

# Points

## Points (PT3)

The **Points** menu displays a list of all points in the site. In the **Points** menu you can create new points, edit existing points, and delete points.

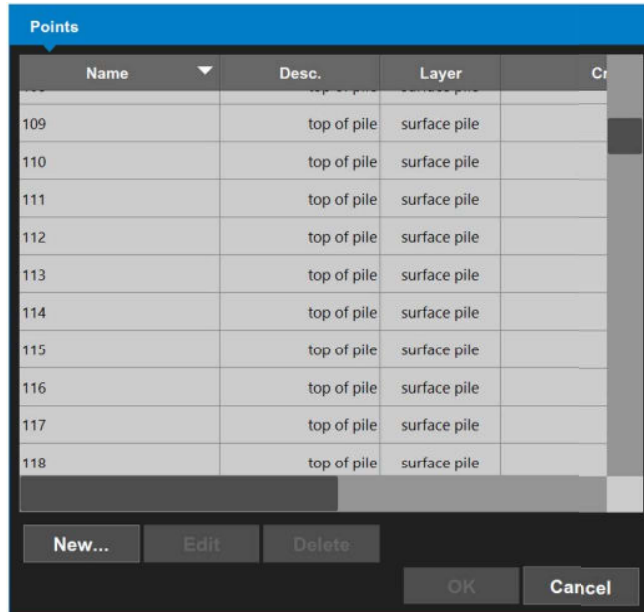


Figure 2-36: Points Menu

Use points to create TIN surfaces, and for navigation and stakeout. For more information, see “Create Triangulated Surfaces From a Topo Survey File” on page 2-32 and “Navigate to a Point” on page 4-5.

# Surfaces

## Surface File Types

- Flat Plane Surface/Sloping Plane Surface (PL3)
  - A planar (flat) surface with a 0% cross slope and mainfall. This surface is primarily used for building pads.
  - A sloping surface with cross slopes and mainfall based on a reference elevation.
- Crown Road Surface (RD3)
  - A crown road surface file contains a centerline with a defined width and cross slope.
- TIN Surface File (TN3)
  - A TIN surface represents a surface as a network of non-overlapping triangles. Within each triangle, the surface is represented by a plane. The triangles are made from a set of points called mass points.

## Create Flat Surface Files

1. Press the **Power** button on the display, then select **Data > Surfaces**. The **Project Surfaces** screen appears (Figure 2-37).
2. Select **New** to create a new flat or sloping surface file. The **Surface Name and Type** screen appears (Figure 2-37).
3. Enter a name for the surface file.
4. Select **Flat plane surface** and select **Next** (Figure 2-37). The **Flat Plane Surface** screen appears (Figure 2-38 on page 2-28).

