

## 9.7. CAD Drafting

### 9.7.1. Overview

The **CAD Drafting** module is mainly used to generate floor plans quickly from point clouds and supports exporting CAD files in formats such as DXF. It is intended for customers in interior decoration, design, and building construction. It can be activated in two ways:

Activation method 1: Select a single point cloud file, then click **CAD Drafting** in the function area. When **Start Drawing** is enabled, a new vector file is added to the directory tree in the **[Data Management]** panel, and the drawing content is stored in that vector file.

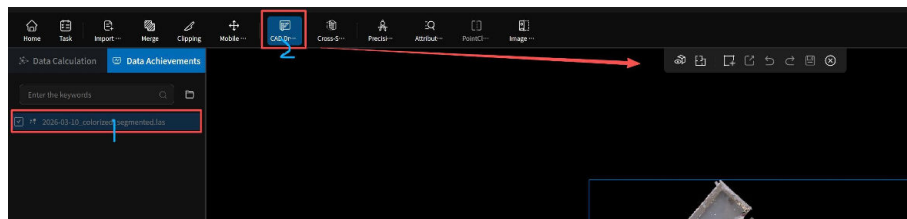


Fig 9-50 CAD Drafting Activation Method 1

Activation method 2: Select an existing vector file, then click **CAD Drafting** in the function area. When **Start Drawing** is enabled, the drawing content is stored in the selected vector file.

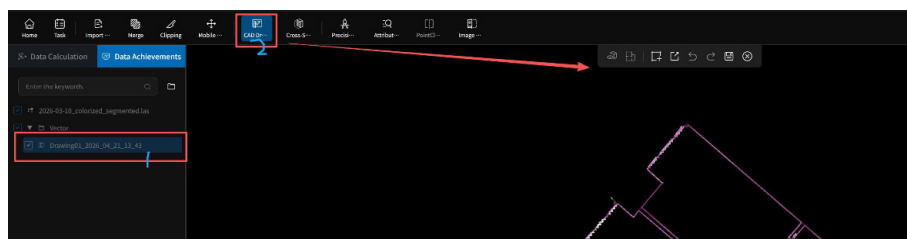


Fig 9-51 CAD Drafting Activation Method 2

After **CAD Drafting** is activated, a drafting tool group appears at the top of the scene, including functions such as **Section Generation**, **Plane Generation**, **Edit and Draw**, **Drawing Export**, **Undo/Redo**, **Save**, and **Exit**, as shown below.

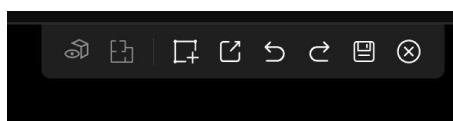


Fig 9-52 Drafting Tool Group

### 9.7.2. Section Generation

**Section Generation** cuts a plane from the point cloud to obtain a slice of near-planar point cloud data with a certain thickness. The slice position and thickness can be fine-tuned, and the resulting section can be used to assist drawing. Vector data can also be generated directly from the section point cloud.

Click **Section Generation** to open the **Section Generation** dialog box. The window can be dragged by its title bar and also supports maximize and minimize.

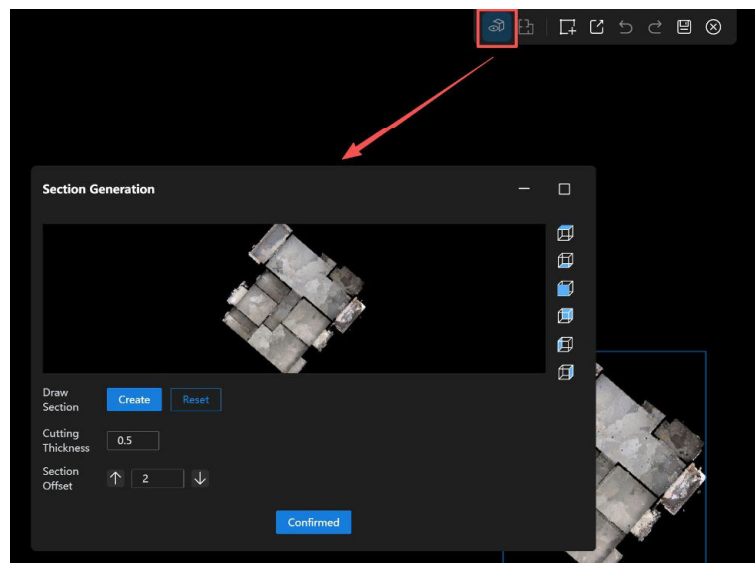


Fig 9-53 Activating the Section Generation Window

You can use the view tools on the side to switch the orientation of the point cloud in the **Section Generation** window. Click **Create**, then left-click in the view to add two points and draw the corresponding section. After the section is drawn, the view shows the corresponding section point cloud.

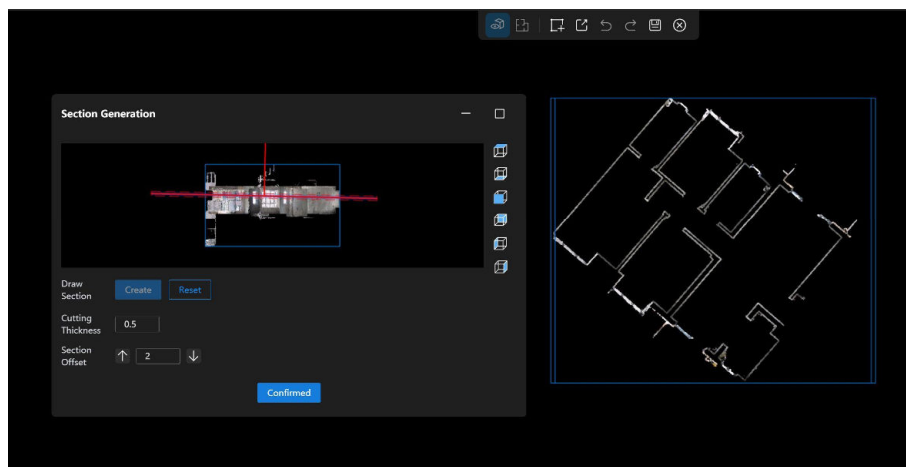


Fig 9-54 Drawing a Section

The default section thickness is 0.5 m. You can fine-tune the thickness and position to improve the section result.

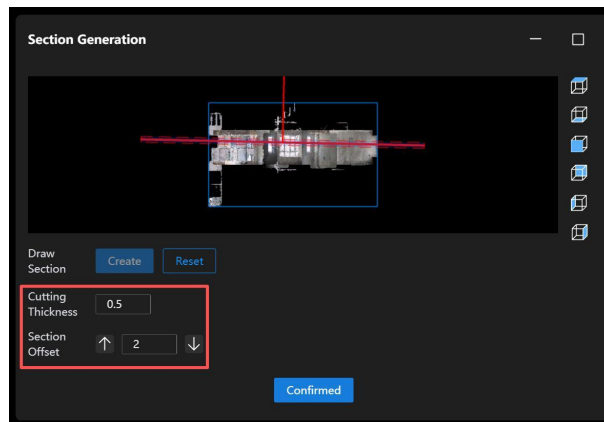


Fig 9-55 Fine-Tuning the Section

Click **Reset** to reset the section. This operation clears already drawn vectors, so use it with caution.

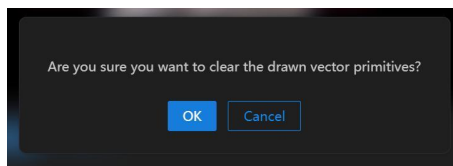


Fig 9-56 Reset Confirmation Dialog

Click **Confirm** to generate the corresponding vectors from the section. You can later enter [Edit and Draw](#) to edit the generated vectors.

