

VBS Geo



VBS4 24.1.1



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1. VBS Geo Overview

VBS Geo provides terrain modeling tools for editing and refining the base world data in VBS4. VBS Geo displays a 3D view of the world terrain where tools operate in a what you see is what you get (WYSIWYG) fashion. Terrain edits made with VBS Geo can be instantly seen at runtime.

NOTE

VBS Geo is only available in Prepare Mode.

VBS Geo can be used by terrain developers and administrators, providing the following features:

- Use tools to make terrain modifications:
 - Elevation tools to modify the elevation heightmap.
 - Model tools to place and edit models.
 - Building tools to place and edit buildings using custom building footprints.
 - Road tools to place and edit roads.
 - Surface tools to edit terrain surfaces.
 - Water tools to place and edit lakes and rivers.
- Connect directly with VBS World Server to upload and share terrain data and modifications:
 - Upload backdrop imagery to stream and reference while making terrain edits.
 - Import your own geospatial data files.
 - Save terrain edits directly within each Battlespace.

WARNING

Terrain edits in VBS Geo are Battlespace-specific and are applied in addition to data added to the Whole-Earth Terrain. Make whole-earth terrain changes prior to VBS Geo edits. For more information, see Managing the Whole-Earth Terrain in the VBS World Server Manual.

A typical terrain workflow starts with large scale edits, and then focuses on smaller local detail.

Follow this process:

1. Access VBS Geo to make terrain edits for your Battlespace.

In the Battlespaces List, select your Battlespace, highlight **Geo** in the Battlespace Functions Panel, and click **Create**.

The [VBS Geo User Interface \(on page 38\)](#) opens.

2. Upload backdrop imagery, if necessary, to use as a reference during modeling.

For more information, see [Adding Backdrop Imagery \(on page 52\)](#).

3. Import your own geospatial data files to quickly refine the terrain area.

For more information, see [Data Import in the VBS World Server Manual](#).

4. Make adjustments to the terrain elevation.

Select **Elevation** mode and click the **Elevation** tool you want to use:

- Brush tool for freehand elevation changes.
- Area tool for areal elevation changes.
- Line tool for linear elevation changes.
- Revert tool to revert the terrain elevation back to the underlying dataset.

For more information, see [Editing Terrain Elevation \(on page 55\)](#).

5. Populate the terrain with models.

Select **Model** mode and click the **Model** tool you want to use:

- Point tool for placing and editing individual models.
- Line tool for placing and editing linear arrangements of models.
- Edit tool for adjusting placed models.
- Eraser tool for removing placed and inset models.
- Built-in model library with thousands of high-quality models.

For more information, see [Placing and Editing Models \(on page 68\)](#).

6. Populate the terrain with buildings.

Select **Building** mode and click the **Building** tool you want to use:

- Draw custom building footprints.
- Modify the building type.
- Select the number of floors and roof color.
- Create courtyard spaces within building footprints.
- Modify existing procedural and inset buildings.

For more information, see [Placing and Editing Buildings \(on page 102\)](#).

7. Refine the road network in the terrain.

Select **Road** mode and click the **Road** tool you want to use:

- Place tool for drawing new roads.
- Edit tool for changing existing roads.
- Library of preconfigured road types.
- Automatic intersection creation.

For more information, see [Placing and Editing Roads \(on page 112\)](#).

8. Edit terrain surfaces.

Select **Surface** mode and click the **Surface** tool you want to use:

- Brush tool for freehand surface changes.
- Area tool for areal surface changes.
- Line tool for linear surface changes.
- Revert tool to revert the terrain surface back to the underlying dataset.
- Set of preconfigured natural and urban surfaces.

For more information, see [Editing Terrain Surfaces \(on page 154\)](#).

9. Refine the lakes and rivers in the terrain.

Select **Water** mode and click the **Water** tool you want to use:

- Place tool for drawing new lakes and rivers
- Edit tool for changing existing lakes and rivers and their islands
- Island tool for adding islands within lakes and rivers

For more information, see [Placing and Editing Water \(on page 172\)](#).

10. While editing, undo and redo terrain changes with **Ctrl + Z** and **Ctrl + Y** or with the History Panel.

For more information, see [Editing Terrain History \(on page 182\)](#).

11. Save and preview edits.

Click the **Main Menu** in the VBS4 Toolbar, and under **Battlespaces** select one of the following options:

- **Save** - Saves changes into the currently open Battlespace.
- **Save As** - Creates a new Battlespace, or overwrites the existing one, based on the name you enter in the dialog.

Place at least one playable unit using VBS Editor and preview your terrain edits in the simulation by pressing the **Preview** button in the VBS4 Toolbar.

12. Include your edits in future Battlespaces by importing the saved VBS Geo Project.

For more information, see [Importing VBS Geo Projects \(on page 184\)](#).

WARNING

The options save the current state of the Tactical Plan in VBS Plan, the terrain Geo Project edits in VBS Geo, and the Mission entities in VBS Editor.

For a demonstration of some VBS Geo functionality in action, see the following tutorials:

- **VBS4 Instructor Series - Intro to Geo Mode** at <https://youtu.be/YJ0IV6nkJXM>.

NOTE

Videos may not show the latest versions of the features they demonstrate.

- On the Bohemia Interactive Simulations [Customer Portal](#) (<https://bisimulations.com/support/customer-portal>), see **Watch > VBS4 Tutorials > In-depth Introduction to VBS Geo**.

1.1 VBS Geo Improvements 24.1

VBS4 includes the following improvements to VBS Geo in this release:

- [General Improvements \(below\)](#)
- [Geo Project Version \(below\)](#)
- [Model Placement Improvements \(below\)](#)
- [Building Placement Improvements \(below\)](#)
- [Road Improvements \(on the next page\)](#)

1.1.1 General Improvements

- The **Library** and **Tool** dialogs (e.g., **Model Library** and **Model Tool Options**) have been reordered in the user interface so that the **Library** dialog is at the top.

1.1.2 Geo Project Version

- The Geo Project version used in VBS Geo 24.1 has changed to Geo Project version 1.4 to support expanded 128-bit object IDs. As a result, VBS Geo 24.1 projects are backwards incompatible with earlier versions of VBS Geo. For more information, see [Geo Project Versioning \(on page 34\)](#).

1.1.3 Model Placement Improvements

- Fifty-one new Linear Presets have been added to the **Linear Model Placement Library**. The majority of these new linears are new types of fences and walls.
- New search refinement operators have been added to VBS Geo to allow for specific searches of the **Model Library**.

1.1.4 Building Placement Improvements

- VBS Geo now includes a new tool to create and edit extruded buildings. This tool allows users to place building footprints that extrude to quickly generate free-form buildings. Extruded buildings have automatic visual templates based on the size and height, and also includes the ability to set their attributes. For more information, see [Building Editor \(on page 15\)](#).

1.1.5 Road Improvements

- The VBS Geo Road Editor now allows for roads to be converted from surface-bound roads into bridges and raised road decks. The roads can be converted into bridges and vice versa via the **Bridge** tool toggle button at the top of the **Road** mode interface for both **Road Place** and **Road Edit** tools. For more information, see [Bridges \(on page 145\)](#).
- The VBS Geo Road Editor Library now allows for the creation of custom road presets. These are user-created and share lists of attributes that define a road's visual and functional use. Custom road presets can be created from both new and existing roads. These presets can then be used to create new roads with the attributes used in the custom road preset. Additionally road attribution can be copied from one road (**Ctrl + C** or **Copy** in the context menu) and pasted onto another (**Ctrl + Shift + V** or **Paste Attributes** in the context menu).

1.1.6 Building Editor

VBS Geo now includes a new tool to create and edit extruded buildings. This tool allows users to place building footprints that extrude to quickly generate free-form buildings. Extruded buildings have automatic visual templates based on the size and height, and also includes the ability to set their attributes.

The **Building Tools** can also modify procedural buildings generated from World Data, and some buildings placed in Insets.

The Building Editor features a simple user interface to place the building footprint, including right-angle snapping, select the building model, and then specify attributes such as the number of floors and the roof color.

VBS Geo includes a Building Library with a variety of different building types from around the world. Alternatively, use Automatic to select an appropriate building for the location of your Battlespace.

Buildings can further be customized by using Courtyards to create cut-out shapes in the building footprint.

For more information, see [Placing and Editing Buildings \(on page 102\)](#).

Image-1: View of San Francisco showing region appropriate buildings



1.2 VBS Geo Improvements 23.2

VBS4 includes the following improvements to VBS Geo in this release:

- [General Improvements \(below\)](#)
- [Elevation Editing Improvements \(on the next page\)](#)
- [Model Placement Improvements \(on page 18\)](#)
- [Road Improvements \(on page 18\)](#)
- [Surface Improvements \(on page 24\)](#)

1.2.1 General Improvements

This section details the improvements to the general functionality in VBS Geo, including:

- [Vector Improvements \(below\)](#)
- [Geo Project Version \(on the next page\)](#)

1.2.1.1 Vector Improvements

Vector lines have been updated to provide improved interaction and editing.

