-Calc Pro plugin "LiDAR Viewer". It describes the necessary components/format of the LiDAR file to be ingested into the O-Calc Pro interface as well as describes the detailed features and functions of the plugin from a user interface perspective. Many O-Calc Pro users who are performing pole loading analysis, clearance analysis, and pole engineering work are using various types of LiDAR field data collection process to either increase the field measurement accuracy and/or increase the efficiency of field data collection. The benefit of this LiDAR Viewer plugin is to apply this field data collection information directly to your O-Calc Pro pole model.

LiDAR Data Format

The O-Calc Pro LiDAR Viewer plugin can ingest either an LAZ or LAS file. An LAZ being a compressed version of a LAS file. A LAS file is a binary file, so it is not 'human readable' if opened with a standard text editor. However it does structure the file and most LiDAR data collection devises following the American Society for Photogrammetry and Remote Sensing format (see ASPRS), but not all LAS files follow the LAS 1.4 format.

One of the key aspects for successfully importing LiDAR data into the O-Calc Pro interface is the proper definition of the Coordinate Reference System as defined by the WKT (Well Know Text) definitions. This is crucial as it defines how the coordinates for the LAS file will get translated to real-world locations within the O-Calc Pro application and defines information such as the Datum, Projection, Units, and Axis Orientation. This WKT definition can be accomplished as either an accompanying WKT file to the LAS file or embedded within the header of the LAS file. O-Calc Pro will take the WKT definition and convert the coordinate system into standard O-Calc Pro coordinates which are WGS 84.

When the LAZ or LAS file is loaded into the LiDAR Viewer plugin, it will first look for the WKT information with the LiDAR file header information. If not found it will then search for a WKT file with same name as the LiDAR file location in the same directory. If neither are found, a message box will be displayed indicating that this LAZ/LAS cannot be loaded since the WKT information is missing.

1.) When the WKT information is embedded within the LAS header (LAS 1.4), it is stored in the "Variable Length Records" (or "Extended Variable Length Records"). An example of the embedded WKT information:

©2025 Osmose Utilities Services, Inc.

```
PROJCS["NAD83 / UTM zone 15N",
  GEOGCS["NAD83",
    DATUM["North American Datum 1983",
      SPHEROID["GRS 1980",6378137,298.257222101]],
    PRIMEM["Greenwich",0],
    UNIT["degree",0.0174532925199433]],
  PROJECTION["Transverse_Mercator"],
  PARAMETER["latitude_of_origin",0],
  PARAMETER["central_meridian",-93],
  PARAMETER["scale_factor",0.9996],
  PARAMETER["false_easting",500000],
  PARAMETER["false_northing",0],
  UNIT["metre",1]]
```

2.) If as an accompany WKT file, with the same name as the LAS file, the file will need information such as the following:

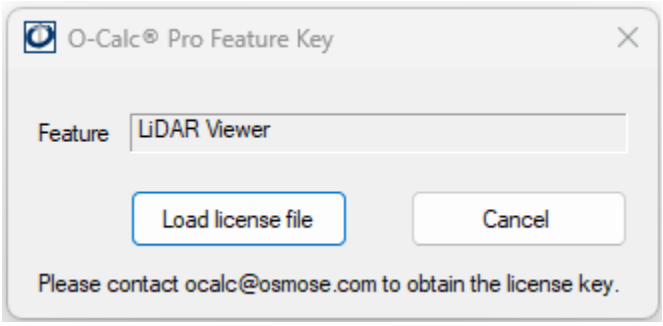
```
PROJCS["WGS_1984_UTM_Zone_10N",GEOGCS["GCS_WGS_1984",DATUM["D_WGS_1984",SPHEROID["WGS_1984",6378137,298.257223563]],PRIMEM["Greenwich",0],UNIT["Degree",0.0174532925199433295]],PROJECTION["Transverse_Mercator"],PARAMETER["latitude_of_origin",0],PARAMETER["central_meridian",123],PARAMETER["scale_factor",0.9996],PARAMETER["false_easting",500000],PARAMETER["false_northing",0],UNIT["Meter",1]]
```

LiDAR Viewer Plugin Subscription Information

The O-Calc Pro LiDAR Viewer plugin is component that is offered as an add-on to the O-Calc Pro application. Therefore, to activate the LiDAR Viewer plugin you need to purchase a separate license file that will be connected directly to your O-Calc Pro subscription. Please contact oclac@osmose.com to purchase the LiDAR Viewer plugin component and obtain the necessary license file.