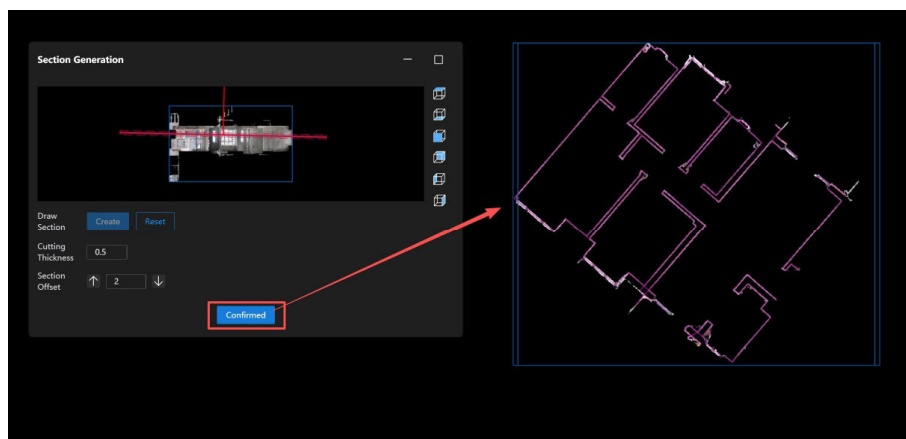


Fig 9-57 Generated Section Vectors

### 9.7.3. Plane Generation

**Plane Generation** intelligently segments the point cloud into independent planes and constructs candidate surfaces for architectural spaces.

Click **Plane Generation** to open the **Generation Settings** dialog box, as shown below.

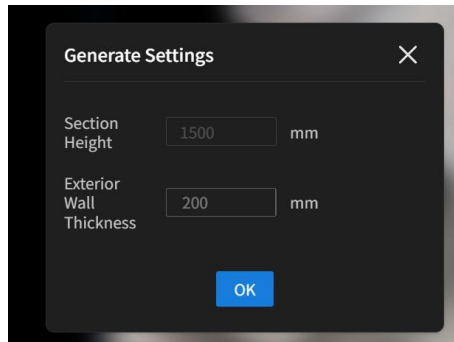


Fig 9-58 Generation Settings Parameters

You can adjust parameters such as **Exterior Wall Thickness**. After adjustment, click OK to execute plane generation. You will need to wait for a while, and the progress is displayed at the bottom.

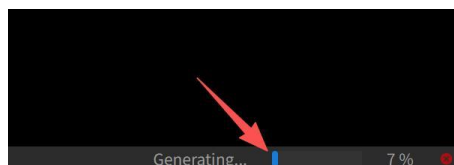


Fig 9-59 Plane Generation Progress

After processing is completed, the plane generation result is displayed. You can later enter [Edit and Draw](#) to edit the generated vectors.

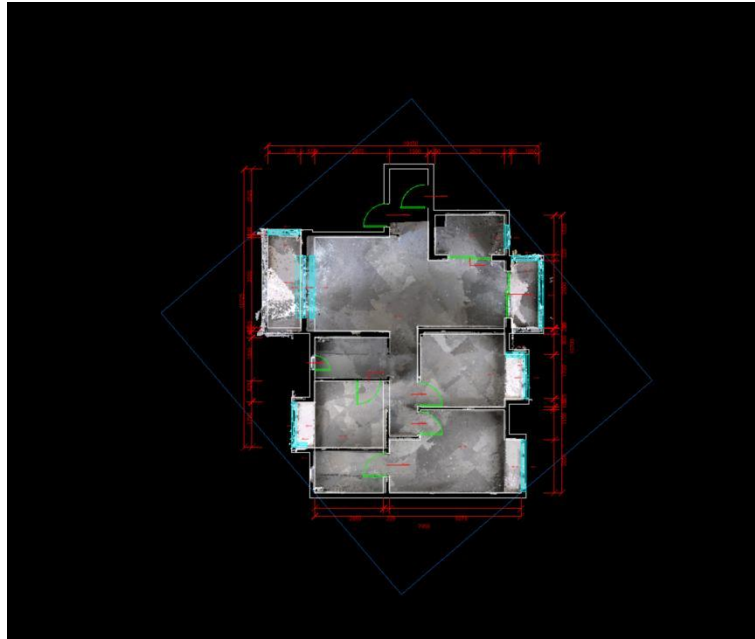


Fig 9-60 Plane Generation Result

#### 9.7.4. Edit and Draw

Click **Edit and Draw** in the drafting tool group at the top to enter the drawing-editing interface. The **Edit and Draw** panel then appears on the right, where you can perform graphic drawing, graphic editing, and annotation operations.

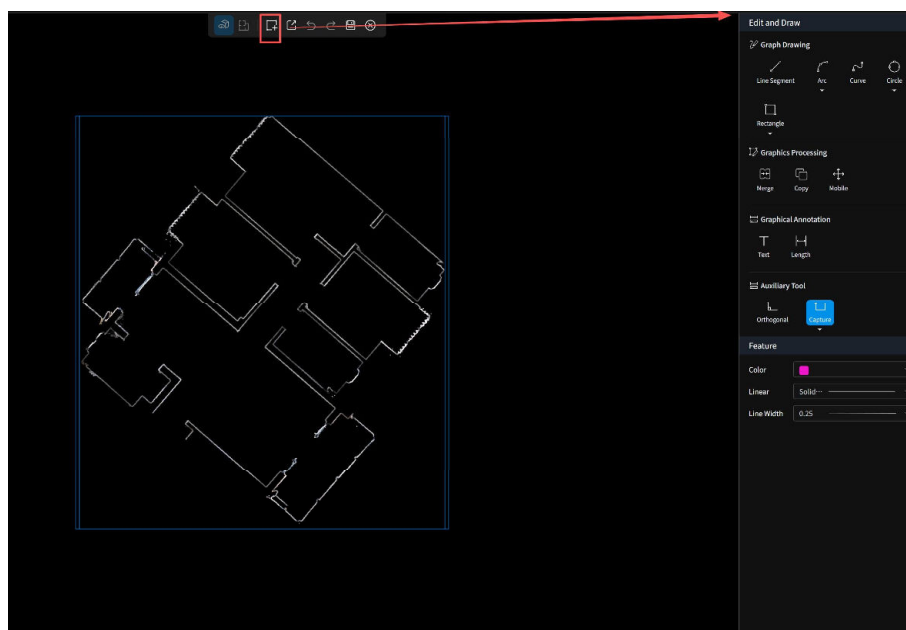


Fig 9-61 Entering the Drawing Interface

### 9.7.4.1. Graphic Drawing

#### 9.7.4.1.1. Line Segment

**Line Segment** is used to draw line entities. The steps are as follows:

In the [**Drafting Tools**] panel, click **Line Segment** in the graphic drawing area. The button is highlighted to indicate activation.

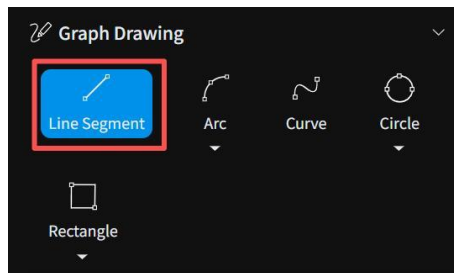


Fig 9-62 Activating the Line Segment Tool

Move the pointer to the view area. Following the cursor prompt, left-click to add the vertices of the line segment one by one. **Right-click** to finish drawing the segment.

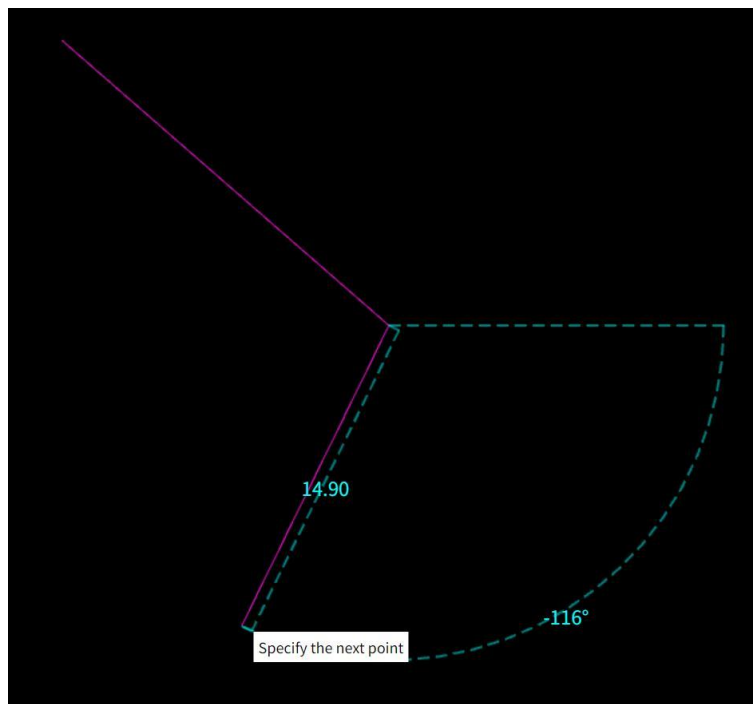


Fig 9-63 Drawing a Line Segment

Repeat the steps above to draw other line segments.