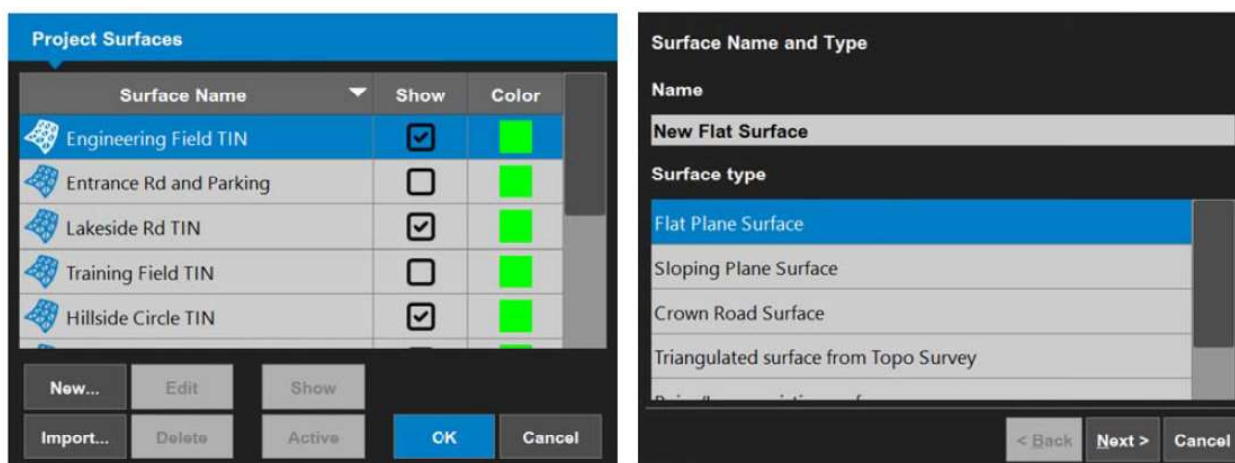


Figure 2-37: Surfaces Screen—New Flat Surface

5. Enter the reference point coordinate values in one of three ways:
  - Manually enter the reference point for **N**, **E**, and **Z**.
  - Place the machine in the desired location, and select the **Measure** button.
  - Select the **Points** button, and select a point.

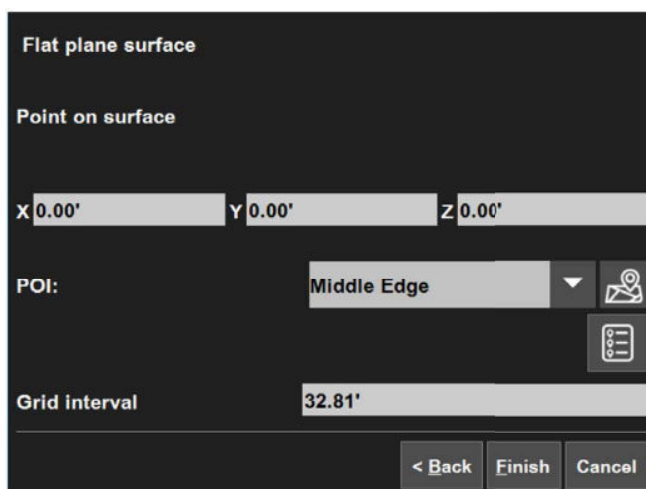
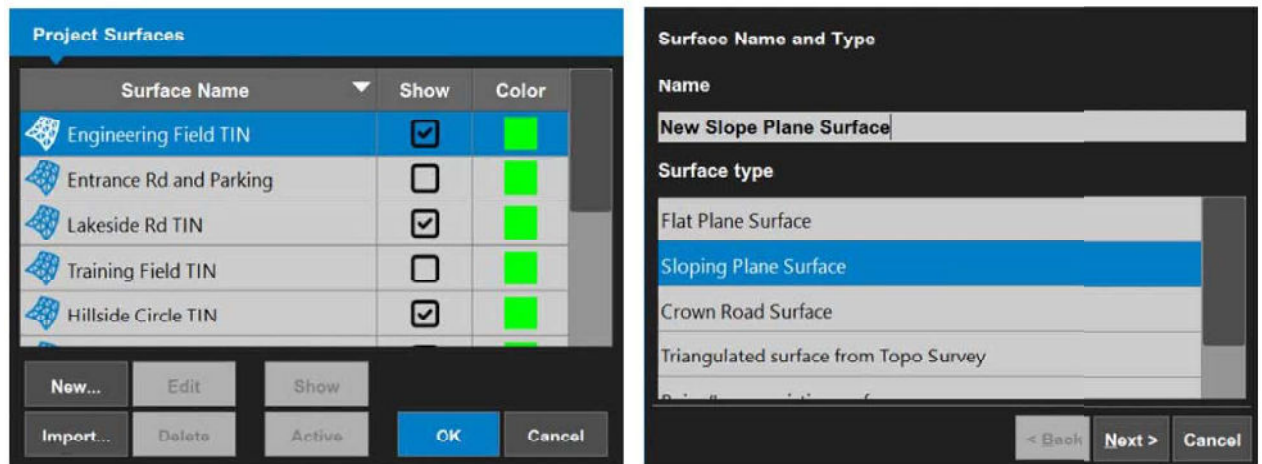


Figure 2-38: Flat Plane Surface Screen

6. Select **Finish** to return to the **Surfaces** screen.
7. Select **OK**.
8. At the prompt, select **Yes** to set the new surface as active, or select **No** to make it inactive. The main screen appears.