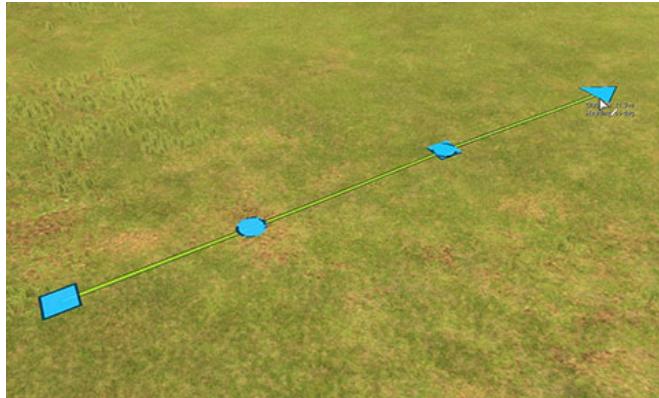
- [Vector Indicators \(below\)](#)
- [Vector Rotation \(on the next page\)](#)

For more information about these changes, see a vector tool topic, such as [Placing and Editing Roads \(on page 112\)](#).

1.2.1.1.1 Vector Indicators

Vector lines display start and end points that also indicate a direction.

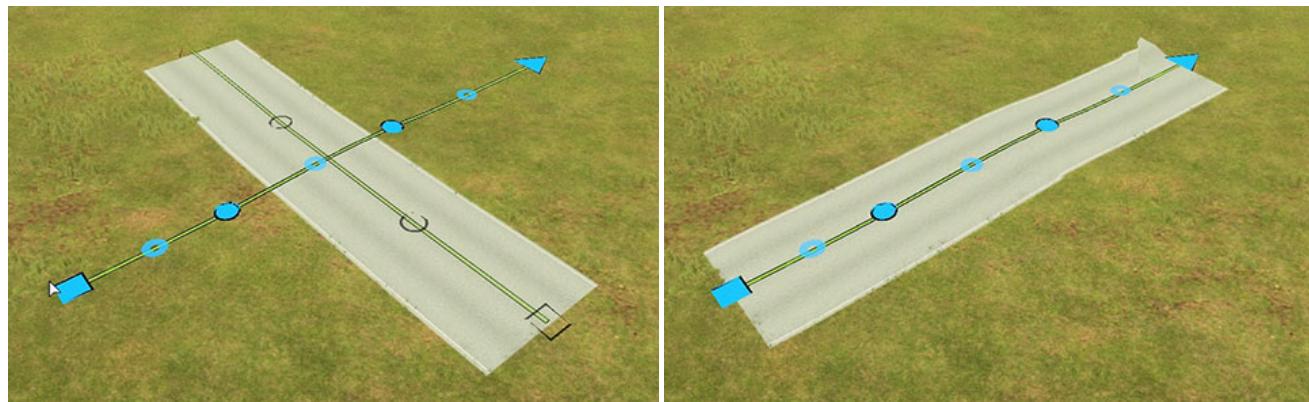
When a line vector-based tool is in use, such as a road, click in the terrain to place a square indicator at the start point, with a triangle indicator at the end point that tracks the mouse cursor.



1.2.1.1.2 Vector Rotation

Vectors can now be rotated regardless of lines or areas.

Hover over the selected vector, hold **Shift** and the right mouse button, and then move the mouse right or left to rotate the vector. Release the **Shift** key and right mouse button to set the vector in place.



1.2.1.2 Geo Project Version

The Geo Project Version used in VBS4 23.2 has changed to Geo Project version 1.3, to support a change to the Geo Project extension and for new roads in VBS Geo 23.2. As a result, VBS4 23.2 projects are backwards incompatible with earlier versions of VBS4.

For more information, see [Geo Project Versioning \(on page 34\)](#).

1.2.2 Elevation Editing Improvements

Elevation editing and its interaction with Roads and Water have been refined and improved.

Both road and water editing feature improved handling of existing elevation edits. They also respond better to new elevation changes placed on them. For example, roads with flatten enabled should no longer become bumpy when placed over flattened terrain.

For more information, see [Editing Terrain Elevation \(on page 55\)](#).

1.2.3 Model Placement Improvements

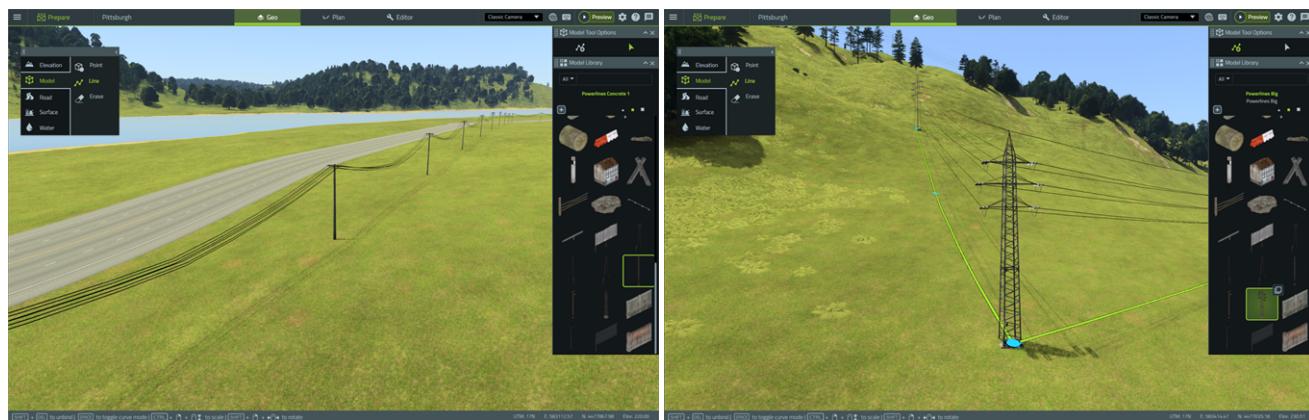
This section details the improvements to the Model Placement functionality in VBS Geo, including:

- [Powerlines \(below\)](#)

1.2.3.1 Powerlines

This release adds several power lines to VBS4. Add power lines in the same way as other linear models with the exception that they are not customizable.

For more information, see [Model Line Placement \(on page 78\)](#).



1.2.4 Road Improvements

VBS Geo includes significant improvements to road placement and editing, including:

- [New Roads in VBS Geo 23.2 \(on the next page\)](#)
- [Road Presets \(on page 20\)](#)
- [Road Customization \(on page 21\)](#)
- [Road Behavior \(on page 22\)](#)
- [3D Road Elevation Editing \(on page 23\)](#)
- [AI Debug \(on page 24\)](#)

For more information about using these changes, see [Placing and Editing Roads \(on page 112\)](#).

1.2.4.1 New Roads in VBS Geo 23.2

VBS Geo includes a major update to the road tools that allow you to create and edit the new road system introduced in VBS4 23.2. The improvements in this release allow for greater road customization with distinct surface textures, lane markings, and colors to better align road appearance based on regional differences.

The old road types from previous versions of VBS4 are now marked as **Legacy** roads. To upgrade a **Legacy** road to the new road system introduced in VBS4 23.2, select the road in the **Road Edit** tool and change the road texture to a new one. Once the road texture has been updated, the other road customization settings are available to edit.

VBS Geo 23.2 also includes options to specify multiple lanes in either direction.

- Select the number of lanes for each road direction and the lane width.

AI-controlled vehicles created with the Civilian AI, respect vehicle lanes, and change lanes automatically based on traffic conditions and path planning.



1.2.4.2 Road Presets

VBS Geo 23.2 includes a new set of presets to support roads with multiple lanes, organized by type, with filter and search options:

Paved

- Urban Street
- Urban Street, Heavy Wear
- Urban Street, Sidewalks
- Urban Street, Sidewalks, Heavy Wear
- Rural Road Rural Road, Heavy Wear
- Concrete Road
- Paneled Concrete Road

Unpaved

- Field Road
- Field Road, Tracks
- Sand Road
- Gravel Road
- Dirt Path
- Rock Path
- Sand Path

Highway

- Divided Highway
- Divided Highway, Light Wear
- Divided Highway, Heavy Wear
- Divided Highway, Shouldered
- Divided Highway, Shouldered, Light Wear
- Divided Highway, Shouldered, Heavy Wear
- Undivided Highway
- Undivided Highway, Light Wear
- Undivided Highway, Heavy Wear
- Undivided Highway, Shouldered
- Undivided Highway, Shouldered, Light Wear
- Undivided Highway, Shouldered, Heavy Wear

Other

- Railway
- Runway

NOTE

These replace the previous presets which are no longer available for selection.