#### 9.7.4.1.2. Arc

#### 9.7.4.1.3. Three-Point Arc

A **Three-Point Arc** is drawn by specifying three non-collinear points. The steps are as follows:

In the [**Drafting Tools**] panel, click the expand button under **Arc**, then click **Three-Point Arc** to activate the function.

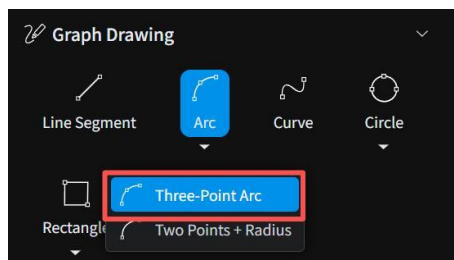


Fig 9-64 Activating the Three-Point Arc Tool

Move the pointer to the view area. Following the cursor prompt, left-click to add three non-collinear points one by one. After all three points are added, an arc is generated automatically.

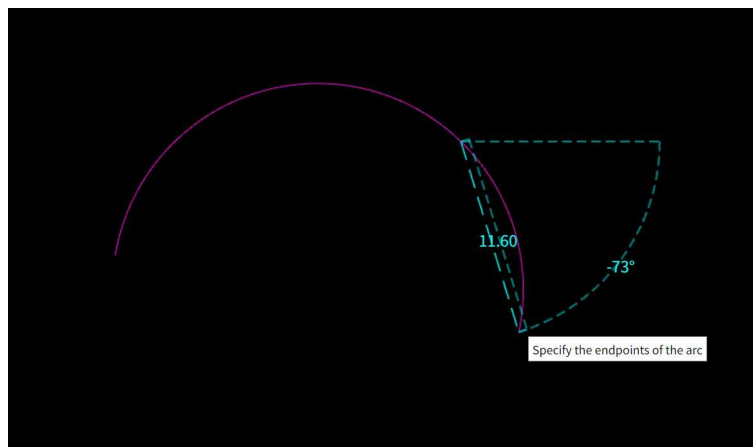


Fig 9-65 Drawing a Three-Point Arc

Repeat the steps above to draw other arcs.

#### 9.7.4.1.4. Two Points + Radius (Arc)

**Two Points + Radius (Arc)** means first specifying the two end points of the arc, and then determining the center of the circle on which the arc lies. The steps are as follows:

In the [Drafting Tools] panel, click the expand button under **Arc**, then click **Two Points + Radius (Arc)** to activate the function.

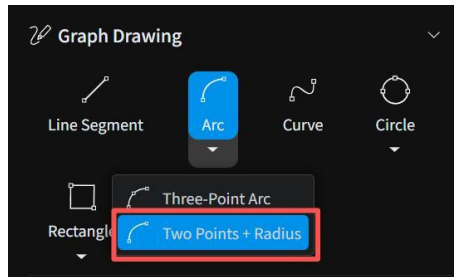


Fig 9-66 Activating the Two Points + Radius Arc Tool

Move the pointer to the view area. Following the cursor prompt, left-click to add two points as the arc endpoints, then move the pointer to determine the center of the circle and left-click again to generate the arc.

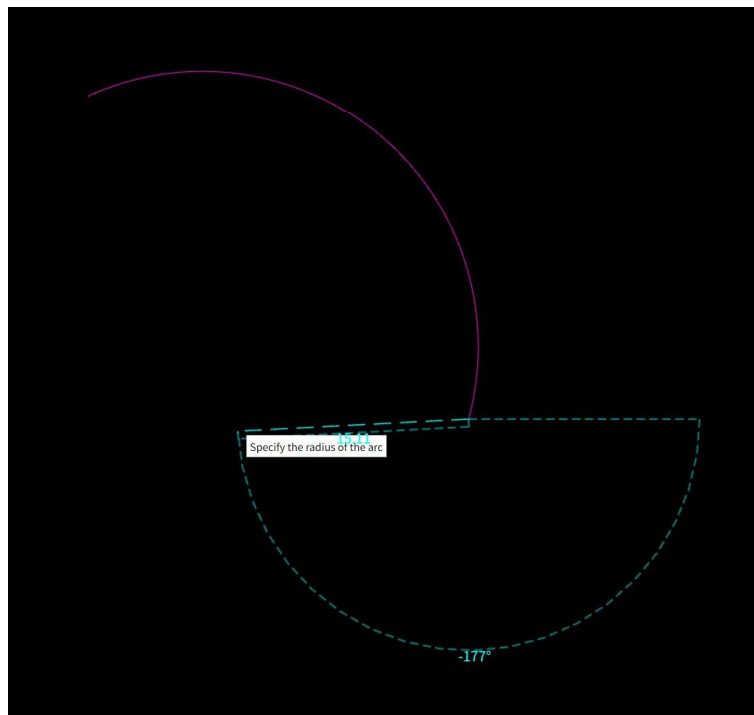


Fig 9-67 Drawing a Two Points + Radius Arc

Repeat the steps above to draw other arcs.

#### 9.7.4.1.5. Curve

A **Curve** is created by drawing a series of points and fitting them into a curve. The steps are as follows:

In the [Drafting Tools] panel, click **Curve** in the graphic drawing area. The button is highlighted to indicate activation.

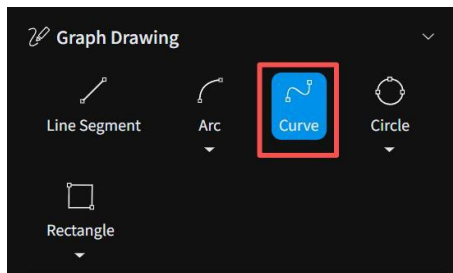


Fig 9-68 Activating the Curve Tool

Move the pointer to the view area. Following the cursor prompt, left-click to add points. As you move the pointer, the shape of the curve changes accordingly. Continue clicking to draw the curve, and right-click to finish.



Fig 9-69 Drawing a Curve

Repeat the steps above to draw other curves.

#### 9.7.4.1.6. Circle

#### 9.7.4.1.7. Three-Point Circle

A **Three-Point Circle** is drawn by specifying three points on the circumference. The steps are as follows:

In the [Drafting Tools] panel, click the expand button under **Circle**, then click **Three-Point Circle** to activate the function.

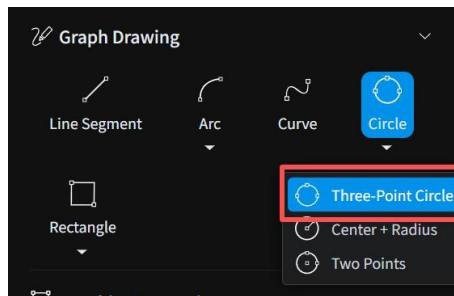


Fig 9-70 Activating the Three-Point Circle Tool

Move the pointer to the view area. Following the cursor prompt, left-click to add three non-collinear points one by one. After all points are added, a circle is generated automatically.

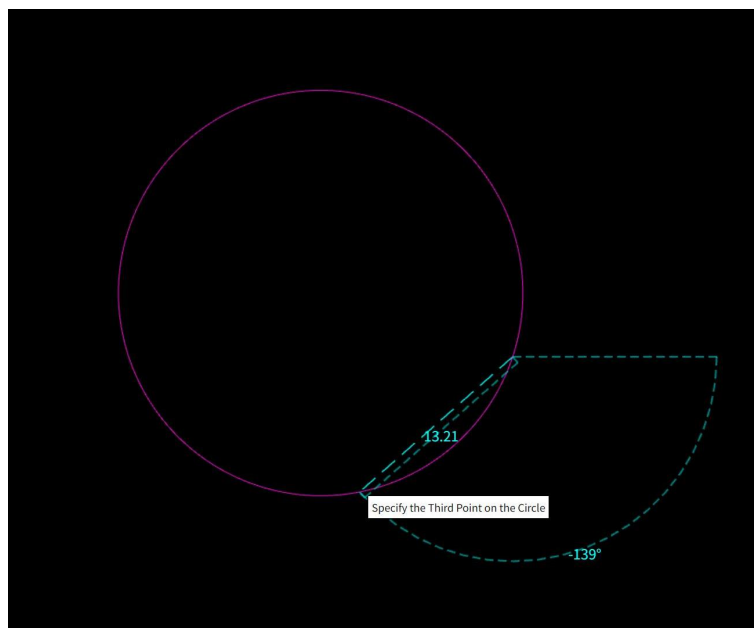


Fig 9-71 Drawing a Three-Point Circle

Repeat the steps above to draw other circles.