To activate the LiDAR Viewer plugin, select it within the Manage Plugin option, (see Managing Plugins section of the O-Calc Pro User Guide). The next time that the O-Calc Pro application is launched, it will ask for a one-time LiDAR subscription activation file:

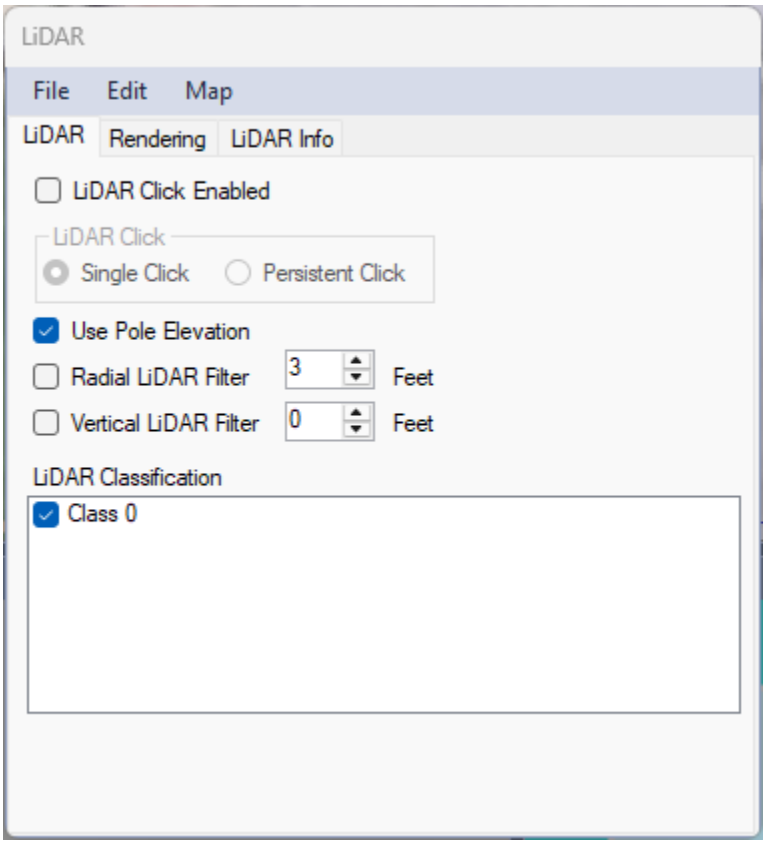
©2025 Osmose Utilities Services, Inc.



Click on the 'Load license file' button to point to the LiDAR Viewer subscription *.dat file obtained from oclac@osmose.com.

LiDAR Viewer User Interface Options

The LiDAR Viewer plugin window offers menu options and tabs containing functionality to assist you when working with LiDAR point cloud data, as detailed below.



©2025 Osmose Utilities Services, Inc.

File Menu

The File drop-down menu has two options:

- **Load LiDAR** –Opens a dialog box that enables the user to navigate to LiDAR file, either a LAZ or LAS file.

- **Clear LiDAR** –Remove/clear any previously loaded LAZ or LAS file. ***Note****: Only a single LiDAR file can be loaded at a time.*

Edit Menu

The Edit drop-down menu has three options that are similar in nature:

- **Set Current Pole Elevation** – This option will set the current poles elevation based on the lowest lying LiDAR points in the vicinity of the pole.

- **Set Checked Poles Elevation** – This option will set the elevation of the currently 'checked' poles within the Line Design based on the LiDAR points.

- **Set All Poles Elevation** – This option will set the elevation for all the poles within the Line Design based on the LiDAR points in the vicinity of each pole.

  Note: *The algorithm for setting the pole elevation is based on LiDAR points within a +-2 foot square of the pole. It takes an average of the vertical LiDAR point of all the LiDAR points within a 95 percentile. This process eliminates any LiDAR points are the +- 5% extremes, effectively eliminating any LiDAR noise.*

Map Menu

The Map drop-down menu has three options that help in rendering the location of the LiDAR file on the O-Calc Pro Line Design map.

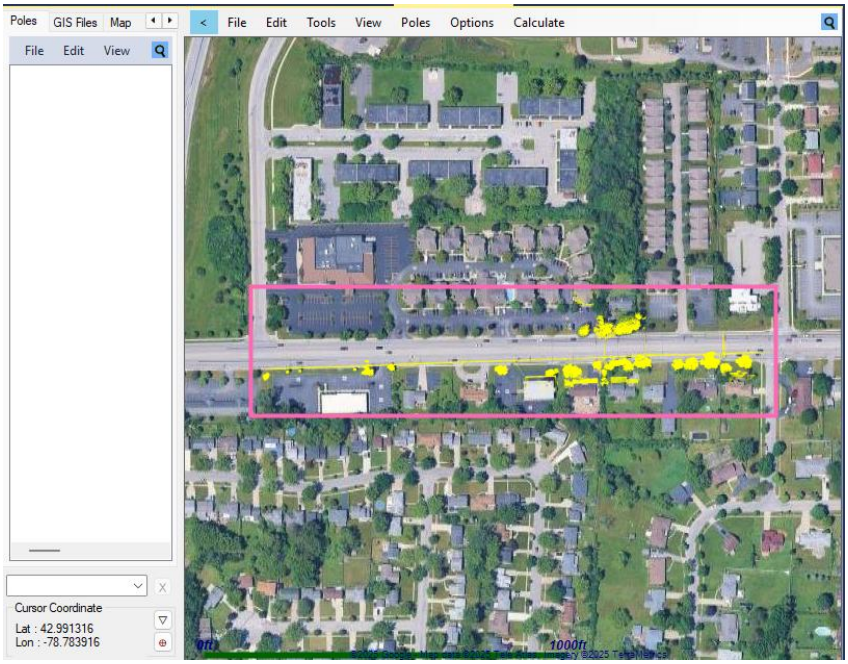
- **Zoom to LiDAR Extents** – Each loaded LiDAR file has a minimal bounding box. This option will zoom the O-Calc Pro Line Design map so that this minimal bounding box is centered on the Line Design map display.