For more information, see [Road Presets \(on page 138\)](#).

1.2.4.3 Road Customization

VBS Geo includes various options to customize the appearance of roads:

- Select the primary surface texture of the road.
- Select the road surface color and brightness.
- Select the width and texture of road edges.

i NOTE

Textures on existing roads that do not support roads with multiple lanes are shown as Legacy. All other road properties are disabled until the texture is changed.

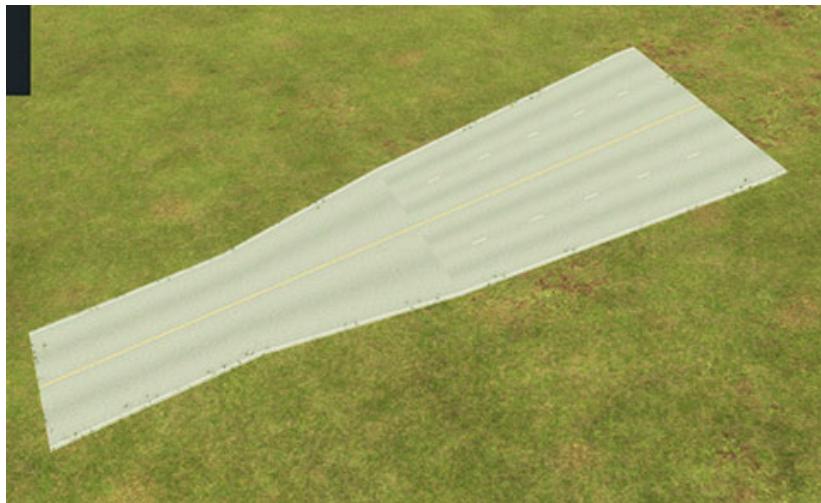
- Select road markings, including individual selection of markings such as centerlines and dividers.
- Select specific markings for road intersections and stop markings.



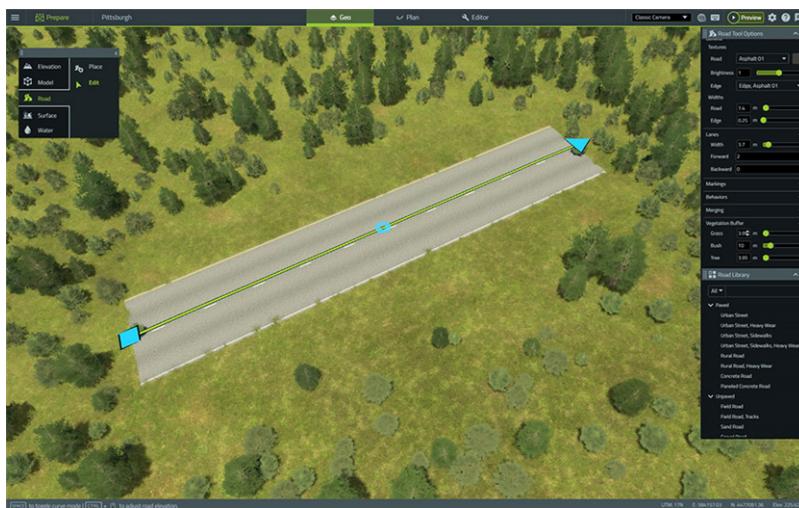
1.2.4.4 Road Behavior

VBS Geo includes new road behaviors to control its appearance and interaction with terrain.

- Select road behaviors, such as terrain leveling and rounded corners.
- Select merge options to widen or narrow a road where it meets another road of the same type with a different width.



- Select Vegetation Buffers to remove grass, bushes, and trees from the edges of roads.



1.2.4.5 3D Road Elevation Editing

VBS Geo enables rapid elevation changes to roads or specific nodes on a road linear. Hover over a road or a road node, hold **Ctrl**, and then use the mouse wheel.

For more information, see [Road Elevation \(on page 126\)](#).

Image-2: Positive and Negative Elevation Changes for a Road Node

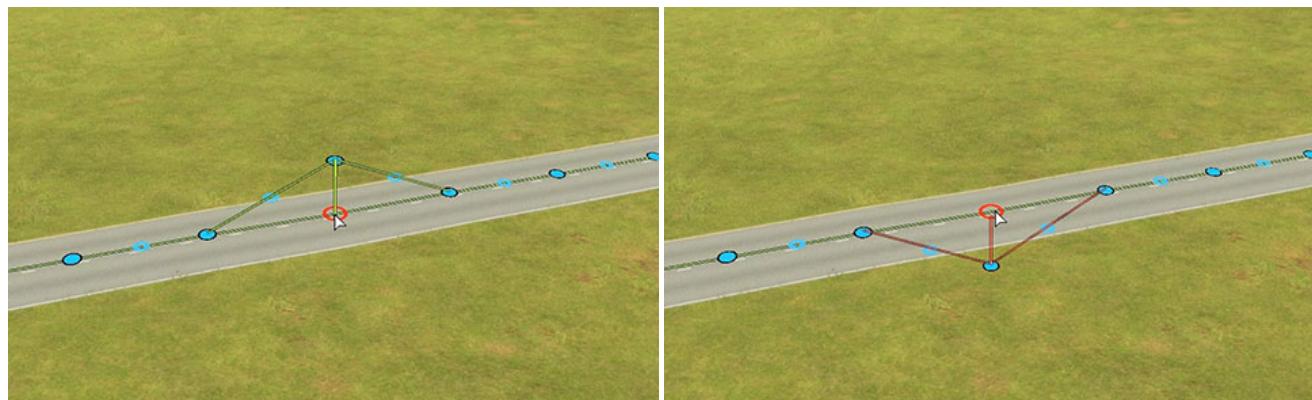
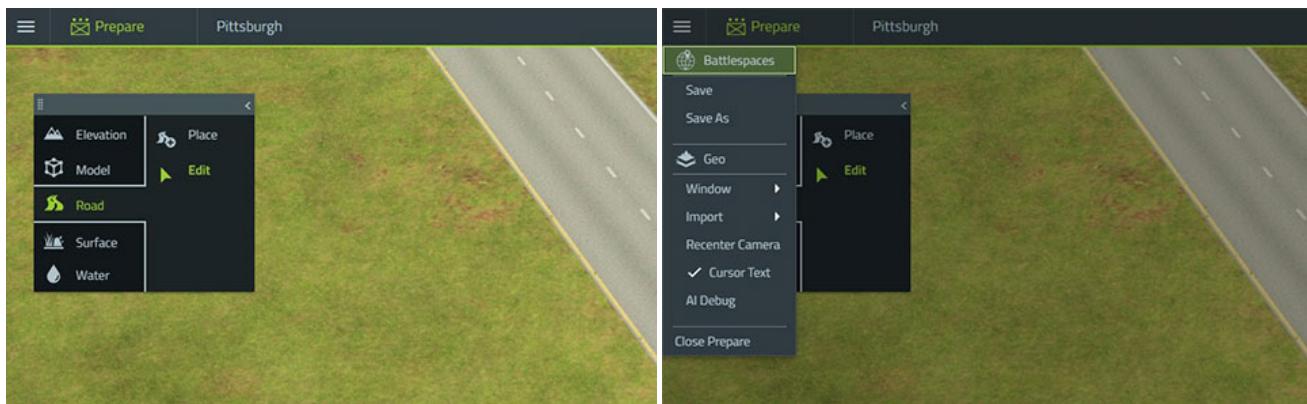


Image-3: Positive and Negative Elevation Changes for a Road



1.2.4.6 AI Debug

The path that the AI-driven entities take on roads can now be displayed with the new **AI Debug** option in the **Main Menu**.



All roads display a faint green and yellow outline and arrows that indicate the boundaries and direction that any AI entities follow.



For more information, see [VBS4 Main Menu for VBS Geo \(on page 40\)](#).

1.2.5 Surface Improvements

Three new surfaces have been added under a new **Other** category in the **Surface** selection menu. These classes are specifically for terrain insets, like Hohenfels, that use a soil and image blending technique. Most VBS Geo surface edits should continue to use the surfaces available under the **Natural** and **Urban** categories.

For more information, see [Editing Terrain Surfaces \(on page 154\)](#).

1.3 VBS Geo Improvements 23.1

VBS4 includes the following improvements to VBS Geo in this release:

- [Geo Project Version \(below\)](#)

1.3.1 Geo Project Version

The Geo Project version used in VBS Geo 23.1 has changed to Geo Project version 1.2. As a result, VBS Geo 23.1 projects are backwards incompatible with earlier versions of VBS Geo.

For more information, see [Geo Project Versioning \(on page 34\)](#).