## Create Sloping Plane Surface

1. Press the **Power** button on the display, then select **Data > Surfaces**. The **Surfaces** screen appears (Figure 2-39 on page 2-29).
2. Select **Add** to create a new flat or sloping surface file. The **Surface Name and Type** screen appears (Figure 2-39 on page 2-29).
3. Enter a name for the surface file.
4. Select **Sloping plane surface** and select **Next** (Figure 2-39 on page 2-29).



**Figure 2-39: Surfaces Screen—New Slope Plane Surface**

5. On the **Sloping Plane Surface** screen (Figure 2-40), enter the direction and mainfall grade in one of three ways:
  - Enter the direction and grade manually.
  - Use the **Measure Points** button.
  - Select the **Points** button to select existing points for **A** and **B**.



### NOTE

For more information about entering direction and mainfall grade, see “Enter Direction and Mainfall Grade” on page 2-30.

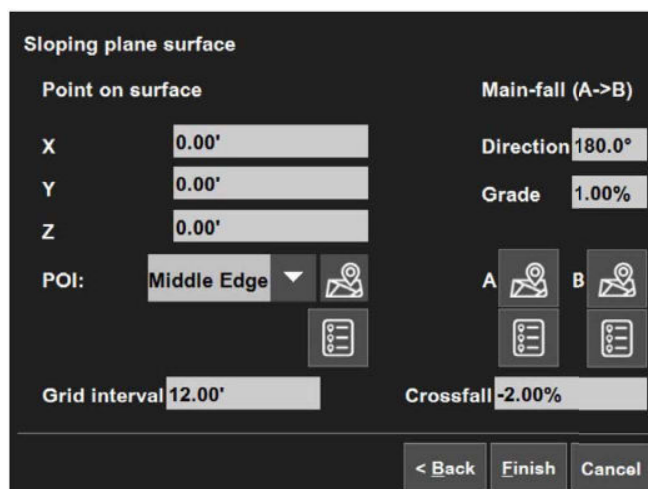


Figure 2-40: Sloping Plane Surface Screen

6. Select **Finish** to return to the **Surfaces** screen.
7. Select **OK**.
8. At the prompt, select **Yes** to set the new surface as active, or select **No** to make it inactive. The main screen appears.

## Enter Direction and Mainfall Grade

To use the **Measure Points** button, move the machine to the desired location and place the blade on the ground. When the cutting edge rests on the ground, do the following:

1. Select the **Measure Point** button for **A**. 3D-MC will measure a point (Figure 2-41).

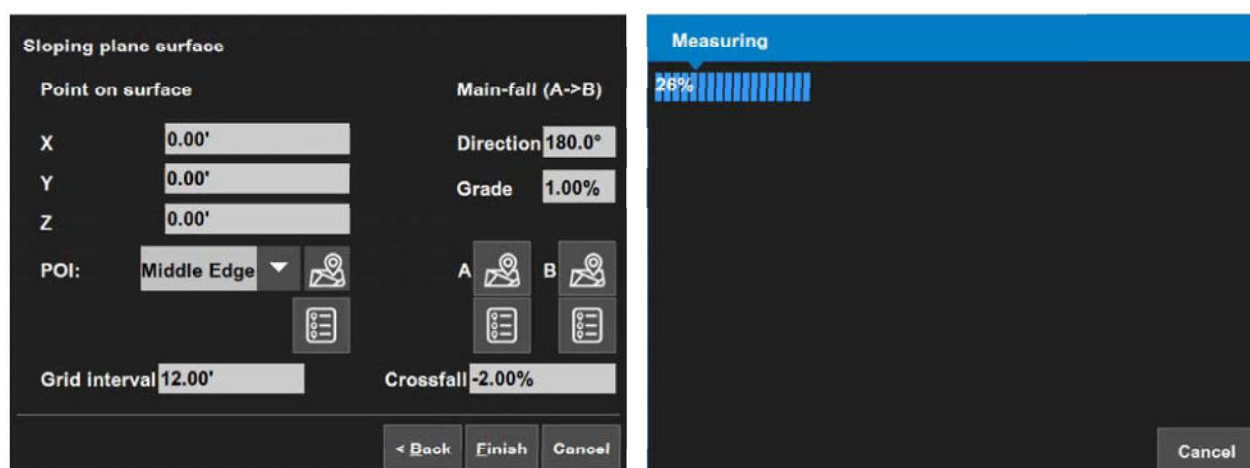


Figure 2-41: Measure Point A

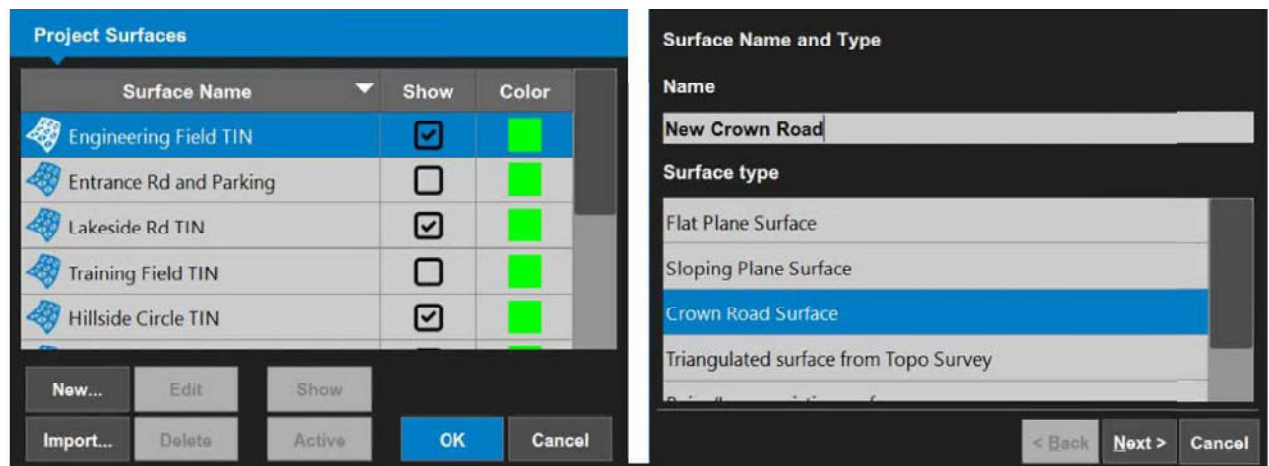
2. Move the machine to the next desired location and repeat Step 1, and select the **Measure Point** button for **B**.
3. Enter a **Grid interval**. The **Grid interval** keeps passes straight by setting the interval to the same length as the cutting edge.

4. Enter the desired **Crossfall Grade** and select **Finish**.
5. Select **OK**.
6. At the prompt, select **Yes** to set the new surface as active, or select **No** to make it inactive. The main screen appears.

## Create Crown Road Surface Files

Follow the steps in “Create Sloping Plane Surface” on page 2-29 and “Enter Direction and Mainfall Grade” on page 2-30.

1. Press the **Power** button on the display, then select **Data > Surfaces**.
2. Select **Add** on the **Project Surfaces** screen.
3. On the **Surface Name and Type** screen, enter a name.
4. Select **Crown road surface** (Figure 2-42 on page 2-31).



**Figure 2-42: Surfaces Screen—New Crown Road Surface**

5. Select **Next**. The **Crown Surface** screen appears (Figure 2-43).
6. On the **Crown Surface** screen (Figure ), enter the direction and mainfall grade in one of three ways.
  - Enter the direction and grade manually.
  - Use the **Measure Points** button.
  - Select the **Points** button to select existing points for **A** and **B**.

Figure 2-43: Crown Road Surface—Measure Point A

7. Enter the desired **Length** and **Width** of the road.
8. Enter the desired **Cross-fall from crown Grade**.



**NOTE**

Entering positive numbers creates a V-ditch.

9. Select **Finish** to return to the **Surfaces** screen.
10. Select **OK**.
11. At the prompt, select **Yes** to set the new surface as active, or select **No** to make it inactive. The main screen appears.