©2025 Osmose Utilities Services, Inc.

- **Display LiDAR Bounds** – This option will display the LiDAR minimal bounding box on the Line Design map as a magenta box.

- **Display as Overlay** – When this option is checked, it will take an overview of the LiDAR point cloud and display it has a 'flatten' view on the Line Design map display. This overhead, flatten view of the LiDAR point cloud is generated as a geoimage file and placed in the same location as the LAZ/LAS file. This is also a 1 meter filtering of the lowest LiDAR points.

Below is an example of both the LiDAR Bounds and Overlay displayed on the Line Design map zoomed to the extents:



LiDAR Tab

The LiDAR tab displays useful features that enable both the filtering of the LiDAR display within the 3D View and interacting with the LiDAR point cloud within the 3D View.

©2025 Osmose Utilities Services, Inc.

- **LiDAR Click Enabled –** This check box enables the interaction of the LiDAR points within the 3D View. Once enabled there are two radio button options: **Single Click** permits the selection of just a single LiDAR point and then auto-disable the LiDAR point clicking, and **Persistent Click** to continuously select LiDAR points within the 3D View until manually turned off.

- **Shift-Left Click –** When working within the 3D View, regardless of the LiDAR Click enabled option, you can simultaneously hold the Shift key and left mouse click to interact with a LiDAR point.

- **Radial LiDAR Filter** – Enabling this option by checking the box will apply a filter to the LiDAR point cloud that is both visible and clickable within the 3D View. The corresponding distance counter will indicate the radial distance from the currently selected pole on which the point cloud will be seen. Any LiDAR point outside the selected radial distance will be filtered out.

- **Vertical LiDAR Filter** – This filter, when enabled, will vertically filter the LiDAR Point cloud based the selected distance from groundline of the pole. Any LiDAR point below the selected vertical distance will be filtered out.

- **LiDAR Classification** – This box will list all the classifications of the LiDAR point cloud with name and classification number. Each item within the list has its own checkbox to turn on/off these classified points within the 3D View. If the loaded LAZ or LAS file has no defined classifications, then just the 'Class 0' check box is displayed.

Rendering Tab

The Rending tab gives information and options on how the LiDAR point cloud is rendered within the 3D View. There are three separate sub-tabs within the Rending tab.

Decimation Sub Tab

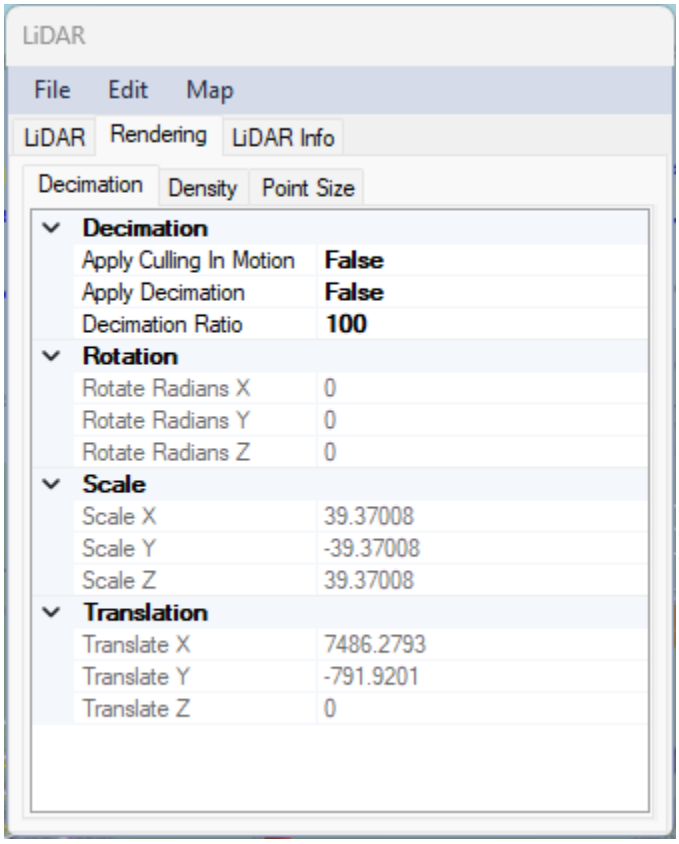
The Decimation sub tab depicted below has four different sections. The bottle three: Rotation, Scale, and Translation are informational only and show how the O-Calc Pro

©2025 Osmose Utilities Services, Inc.

system is rendering the LiDAR point cloud within the 3D View based on these transformations.