1.4 VBS Geo Improvements 22.2

VBS4 includes the following improvements to VBS Geo in this release:

- [User Interface \(below\)](#)

1.4.1 User Interface

- Geo model highlighting, selection, and controls have been updated to support more efficient and informative editing.
 - The box selection of models has been updated to now highlight models that will be part of the selection area.
 - **Ctrl** + box selection will now toggle the selection.
 - **Shift** + box selection will only add models to the selection.
- In VBS Geo 22.2, the behavior of how models react to terrain elevation changes has been improved. Models may take a few seconds to react, then they will update after the delay.
- The elevation displayed in the VBS Geo **Status Bar** has been changed from an Ellipsoid value to Geoid, as to match other VBS4 elevation reporting.

1.5 VBS Geo Improvements 22.1

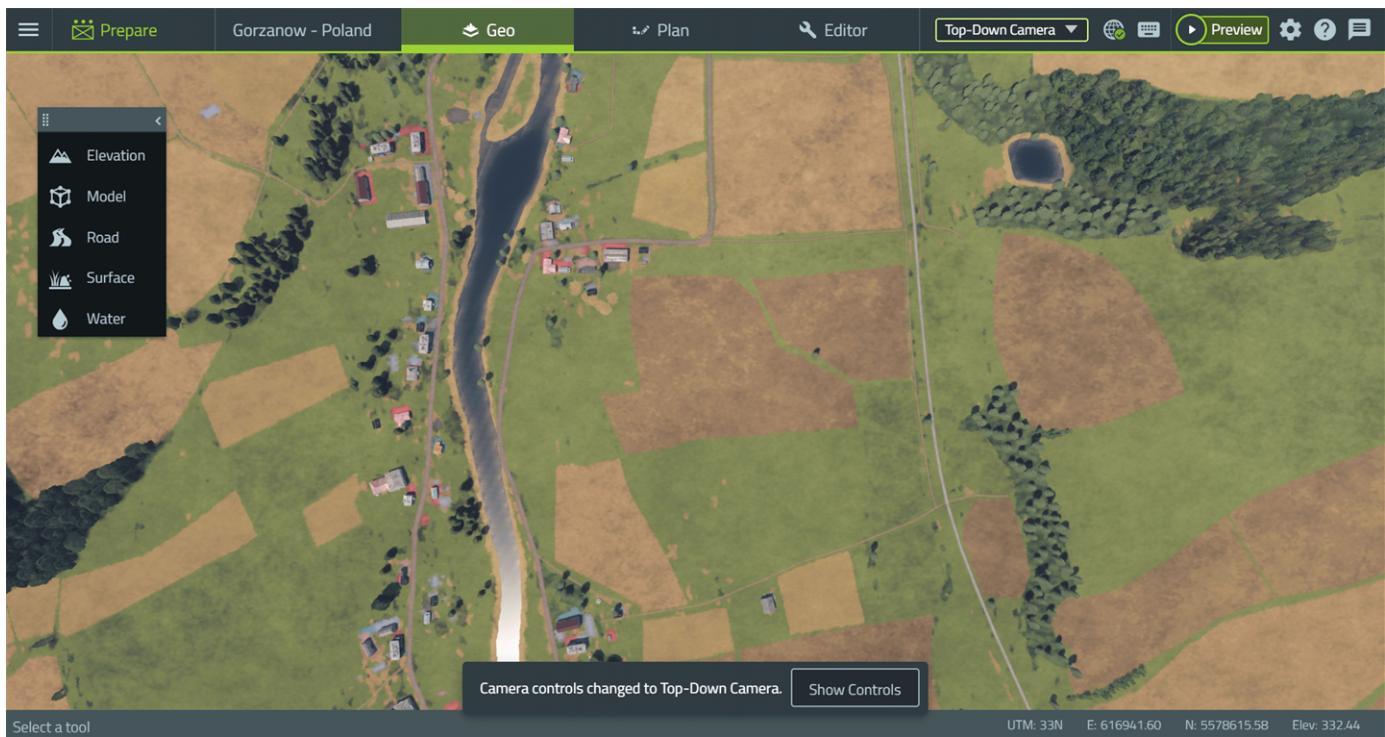
VBS4 includes the following improvements to VBS Geo in this release:

- [Top-Down Camera \(below\)](#)
- [Ground Cutting and Vegetation Removal \(on the next page\)](#)
- [Geo Project Compression \(on the next page\)](#)
- [Error Messages \(on the next page\)](#)

1.5.1 Top-Down Camera

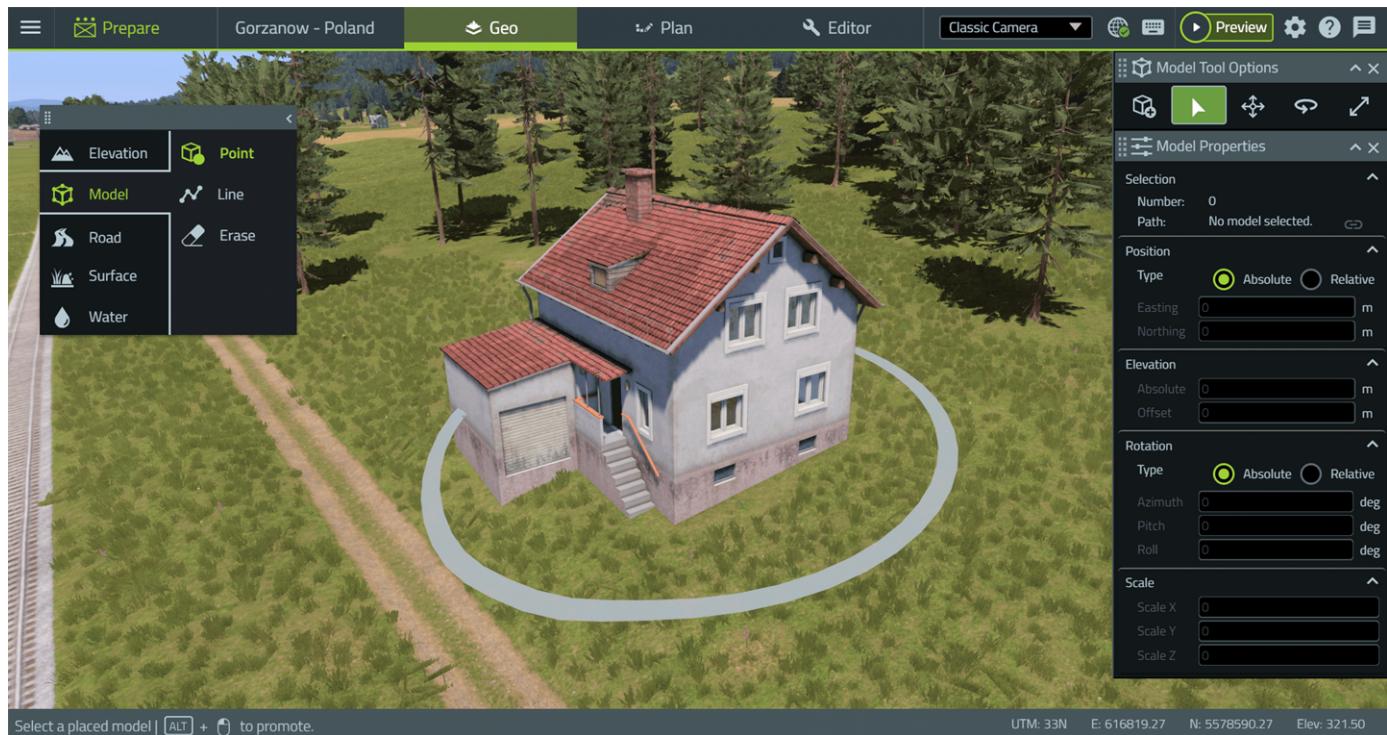
This release introduces a top-down camera specific to VBS Geo with locked orientation to always look directly down at the surface.

For more information, see [Camera Controls \(on page 47\)](#).



1.5.2 Ground Cutting and Vegetation Removal

In earlier releases, VBS Geo placed models would not automatically clear away biome vegetation and would not cut into the terrain for models that contain underground structures. In the VBS4 22.1 release, this dual limitation has been resolved. Shortly after being placed, vegetation and ground will be automatically removed, causing all VBS Geo-placed objects to behave properly both in and out of VBS Geo.



1.5.3 Geo Project Compression

Geo Projects are now automatically compressed as they are uploaded to the VBS World Server. This improves performance and transfer times for uploading the Geo Project as well as sharing the Geo Project to other connected clients. However, this does result in backwards-incompatibility between VBS4 22.1 and earlier versions.

For more information, see [Geo Project Versioning \(on page 34\)](#).

1.5.4 Error Messages

Errors now appear in VBS Geo whenever it is unable to import data to the VBS World Server or load data from the VBS World Server.