## Create Triangulated Surfaces From a Topo Survey File

1. Press the **Power** button on the display, then select **Data > Surfaces**.
2. Select **Add** on the **Surfaces** screen.
3. From the **Surface Name and Type** screen, enter a name, and select **Triangulated surface from topo survey** (Figure 2-44).

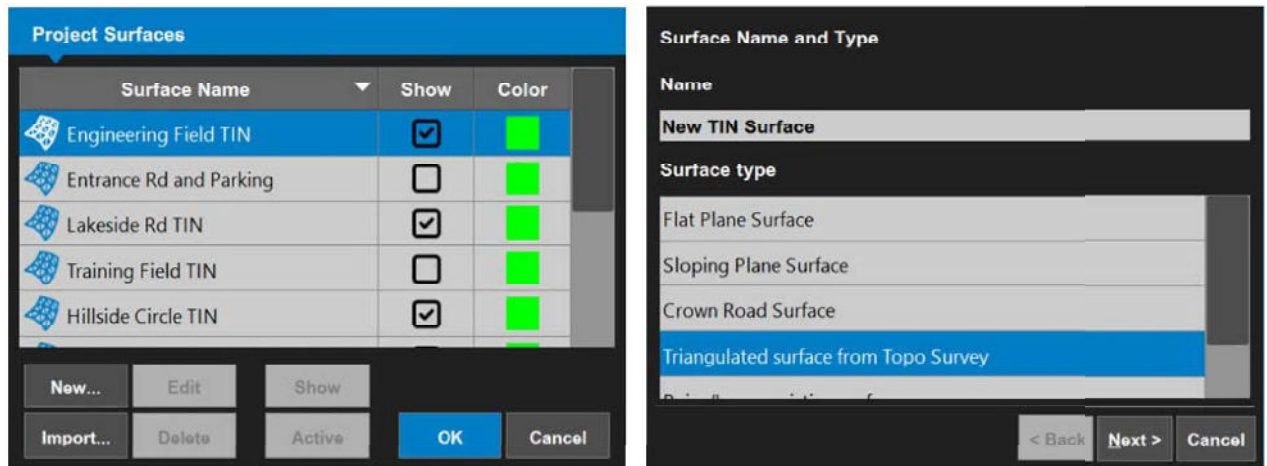


Figure 2-44: Surfaces Screen—New TIN Surface

4. Select **Next**. The **Triangulation of Topo Points** screen appears (Figure 2-45).
5. Select a layer containing the desired points from the **Use points from layer:** drop-down menu (Figure 2-45).