The Decimation section has three options that you can adjust for LiDAR rendering performance reasons.

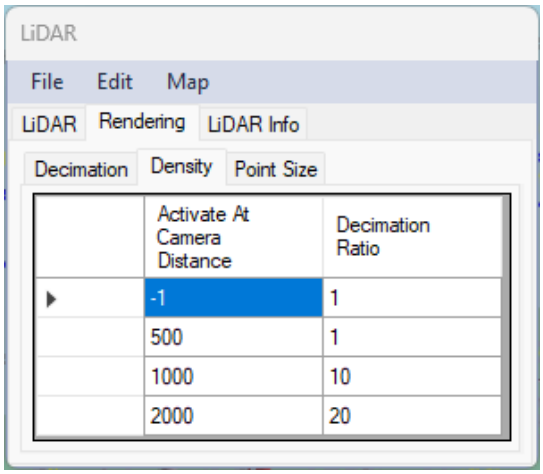
- **Apply Culling In Motion** – This is a True/False selection. When True, the LiDAR point cloud will be temporarily decimated during the time that you are panning and zooming within the 3D View.
- **Apply Decimation** – This True/False section will decimation the number of LiDAR points displayed within the 3D View based on the Decimation Ratio. If False, then no point decimation occurs.
- **Decimation Ratio** – The decimation ratio, a value from 1 or greater, determines how much of the LiDAR points are filtered out of the 3D View. For example, if the value is 20, then only about 1/20th of the LiDAR points will be displayed. A value of 1 means no decimation and is equivalent to having the Apply Decimation value set to False.



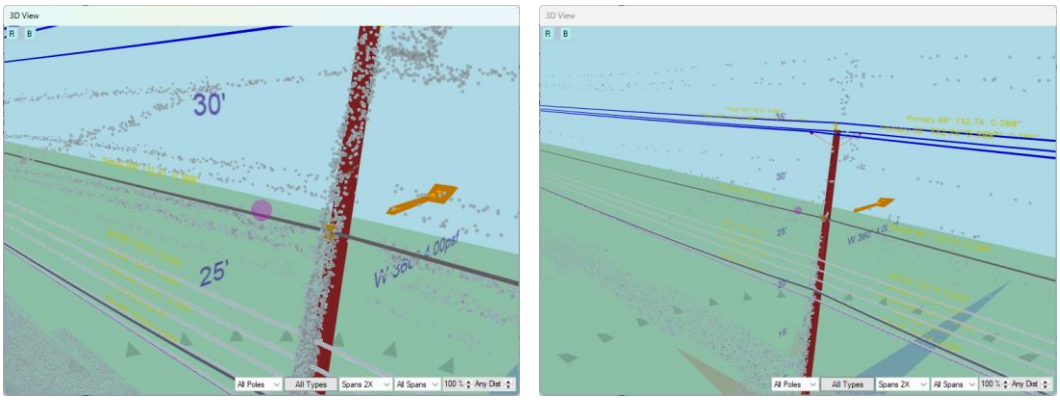
©2025 Osmose Utilities Services, Inc.

Density Sub Tab

The Density sub tab has parameters to decimate the number of LiDAR points displayed within the 3D View based on your zoom level. You can update the values within the 'Activate At Camera Distance' but cannot change the Decimation Ratio. The Camera Distance is the distance from the user's perspective to the 3D View 'Camera Look Point'. This is the pink dot in the center of the 3D View and Camera Distance is a measure of the Zoom level.

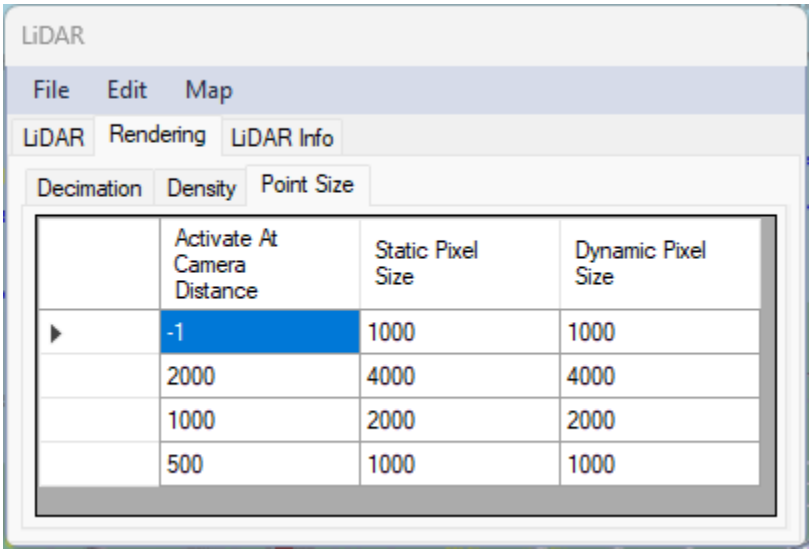


The goal of the Density decimation based on zoom level is that once you are zoomed out far enough, the interaction and viewing of the point cloud is not as useful, so minimizing the number of points seen will help with point cloud display performance. Depicted below are two different zoom levels. The image on the left has a Camera distance of about 100 pixels, while the image on the right is slightly greater than 500 pixels.