1.6 VBS Geo Improvements 21.1

The following features and improvements have been introduced to VBS Geo as part of this release:

- [User Interface \(below\)](#)
- [Elevation \(on the next page\)](#)
- [Model Placement \(on the next page\)](#)
- [Roads \(on the next page\)](#)
- [Surface Editing \(on page 31\)](#)
- [Water Editing \(on page 31\)](#)
- [VBS4 Integration \(on page 31\)](#)

WARNING

Changes to the Geopackage format in this release make Battlespaces created in VBS4 21.1.x backwards incompatible with VBS4 20.1.x.

Battlespaces created in VBS4 20.1.x require editing to restore Elevation and Surface edits for use in VBS4 21.1.x.

For more information, see [Updating VBS4 20.1.x Battlespaces to VBS4 21.1.x \(on page 37\)](#).

1.6.1 User Interface

- Drop-down boxes now automatically scroll to the previously selected item to enhance ease of use.
- Priority loading for libraries has been added to significantly shorten the load time of the preview images based on the current selection or filter.
- Notification Dialogs have been added to warn users when the Geo Project file is locked during either save or load.
- Added status bar tooltip mouse-overs for hints to allow for better readability and user experience in smaller window sizes.
- Updated various status bar hints where the wording was incorrect or imprecise or reduced the number of hints shown for familiar shortcuts.
- Helper shapes of various Geo vector tools now follow water surfaces instead of going under it.
- Fixed various inconsistencies, undocking issues, and unpleasant transitions in various dialogs
- Fixed missing tooltips across the Geo interface.

1.6.2 Elevation

- Saving and Loading of elevation data has been changed to allow for faster saving and loading time as well as *time-to-execution*.
- Fixed rare or potential deadlocks that were caused by the loading of Geo elevation changes during execution startup.
- Context menus now correctly reflect the available and functional choices for the user.

1.6.3 Model Placement

- Support for merge, split, and invert has been added for line placement vectors.
- Ability to tweak models position / rotation / scale using the keyboard in Models - Point - Edit mode has been added.
- Ability to change elevation offset pre-placement of a model in Models - Point - Place mode has been added.
- Properties in Models - Point - Edit mode now always switch to *Absolute* values if the user selects a single model after multiple models have been selected.
- Context menus now correctly reflect the available and functional choices for the user.
- Fixed rare or potential deadlocks that were caused by the loading of Geo placed models during execution startup.
- Fixed a crash that would occur if a Geo project was opened and models that were part of groups were not part of the build.
- Scale limit of 10 should now be correctly applied through all user actions.
- Fixed an issue where copy pasted models did not keep their properties when added to the clipboard.

1.6.4 Roads

- Support for merge, split, and invert has been added for Road vectors.
- Context menus now correctly reflect the available and functional choices for the user.
- Fixed an issue where the user was not able start placing roads after finishing the previous one in Road - Place mode.
- Fixed a duplicated road creation when the user auto-generated a crossroads by overlapping a new road over an existing one in either global or inset data.
- Fixed an issue where road placement could sometime be enabled in the Editor.
- Fixed an issue where the road style placed did not match the one selected in the road library.

1.6.5 Surface Editing

- Saving and Loading of surface data has been changed to allow for faster saving and loading time as well as *time-to-execution*.
- Surfaces are now editable around any water area.
- Context menus now correctly reflect the available and functional choices for the user.

1.6.6 Water Editing

- New water editing mode has been added to VBS Geo. This tool can be used to add new or edit existing lakes and rivers.

For more information, see [Placing and Editing Water \(on page 172\)](#).

1.6.7 VBS4 Integration

- The VBS Geo project version has been introduced to the header of the `.gpkg` file containing version of the project and version of the GeoCore that saved it.
- VBS Geo now logs its output to the `\Log\Geo.log` file in the VBS4 installation folder.
- VBS Geo projects from version 20.1 are backed up in their original form into `\Documents\Geo\` folder when saving to the newer version.

For more information, see [Geo Project Versioning \(on page 34\)](#).

- VBS Geo projects are always saved in the as `geoproject.gpkg` in:
`\Documents\Battlespaces\Battlespace_Name\`

Older project Geopackages are renamed automatically on load / save.

1.7 VBS Geo Improvements 20.1

The following features and improvements have been introduced to VBS Geo as part of this release:

- [User Interface \(below\)](#)
- [Elevation \(below\)](#)
- [Model Placement \(below\)](#)
- [Roads \(on the next page\)](#)
- [Surface Editing \(on the next page\)](#)
- [VBS4 Integration \(on the next page\)](#)

1.7.1 User Interface

- Flickering in the helper circle and preview vectors while using the **Curve** mode has been heavily reduced.
- Flickering in the tool brush and model selection rings has been heavily reduced.
- Clicking in and out of the text field in the **Add Backdrop Image** dialog no longer clears any warning messages displayed in the dialog.

1.7.2 Elevation

- The values of the **Smooth** and **Offset** effects in the **Elevation Brush**'s **Strength** option are no longer tied together.
- The **Elevation Line** tool's **Flatten** effect can now flatten to elevation below 0.

1.7.3 Model Placement

- The **Line Placement Style Editor** has been added to the **Model Line** tool options. This tool can be used to create user-defined model line styles. For more information, see [Creating, Editing, and Managing Model Line Styles \(on page 86\)](#).
- The **Skew To Slope** option has been added to the **Linear Model Properties** panel. This option is used to place models along the drawn linear feature and adjusts their skew to the underlying elevation.
- The **Auto-adjust Vector Length** option has been added to the **Linear Model Properties** panel. This option causes drawn vectors to be adjusted to fit the contents of a model line style.
- A search bar has been added to the **Linear Model Properties** panel for quickly finding default and user-made model styles.
- Linear model features can now be cut, copied, and pasted using the **Model** mode's **Line Edit** tool.

- Default model line styles, such as fences and walls, have been updated to use the **Skew To Slope** option when applicable.
- The **Absolute** elevation of a model can now be set below a negative offset value in the **Model Properties** panel.
- Models edited with the **Rotation** gizmo correctly resnap to the terrain based on their offset value.
- A bug was fixed which caused the **Curve** mode to be disabled after placing a single curve with the **Model Line** tool.
- A bug was fixed that caused VBS4 to freeze or crash to the desktop when drawing primitives or selecting a large number of models.
- A bug was fixed which caused VBS4 to freeze if a nonexistent model was defined in a model line style.

1.7.4 Roads

- Roads can now be cut, copied, and pasted in **Road Edit** mode.
- New City Road variants were added to the Road Presets.
- When placing roads, roads are now highlighted when multiple roads cross over each other to make road snapping and crossroad creation easier.
- A bug was fixed that caused roads to not be deselected when clicked away while in the **Place** mode.
- Road presets imported from VBS3 now have displacement maps. These displacement maps provide detailed elevation information when zoomed in.
- Roads no longer disappear when their vectors start and end in the same location.
- Roads are no longer duplicated when selected upon returning from the **Preview**.

1.7.5 Surface Editing

- A bug was fixed which caused singular surface edits to not be correctly loaded or to incorrectly remove trees once the edits were loaded.

1.7.6 VBS4 Integration

- Performance was improved of VBS Geo-placed objects in VBS4 and the loading of their collision geometry.

1.8 Geo Project Versioning

Updates to VBS4 include changes to the Geo Project format and how VBS4 handles the content.

VBS4	Geo Project	Compatibility
24.1.x	1.4	Backwards incompatible. <div style="border: 2px solid red; padding: 10px;"> WARNING Battlespaces created in VBS4 24.1.x or later cannot be used in VBS4 23.2.x and earlier.</div>
23.2.x	1.3	Backwards incompatible. The Geo Project extension changes from <code>.gpkg</code> to <code>.geo</code> . <div style="border: 2px solid red; padding: 10px;"> WARNING Battlespaces created in VBS4 23.2.x or later cannot be used in VBS4 23.1.x and earlier.</div>
23.1.x	1.2	Backwards incompatible. <div style="border: 2px solid red; padding: 10px;"> WARNING Battlespaces created in VBS4 23.1.x or later cannot be used in VBS4 22.2.x and earlier.</div>
22.2.x	1.1	Backwards compatible with 22.1.x.

VBS4	Geo Project	Compatibility
22.1.x	1.1	<p>Backwards incompatible - work-around available. Geo Projects are compressed and uncompressed automatically.</p> <div style="border: 2px solid red; padding: 10px;"> <p> WARNING Battlespaces created in VBS4 22.1.x or later cannot be used in VBS4 21.1.x and earlier.</p> </div> <div style="border: 2px solid green; padding: 10px;"> <p> TIP Geo Projects can be manually uncompressed to allow them to work with VBS4 21.1.x. Any standard compression utility can be used to uncompress the Geo Projects data. For more information, see Geo Project Compression (below).</p> </div>
21.1.x	1	<p>Backwards incompatible. Elevation and Surface edits must be reapplied to older Battlespaces. The Geo Project in older Battlespaces is automatically renamed to support workflow improvements.</p> <div style="border: 2px solid red; padding: 10px;"> <p> WARNING Battlespaces created in VBS4 21.1.x or later cannot be used in VBS4 20.1.x</p> </div>
20.1.x	0	

1.8.1 Geo Project Compression

As of VBS4 22.1, the Geo Project is automatically compressed as it is uploaded to the VBS World Server. This improves performance and transfer times for uploading the Geo Project as well as sharing the Geo Project to other connected clients.