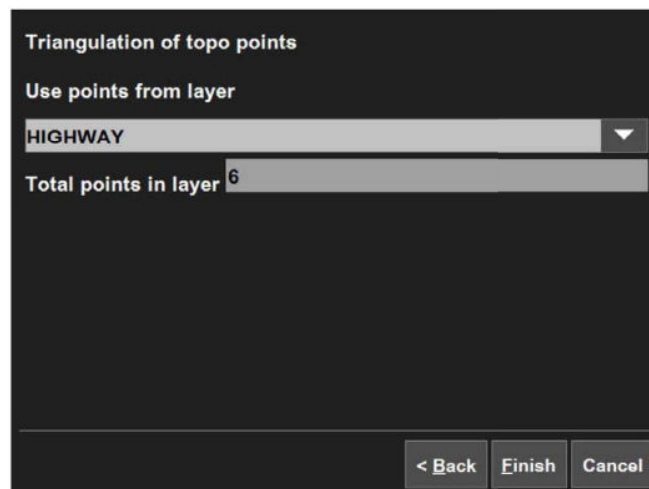
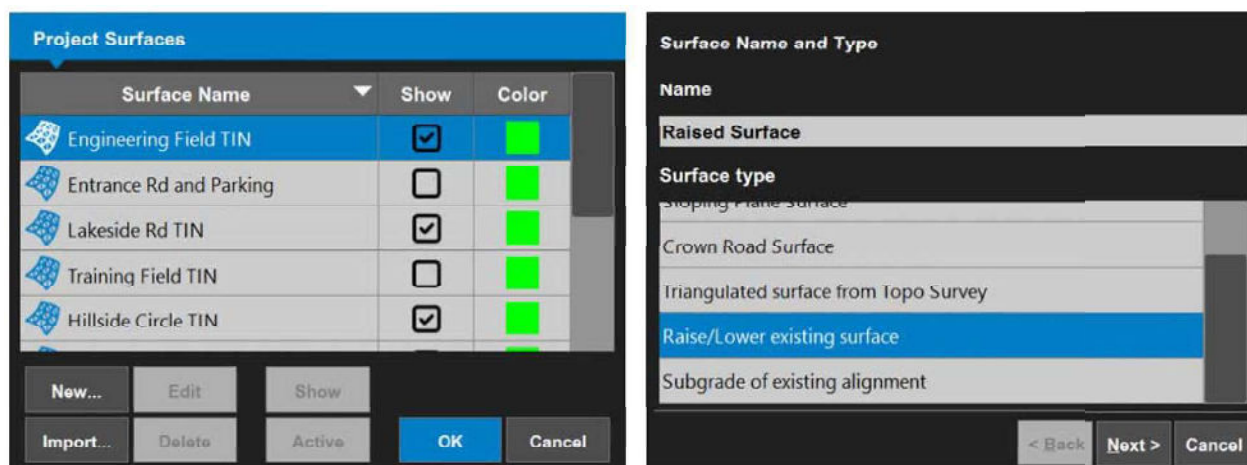


Figure 2-45: Select a Layer

6. Select **Finish** to return to the **Surfaces** screen.
7. Select **Ok**.
8. At the prompt, select **Yes** to set the new surface as active, or select **No** to make it inactive. The main screen appears.

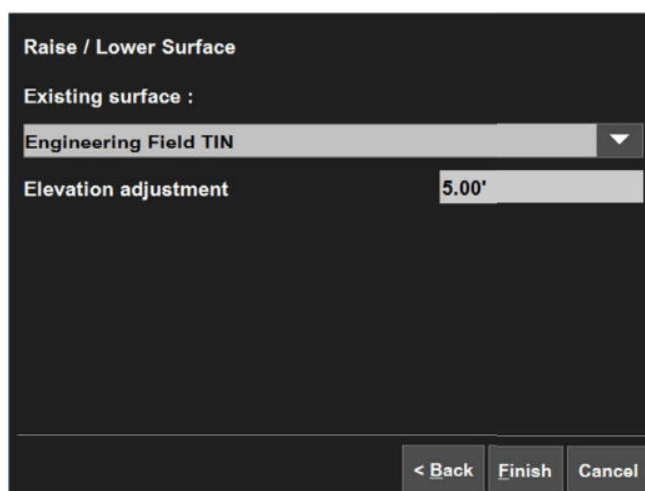
## Raise or Lower an Existing Surface

1. Press the **Power** button on the display, then select **Data > Surfaces**.
2. From the **Surfaces** screen, select **Add**.
3. From the **Surface Name and Type** screen, enter a name and select **Raise/Lower Existing Surface** (Figure 2-46).



**Figure 2-46: Surfaces Screen—Raise/Lower an Existing Surface**

4. Select **Next**.
5. On the **Raise/Lower Surface** screen (Figure 2-47), select an existing surface and enter an elevation adjustment value:
  - A positive number raises the grade relative to the working/reference surface, which is applied to the centerline of the working/reference surface.
  - A negative number lowers the sub-grade relative to the working/reference surface.



**Figure 2-47: Enter an Elevation Adjustment Value**

6. Select **Finish** to return to the **Surfaces** screen.
7. Select **OK**.
8. At the prompt, select **Yes** to set the new surface as active, or select **No** to make it inactive. The main screen appears.

## Sub-grade an Existing Alignment

1. Press the **Power** button on the display, then select **Data > Surfaces**.
2. From the **Surfaces** screen, select **Add**.
3. From the **Surface Name and Type** screen, enter a name and select **Subgrade of Existing Alignment** (Figure 2-48).