#### 9.7.4.1.8. Center + Radius (Circle)

**Center + Radius (Circle)** draws a circle by using two points to determine the center position and radius. The steps are as follows:

In the [Drafting Tools] panel, click the expand button under **Circle**, then click **Center + Radius (Circle)** to activate the function.

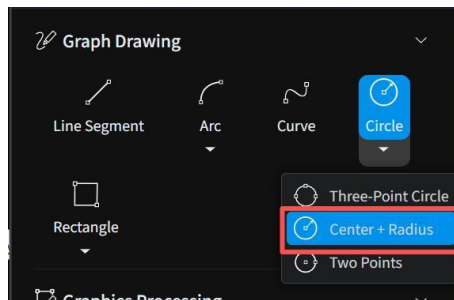


Fig 9-72 Activating the Center + Radius Circle Tool

Move the pointer to the view area. Following the cursor prompt, left-click to determine the center. As you move the pointer, a dashed line is shown between the first point and the current pointer position, and a circle is fitted with the dashed line as the radius. **Left-click** again to complete the circle.

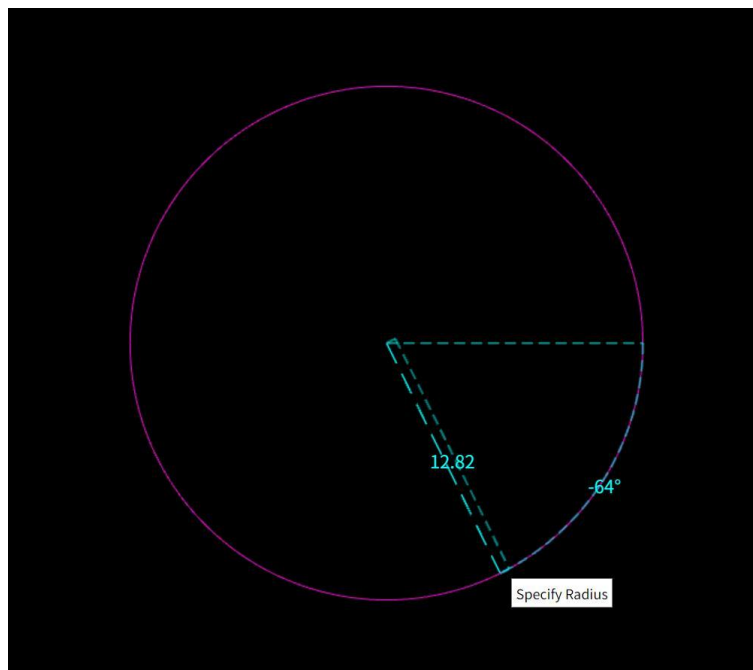


Fig 9-73 Drawing a Center + Radius Circle

Repeat the steps above to draw other circles.

#### 9.7.4.1.9. Two-Point Circle

A **Two-Point Circle** is drawn by specifying the diameter of the circle. The steps are as follows:

In the [Drafting Tools] panel, click the expand button under **Circle**, then click **Two-Point Circle** to activate the function.

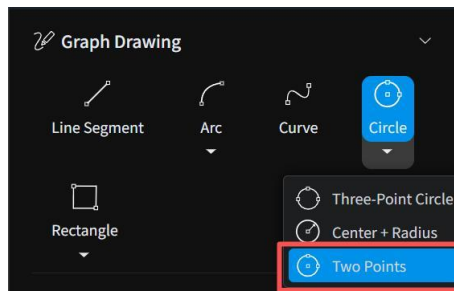


Fig 9-74 Activating the Two-Point Circle Tool

Move the pointer to the view area. Following the cursor prompt, left-click to determine the first point on the diameter, move the pointer to determine the other position on the diameter, and click again to complete the circle.

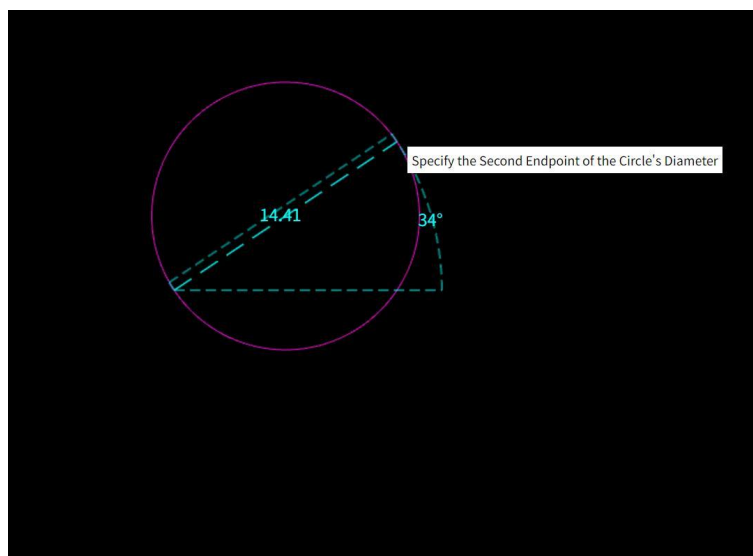


Fig 9-75 Drawing a Two-Point Circle

Repeat the steps above to draw other circles.

#### 9.7.4.1.10. Rectangle

#### 9.7.4.1.11. Two-Point Rectangle

A **Two-Point Rectangle** is drawn by specifying two diagonal points of the rectangle. The steps are as follows:

In the [**Drafting Tools**] panel, click the expand button under **Rectangle**, then click **Two-Point Rectangle** to activate the function.

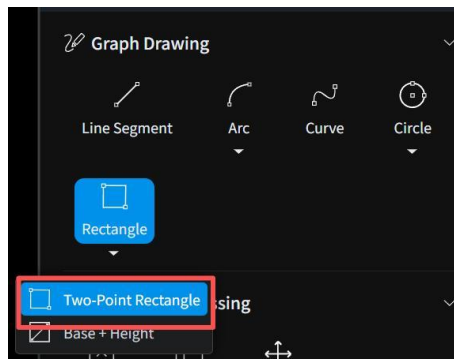


Fig 9-76 Activating the Two-Point Rectangle Tool

Move the pointer to the view area. Following the cursor prompt, left-click to determine the first diagonal point of the rectangle, move the pointer to determine the other diagonal point, and click again to complete the rectangle.

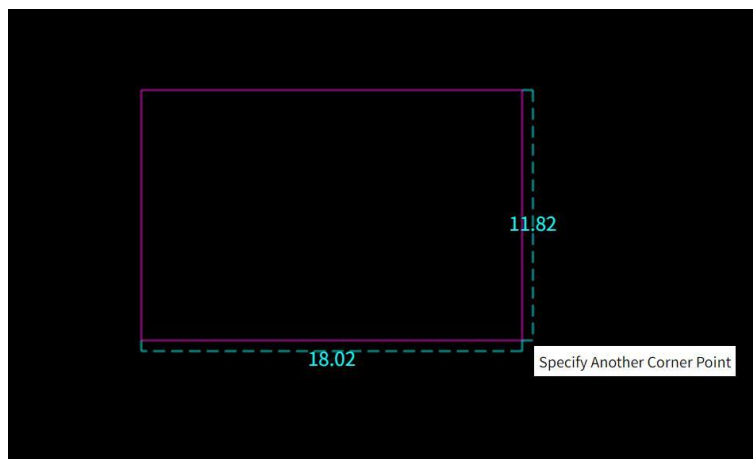


Fig 9-77 Drawing a Two-Point Rectangle

Repeat the steps above to draw other rectangles.

#### 9.7.4.1.12. Base + Height (Rectangle)

**Base + Height (Rectangle)** draws a rectangle by first drawing its base and then controlling its height. The steps are as follows:

In the [Drafting Tools] panel, click the expand button under **Rectangle**, then click **Base + Height (Rectangle)** to activate the function.