The only negative impact that this change has is that the Geo Project implemented in VBS4 22.1 is not backwards compatible with older versions. This can be worked around for VBS4 21.1.x by manually downloading the Geo Project from the VBS World Server, uncompressed it, and then manually placing the data in the Geo Project folder. For example:

```
C:\Users\user.name\Documents\VBS4\Battlespaces\Pittsburgh\Geo\
```

1.8.2 VBS Geo Project Updates in VBS4 23.2

As of VBS4 23.2, VBS Geo Projects have `.geo` extensions instead of `.gpkg`. This change is backwards incompatible.

Additional improvements have been made to support the road updates in 23.2.



TIP

VBS Geo Projects created in VBS4 23.2.x can be made to work with VBS4 23.1.x by renaming the Geo Project extension from `.geo` to `.gpkg`.

However, new functionality added in 23.2.x is not supported in 23.1.x.

1.8.3 VBS Geo Project Updates in VBS4 23.1

As of VBS4 23.1, VBS Geo projects have been updated to provide faster loading and saving. This also provides better handling and performance of significantly big Geo Projects. These changes are backwards incompatible.

- Raster data is now saved in separate files, within the Geo Project, to improve saving and loading speeds.
- Raster data now caches during runtime for better performance.
- Vector data is now optimized during load to avoid unnecessary rendering.
- Rasters data is now compressed during runtime to reduce the overall memory demands of VBS Geo while editing terrain.

1.8.4 VBS Geo Project Updates in VBS4 21.1

Added new vector layers to the Geo Project to support water editing and saving and loading the data.

Raster layer saving and loading has been redone and improved to fix various customer reports about increasing saving / loading times when making edits further away from each other or in extensive areas.

- This change is backwards incompatible.
- Users must redo both their elevation and surface edits due to a fundamental restructuring of the data and its loading in the Blue engine.
- Point and Line Placement data is retained and loaded.
- Road data is retained and loaded.

Geo Project is now always saved as `geoproject.gpkg`.

This change is done automatically on Battlespace load and does not require any user input.

For example, in 20.1.x:

`\Documents\VBS4\Battlespaces\Maidan Town, AFG\Geo\Maidan Town, AFG.gpkg`

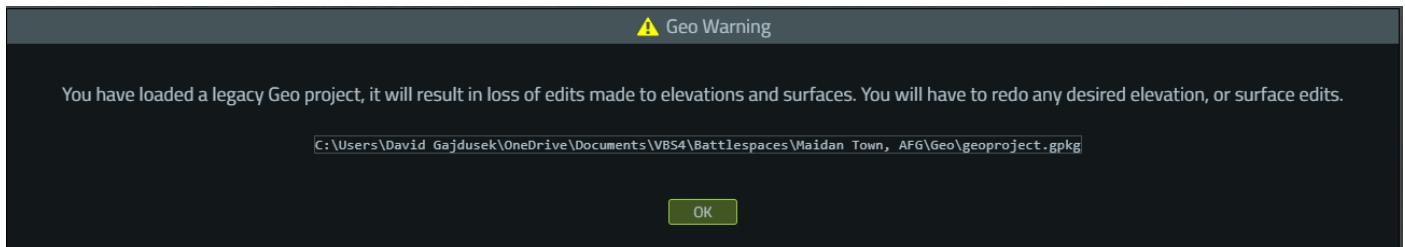
changes to, in 21.1.x:

`\Documents\VBS4\Battlespaces\Maidan Town, AFG\Geo\geoproject.gpkg`

Geo Project file name is no longer dependent on the mission name to simplify various workflow changes, language support and renaming procedures.

1.8.5 Updating VBS4 20.1.x Battlespaces to VBS4 21.1.x

When you load a Battlespace created in VBS4 20.1.x, a warning displays that some layers may not load correctly.



Surface and Elevation layers are not loaded, but Model and Road layers are retained with their original elevation.

To resolve the potential mismatch between Model and Road positioning and the Elevation:

1. **Optional:** Reapply the Elevation and Surface edits to match the Model and Road positioning.
2. Reselect the Models and Roads using their respective VBS Geo editing tools to snap them to the new elevation.

When you save the modified Battlespace, a backup copy of the original Battlespace is saved to:

`\Documents\VBS4\Geo\Backup\Battlespace_Name`

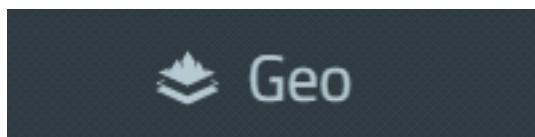
TIP

The backup `.gpkg` file can be used in TerraTools® to generate an inset with the original layers.

2. VBS Geo User Interface

Access VBS Geo in one of the following ways:

- From the Battlespaces List, select the Battlespace, highlight **Geo** in the Battlespace Functions Panel, and click **Create** or **Open**.
- Right-click a Battlespace icon in the Whole-Earth Terrain and select **Open in Geo**.
- From VBS Editor or VBS Plan, click **Geo** in the VBS4 Toolbar.



The VBS Geo user interface opens containing the following UI elements:



1	VBS4 Toolbar (on the next page)	Provides access to the global Main Menu functions, Tool Selection switching to VBS Plan and VBS Editor, plus VBS4 Settings, Documentation, and Notifications. For more information, see in the Introduction to VBS4 Guide.
2	VBS Geo Toolbar (on page 43)	Contains tools for Placing and Editing Roads (on page 112) , Placing and Editing Models (on page 68) , Editing Terrain Elevation (on page 55) , Editing Terrain Surfaces (on page 154) , and Placing and Editing Water (on page 172) .

3	Camera Controls (on page 47)	A selection of camera modes in VBS Geo.
4	Tool Panels (on page 48)	A set of panels for controlling options specific to the selected tool.
5	History Panel (on page 50)	A panel for undoing and redoing terrain edits during an active terrain editing session.
6	Backdrop Image Panel (on page 50)	A panel for uploading and streaming backdrop imagery for use as a reference while modeling terrain areas.
7	Status Bar (on page 51)	The right side of the status bar reports the UTM coordinate location of the cursor.
8	Status Bar Hints	The left side of the status bar displays context sensitive tooltips listing keybinds and available actions.
9	3D Camera View (on page 51)	View of the world terrain where modeling actions occur.

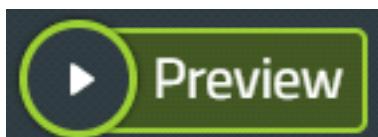
2.1 VBS4 Toolbar

The VBS4 Toolbar in **Prepare Mode** provides access to the global Main Menu functions, Tool Selection switching to VBS Plan and VBS Editor, plus VBS4 Settings, Documentation, and Notifications.



For more information, see in the Introduction to VBS4 Guide.

The Toolbar in Prepare Mode also displays the Preview Button to quickly run the Battlespace in single-player mode.



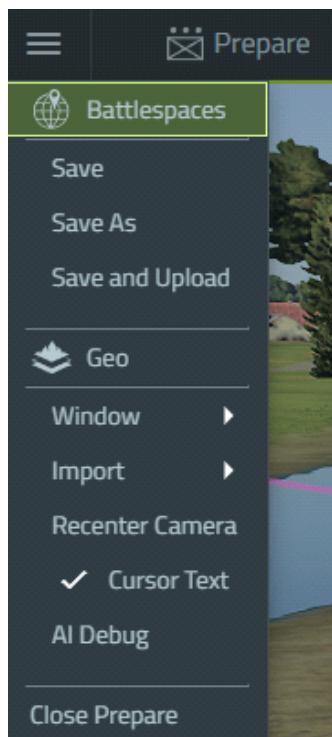
WARNING

A playable unit must be present in the Editor for Preview to be available.

2.2 VBS4 Main Menu for VBS Geo

In this release of VBS4, the following VBS Geo options are available under the VBS4 Main Menu.