Point Size Sub Tab

The Point Size sub tab depicted below allows you to change the rendering size of the LiDAR individual points within the 3D view. This can be helpful when selecting LiDAR points to update your O-Calc Pro pole model.

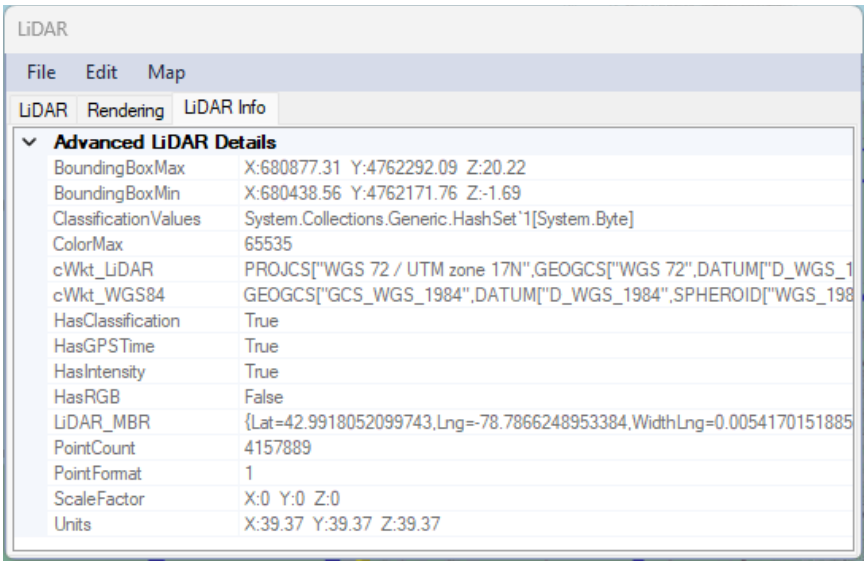


	Activate At Camera Distance	Static Pixel Size	Dynamic Pixel Size
▶	-1	1000	1000
	2000	4000	4000
	1000	2000	2000
	500	1000	1000

The appendix to this document gives a detailed example on how to use the Point Size table.

LiDAR Info Tab

The LiDAR Info tab displays Advanced LiDAR Details that are extracted out of the LAZ or LAS Header information. It is a read-only view of this information.



©2025 Osmose Utilities Services, Inc.

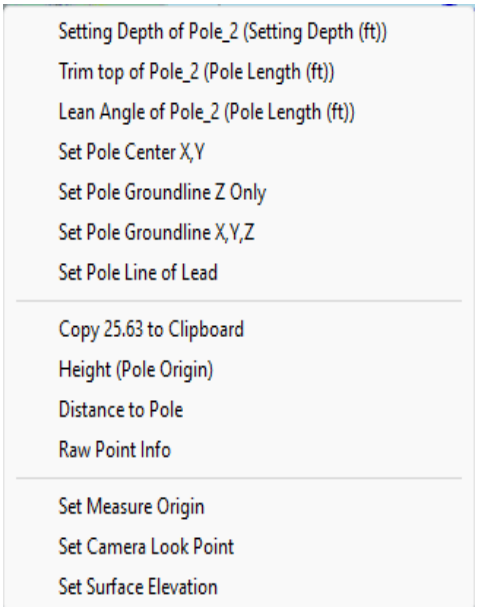
Apply LiDAR Information to your Pole Model

The most important aspect of the O-Calc Pro LiDAR Viewer plugin is the ability to apply a particular LiDAR point information directly to your pole model. This is a process to use the precise LiDAR point cloud information to make a more precise O-Calc Pro model. The three-step process is outlined below.

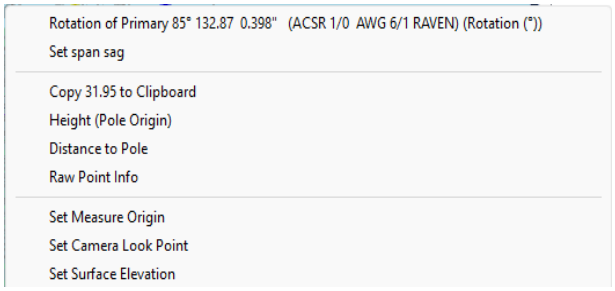
1. Select the O-Calc Pro object within the Inventory panel that you want to adjust.
2. With the LiDAR Click Enabled, you left click on the explicit LiDAR point within the 3D View. A dynamic context menu will then be displayed with various options, such as adjusting the attachment of the selected object.
3. Select the appropriate option, and the selected O-Calc Pro object will be automatically adjusted based on the LiDAR point.