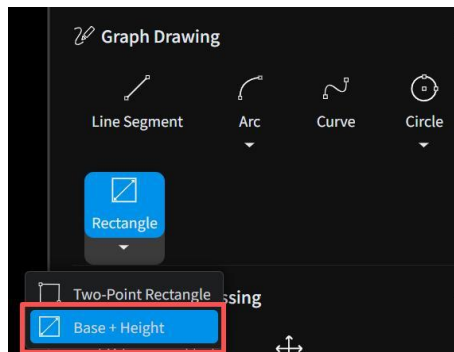


Fig 9-78 Activating the Base + Height Rectangle Tool

Move the pointer to the view area. Following the cursor prompt, left-click to draw the first point of the rectangle base, move the pointer and left-click again to determine the second base point. Then move the pointer to determine the height of the rectangle and click to finish.

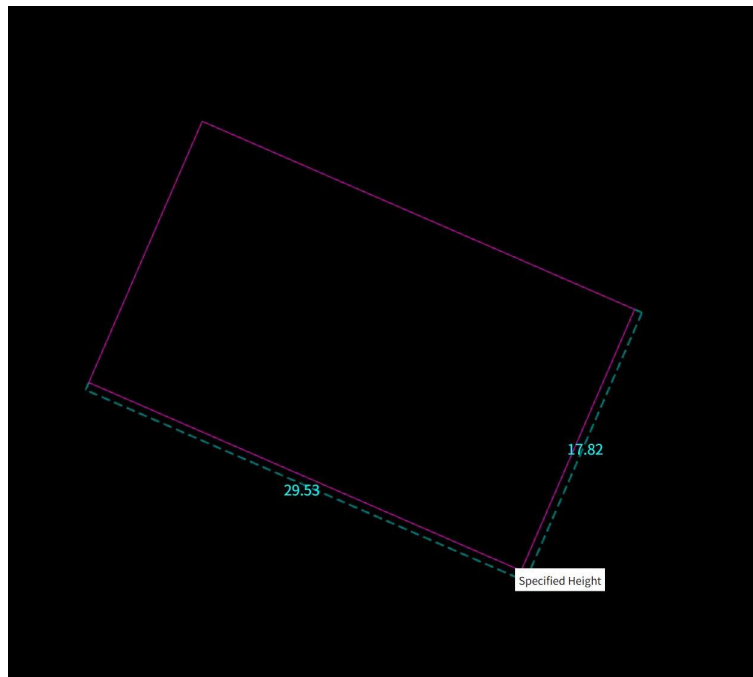


Fig 9-79 Drawing a Base + Height Rectangle

Repeat the steps above to draw other rectangles.

#### 9.7.4.2. Graphic Editing

##### 9.7.4.2.1. Merge

The **Merge** operation combines several continuously connected vector entities into a single entity. The steps are as follows:

In the [Drafting Tools] panel, click **Merge** in the graphic editing area. The button is highlighted to indicate activation.

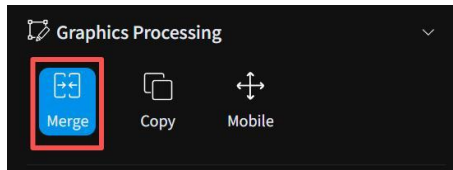


Fig 9-80 Activating Merge

Move the pointer to the view area. While holding down **Ctrl**, move the cursor to each entity to be merged and left-click to select it. The cursor displays the number of selected entities.

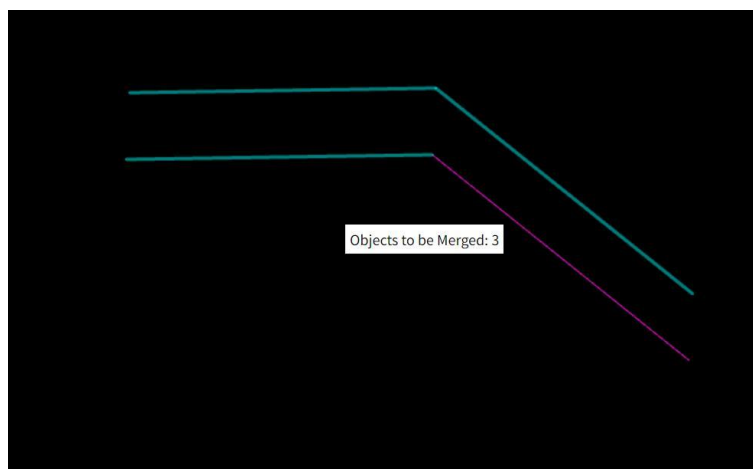


Fig 9-81 Selecting Objects to Merge

After the selection is completed, right-click to finish. If the entities are continuously connected, they are merged into one entity.



Fig 9-82 Merged Object

Repeat the steps above to continue performing merge operations.

#### 9.7.4.2.2. Copy

The **Copy** operation duplicates one or more entities to avoid redrawing the same elements and improve drafting efficiency. The steps are as follows:

In the [**Drafting Tools**] panel, click **Copy** in the graphic editing area. The button is highlighted to indicate activation.

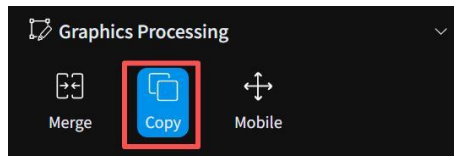


Fig 9-83 Activating Copy

Move the pointer to the view area. Following the cursor prompt, left-click to select the entity or entities to copy. You can hold down **Ctrl** to select multiple entities. **Right-click** to finish the selection.

After the entities are selected, left-click to define the base point for copying, move the pointer to determine the copy location, and right-click to complete the copy operation.

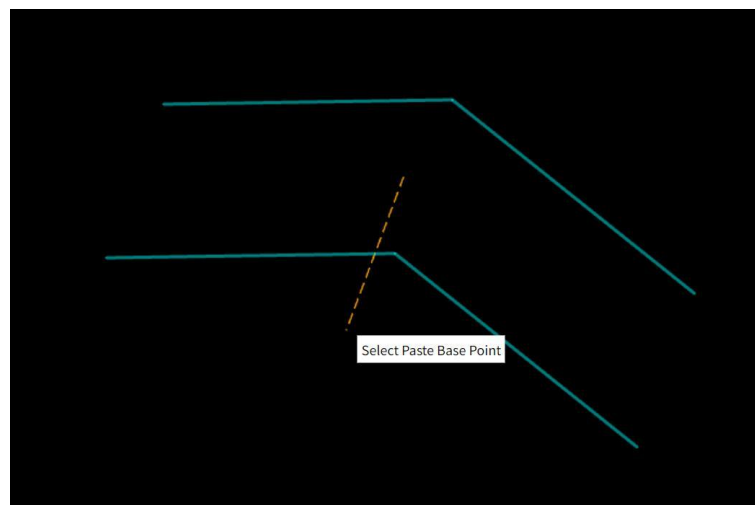


Fig 9-84 Copy Operation

Repeat the steps above to continue copying.

#### 9.7.4.2.3. Move

The **Move** operation moves one or more entities to another location. The steps are as follows:

In the **[Drafting Tools]** panel, click **Move** in the graphic editing area. The button is highlighted to indicate activation.

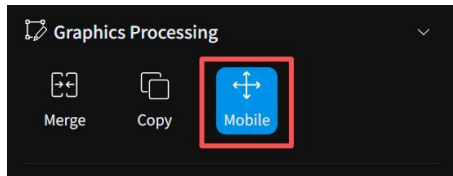


Fig 9-85 Activating Move

Move the pointer to the view area. Following the cursor prompt, left-click to select the entity or entities to move. You can hold down **Ctrl** to select multiple entities. **Right-click** to finish the selection.

After the entities are selected, left-click to define the base point for moving, move the pointer to determine the target position, and right-click to complete the move operation.

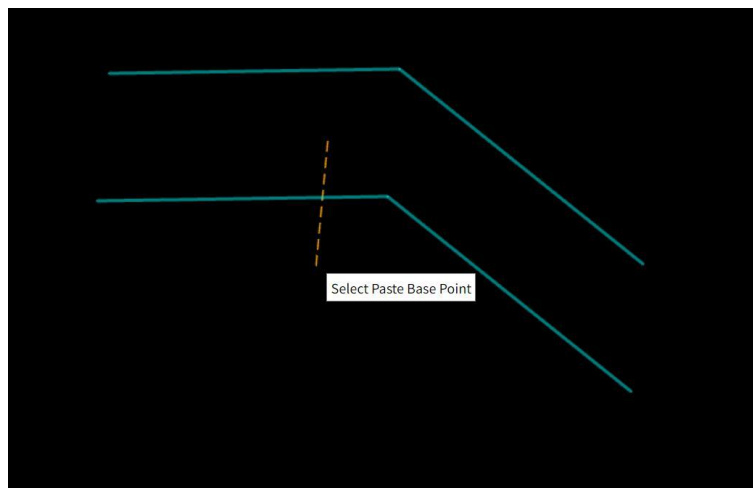


Fig 9-86 Move Operation

Repeat the steps above to continue moving.