Click the **Main Menu** icon to expand the following options:



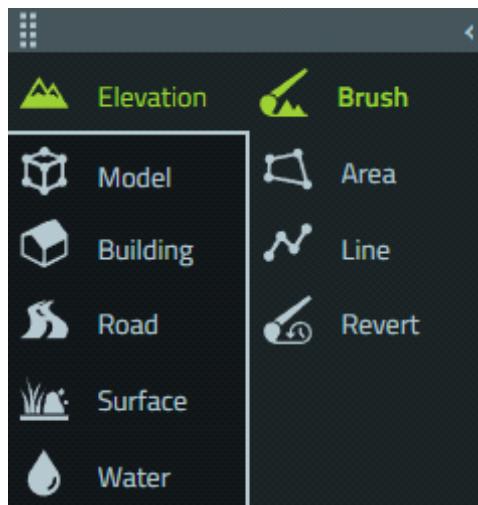
VBS Geo	Description
Menu	
Option	
Save	Use this option to save the current terrain edits as part of the Battlespace. <div style="border: 2px solid red; padding: 10px; margin-top: 10px;">⚠️ WARNING This option saves the current state of the Tactical Plan in VBS Plan, the terrain Geo Project edits in VBS Geo, and the entities in the mission from VBS Editor.</div> All Battlespace files are saved locally with an option to upload to a connected VBS World Server. For more information, see Battlespaces Folder in the Introduction to VBS4 Guide.

VBS Geo	Description
Menu	
Option	
Save As	<p>Use this option to save the current terrain edits in a new Battlespace, or an overwritten version of the original Battlespace, based on the name you enter in the dialog.</p> <div style="border: 2px solid red; padding: 10px; margin-top: 10px;"><p> WARNING</p><p>This option saves the current state of the Tactical Plan in VBS Plan, the terrain Geo Project edits in VBS Geo, and the entities in the mission from VBS Editor.</p></div> <p>All Battlespace files are saved locally with an option to upload to a connected VBS World Server.</p> <p>For more information, see Battlespaces Folder in the Introduction to VBS4 Guide.</p>
Save and Upload	<p>Use this option to save the current terrain edits as part of the Battlespace and upload it to the connected VBS World Server.</p> <div style="border: 2px solid red; padding: 10px; margin-top: 10px;"><p> WARNING</p><p>This option saves the current state of the Tactical Plan in VBS Plan, the terrain Geo Project edits in VBS Geo, and the entities in the mission from VBS Editor.</p></div> <p>All Battlespace files are saved locally and uploaded to a connected VBS World Server.</p> <p>For more information, see Battlespaces Folder in the Introduction to VBS4 Guide.</p> <div style="border: 2px solid #0070C0; padding: 10px; margin-top: 10px;"><p> NOTE</p><p>This option is only available if VBS4 is connected to VBS World Server, and only in Prepare mode.</p></div>
Window	<p>History: Opens the History panel. For more information, see Editing Terrain History (on page 182).</p> <p>Backdrop Image: Opens the Backdrop Image panel. For more information, see Adding Backdrop Imagery (on page 52).</p> <div style="border: 2px solid #0070C0; padding: 10px; margin-top: 10px;"><p> NOTE</p><p>Backdrop imagery import is disabled when running VBS4 in Offline Mode.</p></div>

VBS Geo Menu Option	Description
Import	Import Geo Project: Allows you to import a VBS Geo project from one Battlespace into another. For more information, Importing VBS Geo Projects (on page 184) . Import Data: Allows you to import specific geographic source data directly to VBS World Server. For more information, see Data Import in the VBS World Server Manual.
	<div style="border: 1px solid #0070C0; padding: 5px; margin-top: 10px;"><p> NOTE Geographic source data import is disabled when running VBS4 in Offline Mode.</p></div>
Recenter Camera	Receters the camera to the approximate center of the VBS Geo edits in a Battlespace.
Cursor Text	Toggles cursor tooltips on or off in vector-focused tools. This feature is enabled by default.
AI Debug	Displays overlay information on roads to indicate paths for AI entities.
Close Prepare	End Battlespace Preparation and return to the main VBS4 UI in Battlespace mode. VBS Geo prompts you to Save and Close , Close Without Saving , or Cancel .

2.3 VBS Geo Toolbar

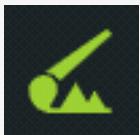
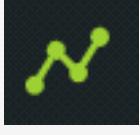
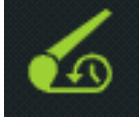
The VBS Geo **Toolbar** contains tools for Placing and Editing Roads (on page 112), Placing and Editing Models (on page 68), Placing and Editing Buildings (on page 102), Editing Terrain Elevation (on page 55), Editing Terrain Surfaces (on page 154), and Placing and Editing Water (on page 172).



TIP

The VBS Geo **Toolbar** is movable. Click and drag the top of the toolbar to change its location on your screen.

2.3.1 Elevation Tools

Tool Icon	Tool Type	Description
	Elevation Brush	Modify the terrain using a freehand Elevation Brush . For more information, see Freehand Elevation Editing (on page 56) .
	Elevation Area	Modify the terrain elevation by selecting and editing an area. For more information, see Elevation Area Editing (on page 59) .
	Elevation Line	Modify the terrain by selecting and editing elevation along a line. For more information, see Elevation Line Editing (on page 62) .
	Elevation Revert	Revert the terrain elevation back to the underlying dataset. For more information, see Reverting Elevation Edits (on page 66) .

2.3.2 Model Tools

Tool Icon	Tool Type	Description
	Model Point	Place selected models on the terrain surface one at a time with a simple point-and-click process. For more information, see Model Point Placement (on page 69) .
	Model Line	Place and edit models based on a vector using predefined. For more information, see Model Line Placement (on page 78) .
	Model Erase	Erase placed models, inset terrain models, and procedural buildings with a freehand eraser tool. For more information, see Model Erasing (on page 99) .

2.3.3 Building Tools

Tool Icon	Tool Type	Description
	Building Create	Place a building footprint and generate a default building. For more information, see VBS Geo User Interface (on page 38) .
	Building Edit	Modify a previously placed building. For more information, see VBS Geo User Interface (on page 38) and VBS Geo User Interface (on page 38) .
	Building Courtyard	Create internal spaces by cutting areas out of the building footprint. For more information, see VBS Geo User Interface (on page 38) .

2.3.4 Road Tools

Tool Icon	Tool Type	Description
	Road Place	Place new roads on the terrain surface. For more information, see Road Placing (on page 113) .
	Road Edit	Select and edit existing roads. For more information, see Road Editing (on page 121) .

2.3.5 Surface Tools

Tool Icon	Tool Type	Description
	Surface Brush	Modify the terrain using a freehand Surface Brush . For more information, see Freehand Surface Editing (on page 155) .
	Surface Area	Modify the terrain surface by selecting and editing an area. For more information, see Surface Area Editing (on page 158) .
	Surface Line	Modify the terrain by selecting and editing surfaces along a line. For more information, see Surface Line Editing (on page 162) .
	Surface Revert	Revert the terrain surface back to the underlying dataset. For more information, see Reverting Surface Edits (on page 167) .

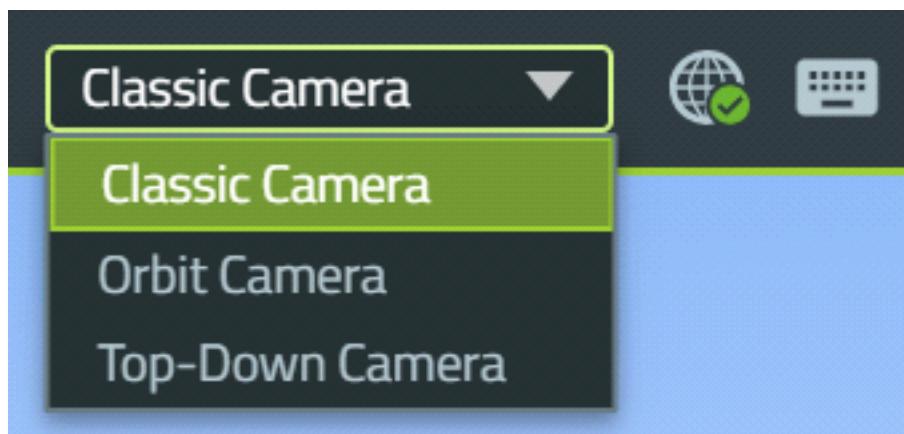
2.3.6 Water Tools

Tool Icon	Tool Type	Description
	Water Place	Place new inland water bodies. For more information, see Water Placing (on page 173) .
	Water Edit	Select and edit existing inland water bodies, their islands, and their properties. For more information, see Water Editing (on page 175) .
	Water Island	Place new islands in existing inland water bodies. For more information, see Placing Islands (on page 179) .

2.4 Camera Controls

The **Camera Controls** menu allows you to select the current camera mode in VBS Geo. The selected camera mode persists when switching in and out of VBS Geo in a Battlespace session.

- **Classic Camera** - Camera used in VBS Plan and VBS Editor. Recommended option for working close to the ground. This camera is set by default.
- **Orbit Camera** - Camera used in the VBS4 Main Menu. Recommended for working from higher altitudes.
- **Top-Down Camera** - Camera specific to VBS Geo with locked orientation to always look directly down at the surface.