The context menu that is displayed is dependent on the O-Calc Pro object currently selected/highlighted within the Inventory panel. Below are three screenshots of the context menu with the Pole, Primary, or Transformer selected, as examples.

2 Transformer Selected



1 Pole Selected



3 Primary Selected

From the context menus depicted above, notice that each context menu is divided into three sections. The topmost section includes options for performing actions using a selected LiDAR point which can be applied directly to the O-Calc Pro element selected in

©2025 Osmose Utilities Services, Inc.

the Inventory panel. For example, when a transformer has been selected, the user can either adjust the attachment height of the transformer or the rotation of the transformer. Notice that these topmost options will dynamically change based on which O-Calc Pro item has been selected in the Inventory panel.

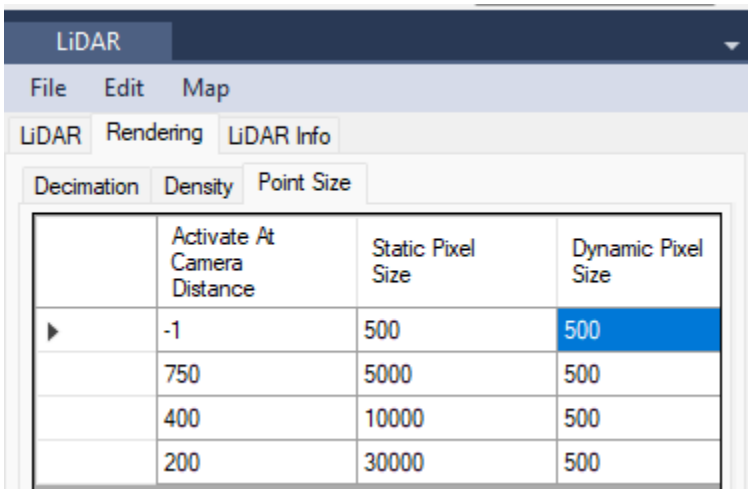
The second section of the context menus will always have the same options. These are explicit options that give information about the selected LiDAR point relative to the current pole you have selected.

The third section of the context menus also have the same options regardless of the selected O-Calc Pro object. These three options allow for setting reference points based on the selected LiDAR point.

Appendix

LiDAR Viewer – LiDAR Point Size Table Explanation

The LiDAR Viewer Plugin enables the user to adjust how the LiDAR point cloud is displayed within the 3D View. One of the parameters that can be adjusted is the LiDAR point size as a function of the zoom level. This can be adjusted within the Rendering tab under the sub-tab called Point Size. Below is a screenshot with some representative, example values.



The “Activate At Camera Distance” is a measure of the zoom level of the 3D view. Technically it is the distance between the Camera location (view location of the user) to the Camera Look Point (the pink dot within the center of the 3D View). The larger the number

©2025 Osmose Utilities Services, Inc.

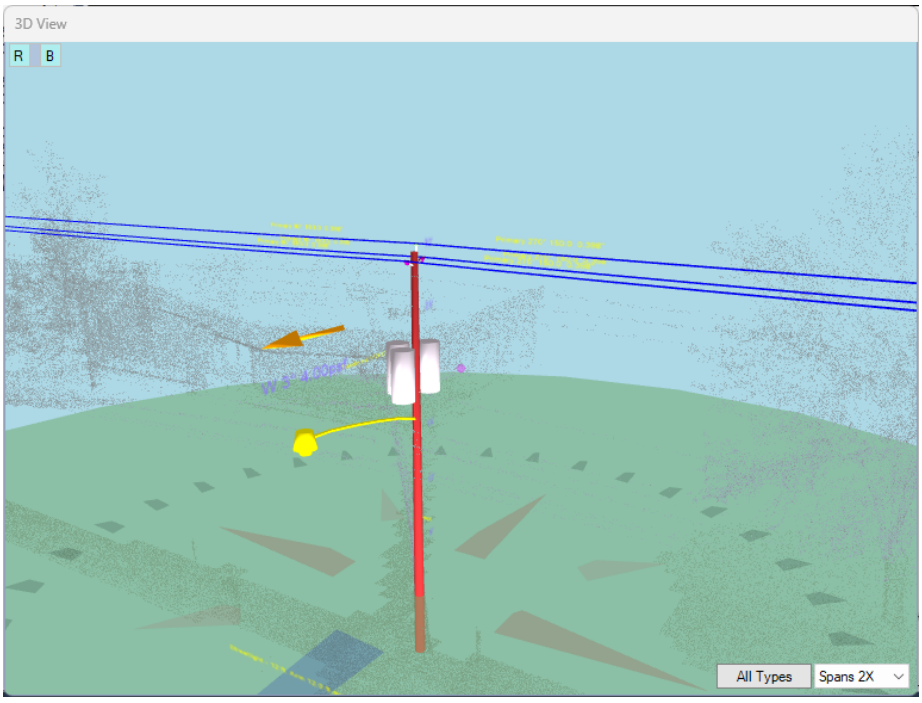
the further you are zoomed out, and the smaller the size of the Camera Look Point (pink dot).