#### 9.7.4.2.4. Delete

To delete an entity, select it and press the **Delete** key on the keyboard. Multi-selection and batch deletion are supported.

#### 9.7.4.3. Annotations

##### 9.7.4.3.1. Text

Creates a text annotation entity. The steps are as follows:

In the **[Drafting Tools]** panel, click **Text** in the annotation area. The button is highlighted to indicate activation.

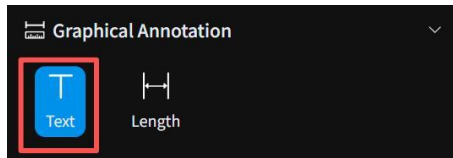


Fig 9-87 Activating Text

2. Move the pointer to the view area and, following the cursor prompt, left-click to define the width of the text box.

3. After the text width is defined, enter the text content and press **Enter** to finish input.



Fig 9-88 Drawing a Text Annotation

4. Repeat the steps above to create other text annotations.

#### 9.7.4.3.2. Length

**Length** annotation displays the length between two points. The steps are as follows:

In the **[Drafting Tools]** panel, click **Length** in the annotation area. The button is highlighted to indicate activation.



Fig 9-89 Activating Length Annotation

Move the pointer to the view area. Following the cursor prompt, left-click to determine the starting extension line of the dimension, move the pointer to determine the ending limit position, and click again.

Move the pointer to determine the position of the dimension line, then left-click to finish.

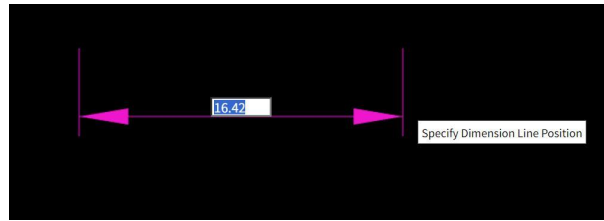


Fig 9-90 Drawing a Length Annotation

Repeat the steps above to create other length annotations.

#### 9.7.4.4. Auxiliary Functions

##### 9.7.4.4.1. Orthogonal Mode (On)

By default, **Orthogonal** is off. When it is turned on, the cursor is constrained to move only horizontally or vertically while drawing, which makes it easier to create horizontal or vertical lines quickly.

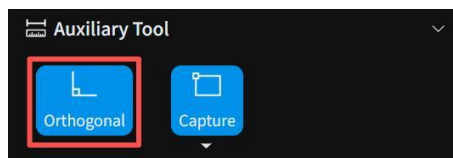


Fig 9-91 Enabling Orthogonal Mode

##### 9.7.4.4.2. Snap (On)

By default, **Snap** is on, but it can be turned off. When enabled, it assists users in drawing graphics. Supported snap elements include endpoints, midpoints, nodes, circle centers, and nearest points.

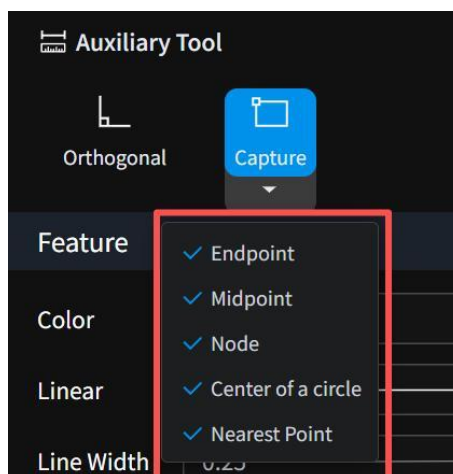


Fig 9-92 Snap Options

### 9.7.5. Drawing Export

The drawn vectors can be exported as drawing data in **DXF** format.

Click **Generate Drawing** to open the **Drawing Export** settings dialog box, as shown below.

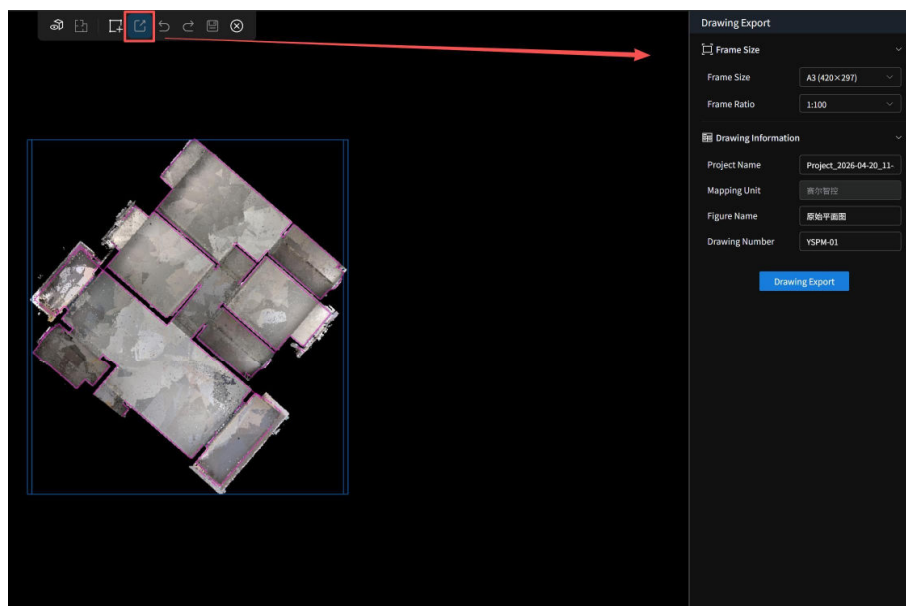


Fig 9-93 Drawing Export Settings

Set the drawing frame size and drawing information. After the settings are completed, click **Drawing Export**. In the dialog box that appears, set the export file name and storage path, then click **OK** to execute the export.

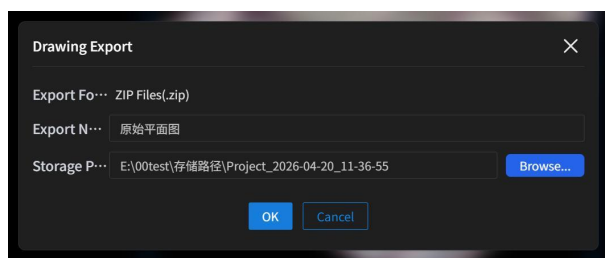


Fig 9-94 Export File Settings

After the export succeeds, unzip the **ZIP** file. The result can then be opened in third-party software as shown below.

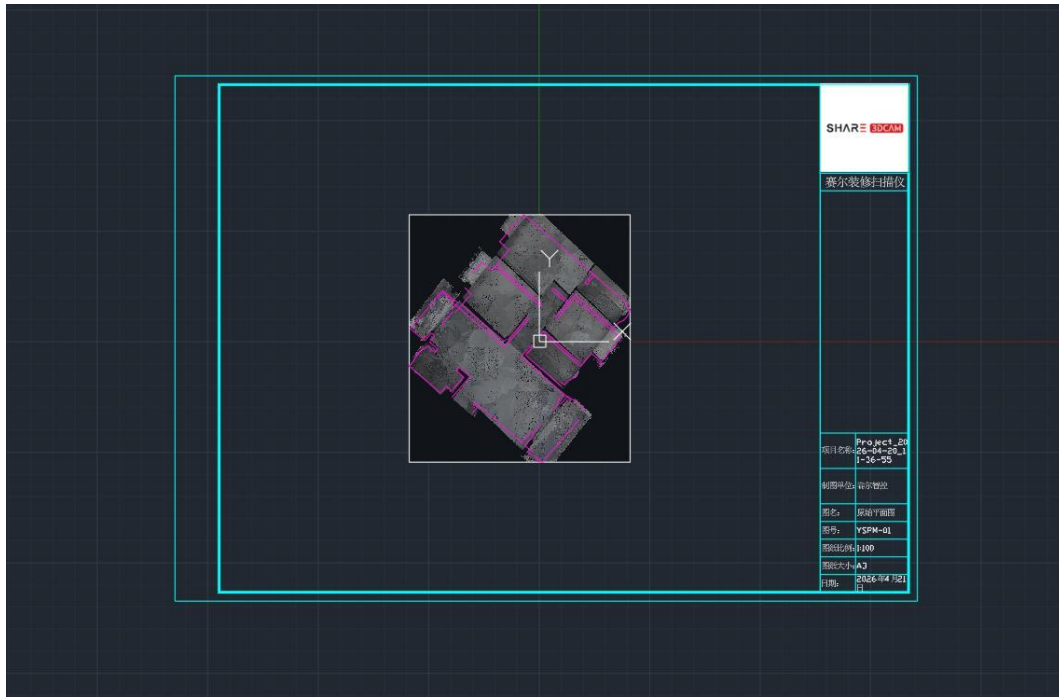


Fig 9-95 Export Result Example

#### 9.7.6. Undo / Redo

During drawing, you can undo the previous step (**Ctrl + Z**) and continue undoing multiple steps in sequence. You can also redo undone content (**Ctrl + Y**), also in sequence.