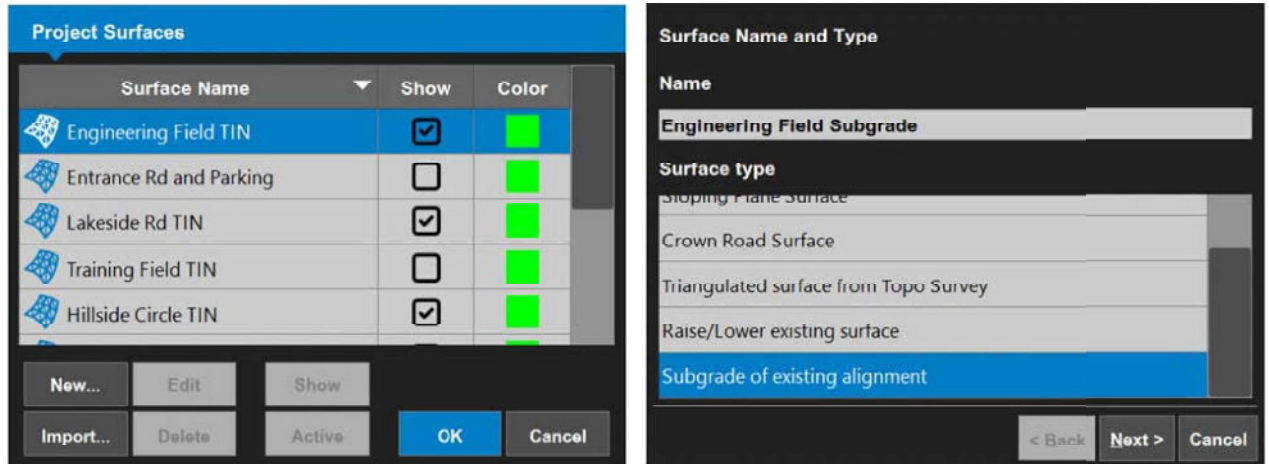


Figure 2-48: Surfaces Screen—Sub-grade Existing Alignment

4. Select **Next**. The **Sub-grade of Existing Alignment** screen appears (Figure 2-49).

Figure 2-49: Select or Enter the Subgrade Values

5. From the **Subgrade of Existing Alignment** screen, select a reference road surface. This will be used to create the surface (Figure 2-50 on page 2-36).

6. Enter value for the existing surface for **Elevation adjustment** (Figure on page 2-36):
  - A positive number raises the grade relative to the working/reference surface, which is applied to the centerline of the working/reference surface.
  - A negative number lowers the sub-grade relative to the working/reference surface, which is applied to the working/reference surface.
7. Select a **Grade** type:
  - **Manual** – if enabled, enter the percentage of the Left/Right side of the sub-grade element, which determines the slope for the left/right side of the machine or the road.
  - **Copy from** – if enabled, use the gradient (grade) of the reference cross-section element that matches the entered offset value (lateral offset from centerline). The left/right grade is copied from the existing road. Select an option for **Extend slope** (Figure 2-50).
  - **Vertical** – if selected, the cross section of the sub-grade stops at the same horizontal offset as the cross section of the reference surface.
  - **Continue** – if selected, the last element of both surfaces selected in the **Maximum extension** entry box is continued.
    - Use this option if there are more intersection points expected beyond the end of the cross section.

Subgrade of Existing Alignment		
DITCH Alignment		
Elevation adjustment 6.00'		
Grade	Left side	Right side
<input checked="" type="radio"/> Manual	2.00%	4.00%
<input type="radio"/> Copy from	0.00'	0.00'
Extend slope	Vertical	Vertical
Maximum extension 0.00'		
<input type="button" value=" &lt; Back"/> <input type="button" value=" Finish"/> <input type="button" value=" Cancel"/>		

**Figure 2-50: Select or Enter the Subgrade Values**

8. Select **Finish** to save the new surface file and return to the **Surfaces** screen.
9. Select **OK**.
10. At the prompt, select **Yes** to set the new surface as active, or select **No** to make it inactive. The main screen appears.