In this example you see values of 200 (zoomed in), 400, 750, and -1 (all zoomed out values greater than 750). These values are thresholds values that define ranges: between completely zoomed in to 200, greater than 200 to 400, greater than 400 to 750, greater than 750.

The Point Size table also shows the Static Pixel Size and Dynamic Pixel Size of the LiDAR point cloud as viewed within the 3D view. For this example, the Dynamic Pixel Size (size of LiDAR points when panning and zooming) have been set to all the same value so the Static Pixel Size can be illustrated. The Static Pixel Size has been set to some extreme values for this illustrative example, pixel sizes of 30000 pixels at the greatest zoom level down to 500 pixels when zoomed out further than 750 for the Camera Distance.

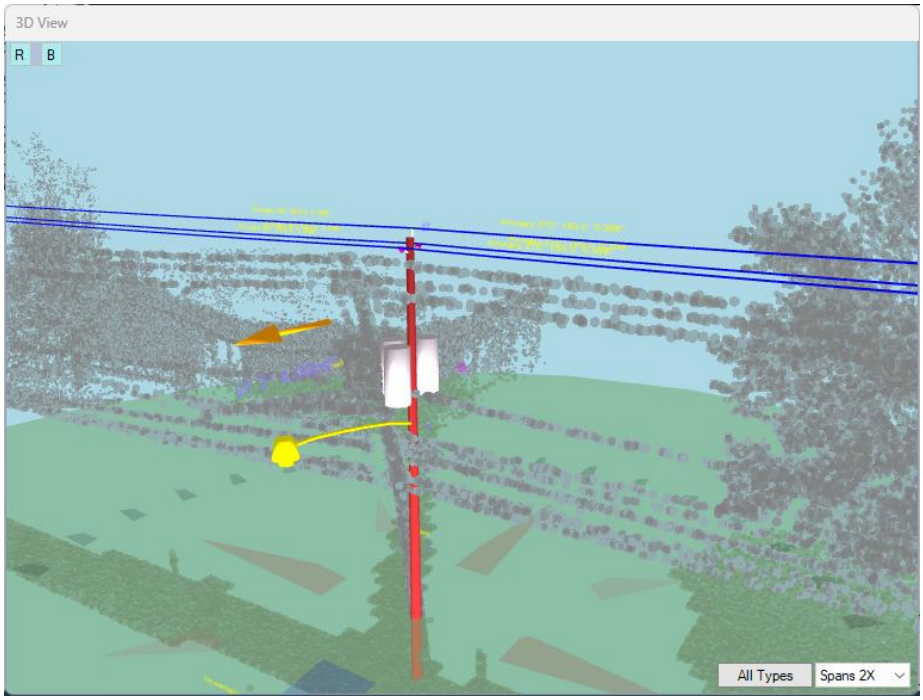
The 4 screen shots below show the four different zoom ranges and the corresponding LiDAR Pixel sizes.

Zoom Level Greater than 750, LiDAR Pixel Size 500

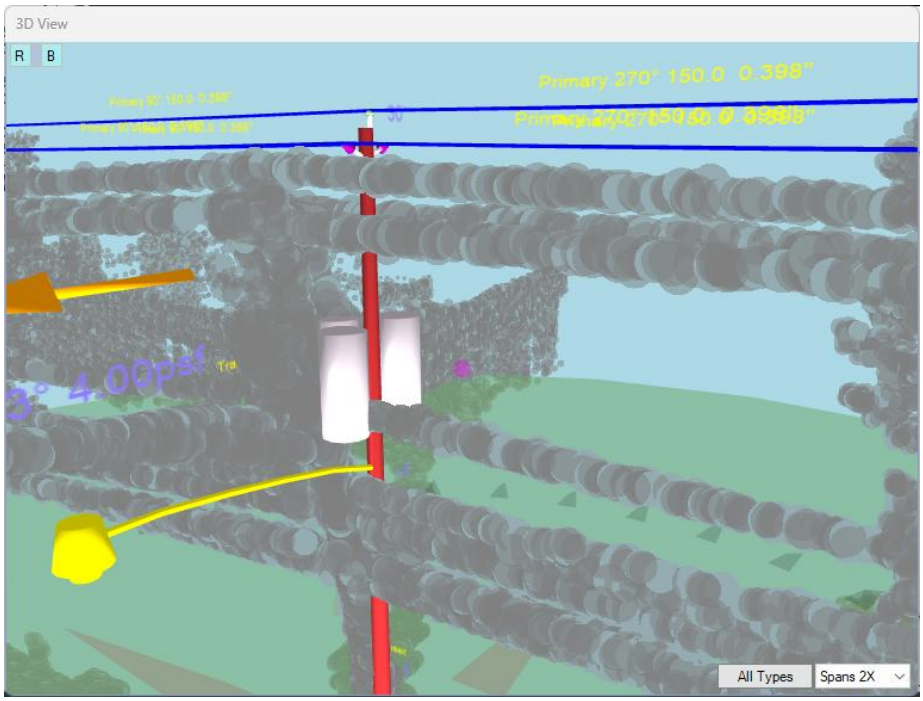


©2025 Osmose Utilities Services, Inc.