For an entity that is currently being drawn, the number of undo/redo operations is not limited, except that the first point cannot be undone. After drawing is completed, up to 20 drawn entities can be undone or redone.



Fig 9-96 Undo / Redo

#### 9.7.7. Save

During drawing, or after drawing is completed, save or update the drawn vector file in the vector-file node of the directory tree.



Fig 9-97 Save

### 9.7.8. Exit

Click **Exit** to leave the **CAD Drafting** function.

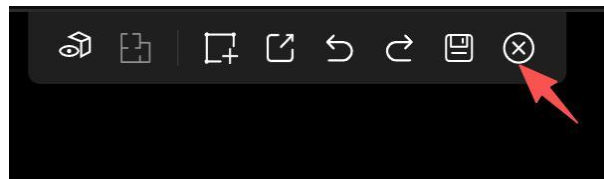


Fig 9-98 Exit CAD Drafting

If you exit **CAD Drafting** without saving the drawing content, a prompt appears and asks whether to save.

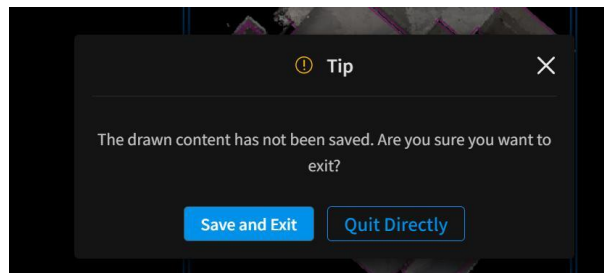


Fig 9-99 Unsaved Changes Prompt

## 9.8. Section Extraction

**Section Extraction** is used to quickly extract and save multiple slices of a point cloud in the same direction. Select a single point cloud, then click **Section Extraction** in the main function area to activate the function. After activation, the **Section Extraction** operation panel appears on the right.

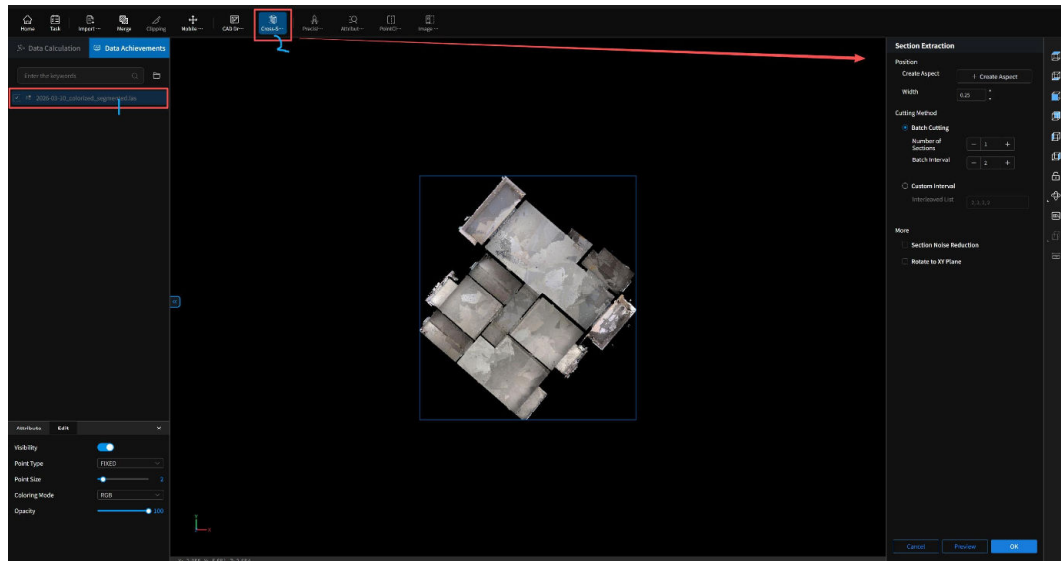


Fig 9-100 Activating Section Extraction

The workflow is as follows:

1. Determine the cut direction.
2. Create the section position.
3. Set section parameters such as thickness, quantity, and spacing.
4. Preview the cut result.
5. Execute Section Extraction.

The following content describes these steps in detail.

### 9.8.1. Determine the Cutting Direction

After **Section Extraction** is activated, you can determine the point cloud cutting direction by rotating the scene with the mouse, clicking the **View Control buttons** on the side toolbar, or entering the Cut Direction manually.

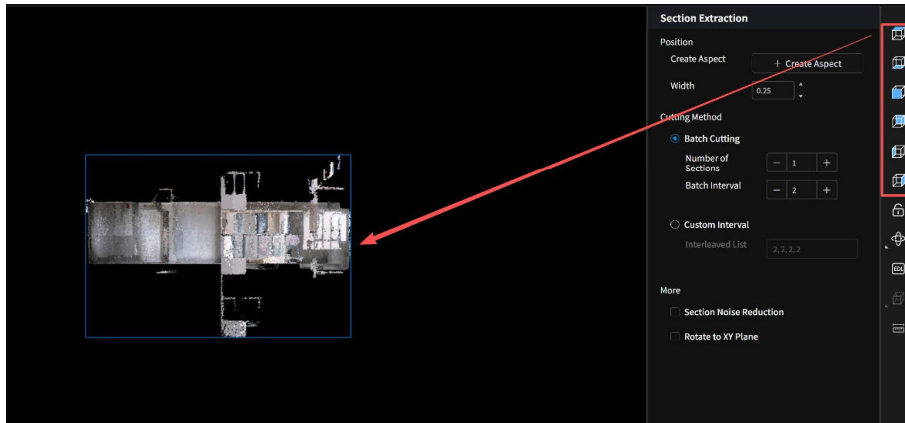


Fig 9-101 Determining the Cutting Direction

### 9.8.2. Create the Section Position

In the **Section Extraction** panel, click **Create Aspect** to activate the section creation function.

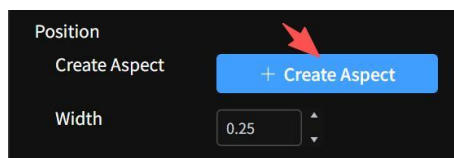


Fig 9-102 Activating Section Creation

Move the pointer into the scene. First, left-click to add two points to determine the section direction. Then move the pointer to determine the section width and left-click again to complete section creation.

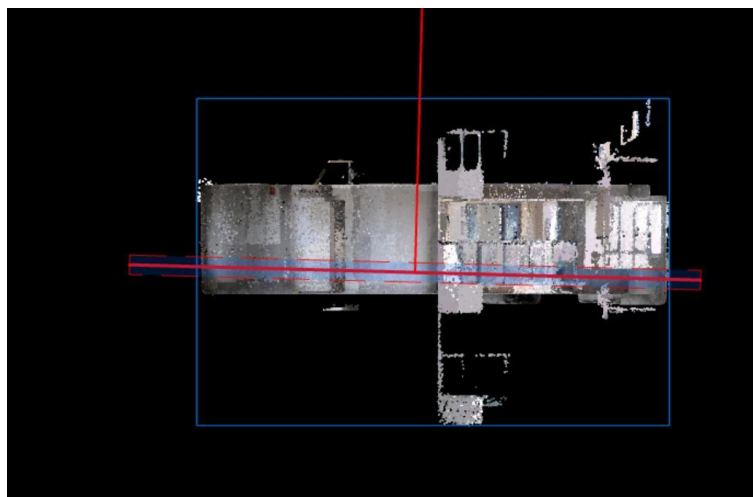


Fig 9-103 Creating a Section

If you are not satisfied with the drawn section direction, click **Create Aspect** to clear the current section. Click it again to redraw.