Zoom Level at ~750, LiDAR Pixel Size 5000

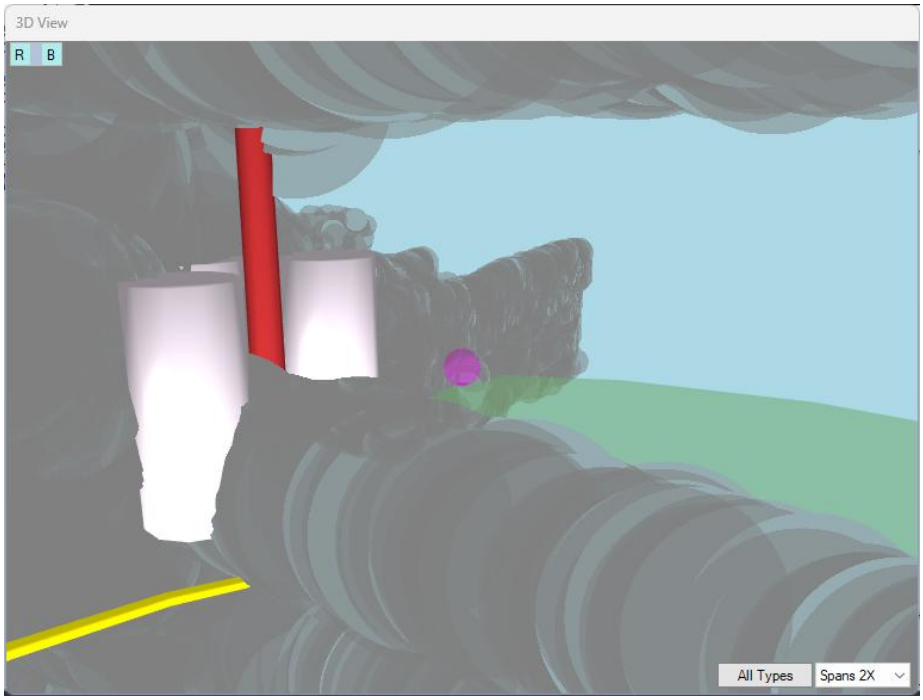


Zoom Level at ~400, LiDAR Pixel Size 10000



©2025 Osmose Utilities Services, Inc.

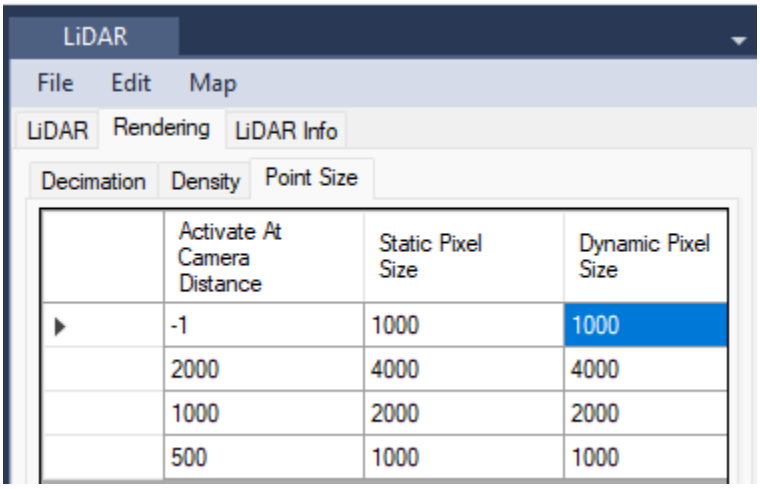
Zoom Level less than 200, LiDAR Pixel Size 30000



A few notes on these four different screen shots. Notice the size of the Camera Look Point (pink dot), this gives an indication of the zoom level. Also note that a zoom level of about 750 is a level to see completely the full distribution pole. While the zoom of about 400 is about the top half of a distribution pole. And a zoom level of 200 is where electric distribution equipment, i.e. the 3-phase transformer takes up most of the screens of the 3D View.

While the size of the LiDAR points in these examples is extreme, changing the LiDAR point size can be helpful when attempting to select a LiDAR point to adjust your pole loading model. The default LiDAR point sizes are as follows:

©2025 Osmose Utilities Services, Inc.



Tip: These LiDAR Point sizes have been found to be reasonable working sizes when zoomed in enough to make precise adjustments to the pole model.

©2025 Osmose Utilities Services, Inc.