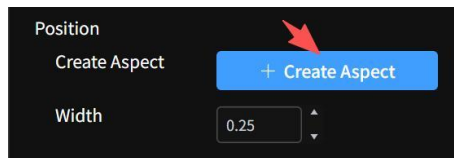


Fig 9-104 Clearing the Drawn Section

### 9.8.3. Set Section Parameters (Thickness, Quantity, Spacing, etc.)

After the section is created successfully, you can dynamically adjust the section width in the **Section Extraction** panel. The width must not exceed 10 m.

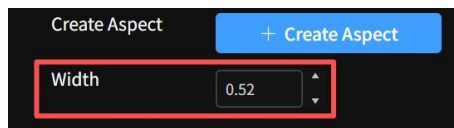


Fig 9-105 Adjusting Section Width

The default cut mode is **Batch Cutting**. You can adjust the number of sections and the batch spacing.

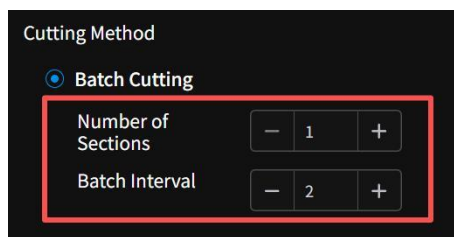


Fig 9-106 Adjusting Batch Cutting Parameters

You can also choose Custom Interval and specify the spacing between sections in the interval list, separated by commas.

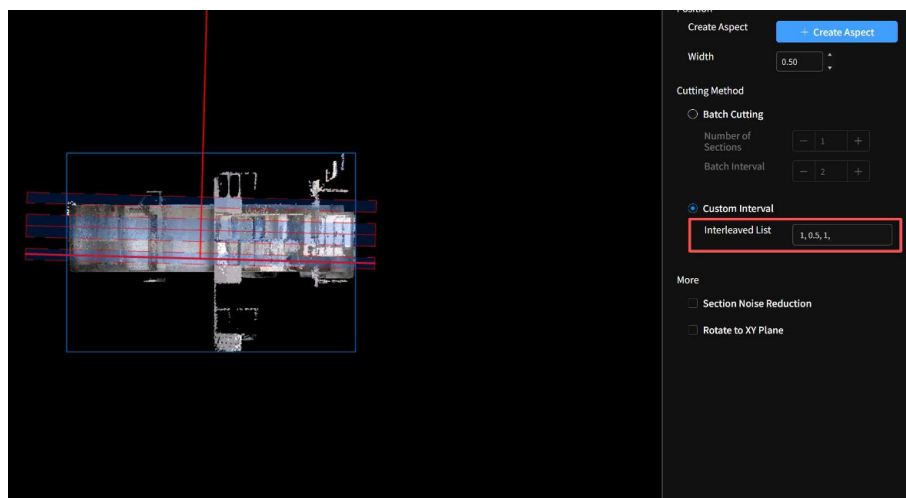


Fig 9-107 Custom Section Intervals

#### 9.8.4. Preview the Section Result (Optional)

After completing the steps above, click **Preview** at the bottom of the **Section Extraction** panel to preview the cut result.

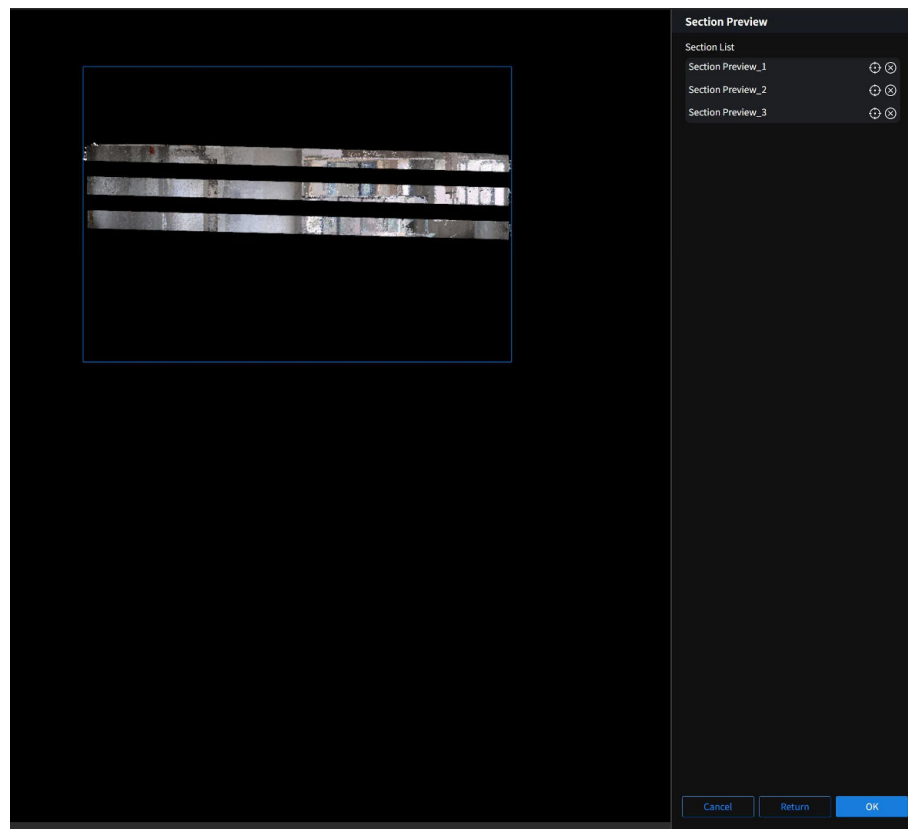


Fig 9-108 Section Preview

#### 9.8.5. Execute Section Extraction

Click **OK** at the bottom of the **Section Extraction** panel to execute the section extraction operation.

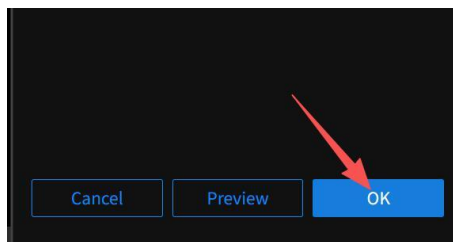


Fig 9-109 Executing Section Extraction

After the extraction is completed, the extracted section data is added to the directory tree of the **[Data Management]** panel.

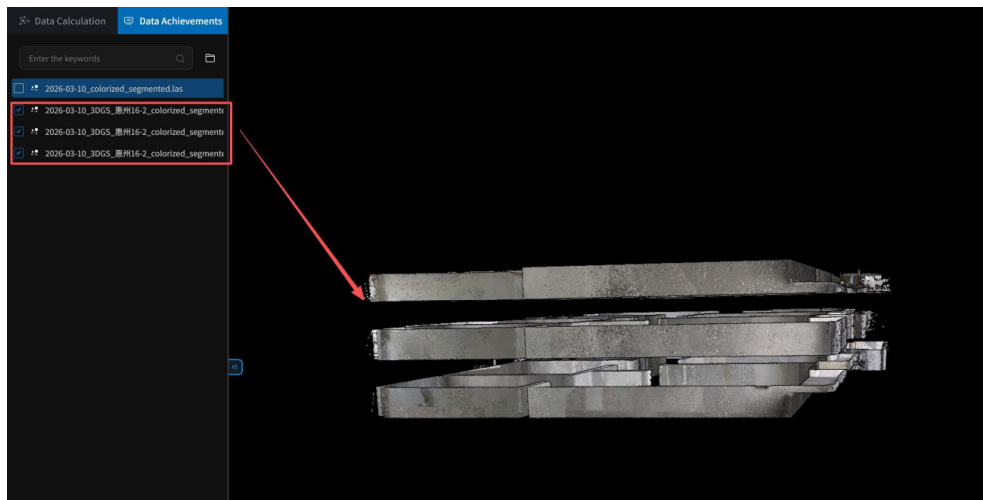


Fig 9-110 Section Data