Clicking the **Keyboard** icon in the VBS4 Toolbar while VBS Geo is active will display the camera controls for the active camera for VBS Geo.



2.5 Panels

Panels consist of the following components:

- [Tool Panels \(on the next page\)](#)
- [History Panel \(on page 50\)](#)
- [Backdrop Image Panel \(on page 50\)](#)

 **TIP**

All panels are dockable and movable. To dock or move a panel, drag the selected panel by its title bar to the desired location on your screen.

2.5.1 Tool Panels

The **Tool Panels** are a set of panels for controlling options that are specific to the selected tool. **Tool Panels** can include **Tool Options**, **Properties**, and **Library** panels that will only appear when the associated tool is selected in the **Toolbar**.

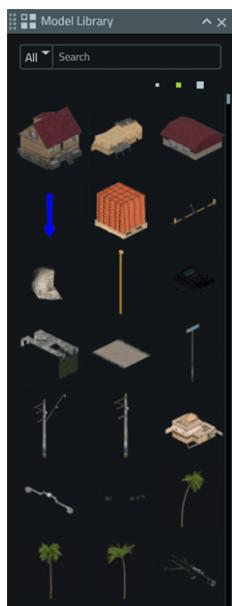
- **Tool Options** - The **Tool Options** panels provide options for controlling the tool that is selected in the **Toolbar**. These options directly affect how the terrain will be edited with the equipped tool.



For details on individual **Tool Options**, see [Editing Terrain Elevation \(on page 55\)](#), [Placing and Editing Models \(on page 68\)](#), [Placing and Editing Roads \(on page 112\)](#), or [Editing Terrain Surfaces \(on page 154\)](#).

- **Library** - The **Library** panels provide access to preconfigured content for placement using the selected tool (i.e., **Point**, **Road Place**, and **Road Edit**).

For details on the **Library** panels, see [Model Point Placing \(on page 69\)](#), [Editing Model Lines \(on page 83\)](#), [Road Placing \(on page 113\)](#), or [Road Editing \(on page 121\)](#).



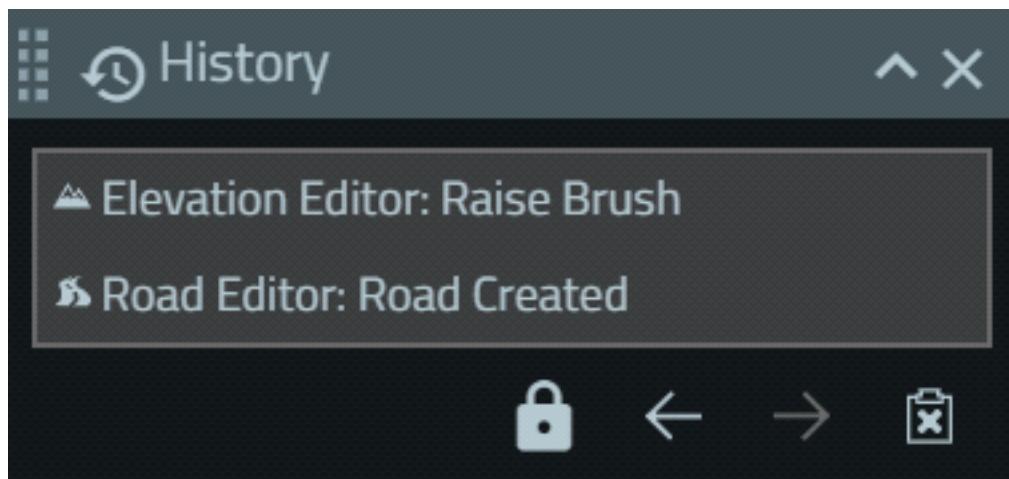
- **Properties** - The **Properties** panels provide detailed information about selected terrain content.



For details, see [Model Point Editing \(on page 72\)](#).

2.5.2 History Panel

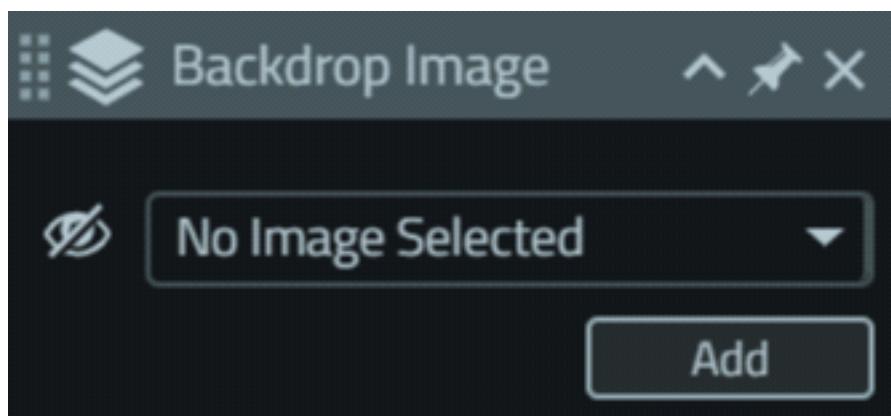
A panel for undoing and redoing terrain edits made during the current editing session. This panel is disabled by default.



For more information, see [Editing Terrain History \(on page 182\)](#).

2.5.3 Backdrop Image Panel

A panel for uploading and streaming custom backdrop imagery for use as a reference while placing terrain models. This panel is disabled by default.



For more information, see [Adding Backdrop Imagery \(on page 52\)](#).

2.6 Status Bar

The right side of the **Status Bar** lists the UTM coordinate location and elevation (VDatum: Geoid) of the cursor position.

UTM: 33N E: 616607.17 N: 5578342.24 Elev: 314.84

The left side of the Status Bar lists available keybinds, shortcuts, and controls based on the current tool and state.

Click to place model | **[ALT]** + **↶↷** to rotate | **[CTRL]** + **[SHIFT]** + **🖱️↑↓** to offset | **[CTRL]** + **[ALT]** + **↶↷** to scale.

[CTRL] + **ⓘ** to change radius | **[SPACE]** to toggle curve mode.

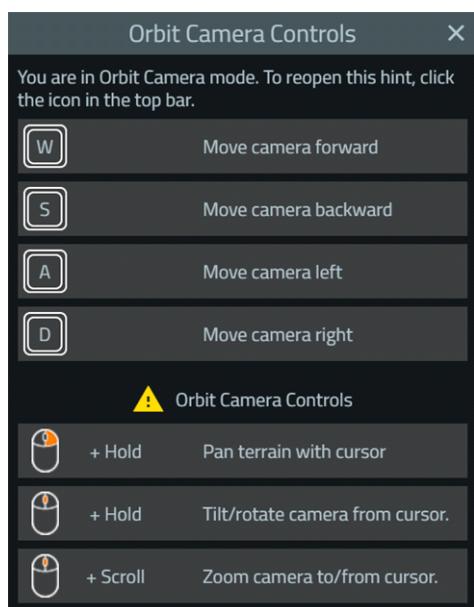
2.7 3D Camera View

Navigate the terrain with orbit camera controls in a 3D camera view. Use the camera view to place and modify VBS Geo content.

Clicking the **Keyboard** icon in the VBS4 **Toolbar** while VBS Geo is active displays details on the camera controls for VBS Geo.



For example, if the **Orbit Camera** is selected, the **Orbit Camera Controls** dialog opens.



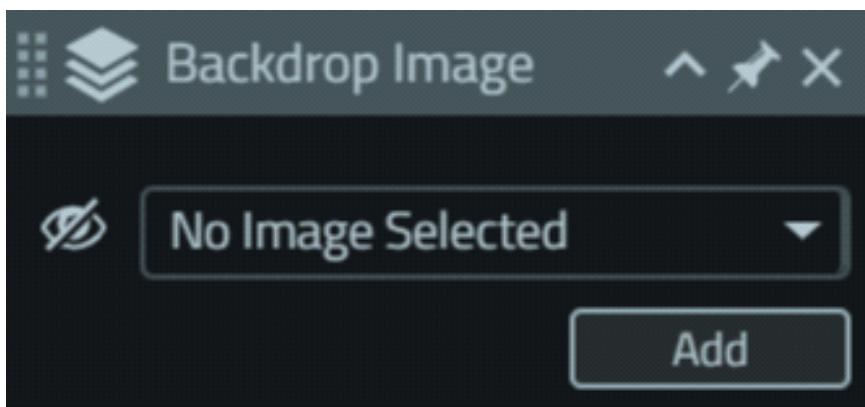
3. Adding Backdrop Imagery

i NOTE

This feature is only available when connected to a VBS World Server in Online Mode. For information on how to connect to a VBS World Server, see in the VBS World Server Manual.

VBS Geo includes a **Backdrop Image** panel for uploading and streaming custom backdrop imagery for use as a reference while modeling terrain areas.

To access the **Backdrop Image** image panel, click the **Main Menu** icon and select **Window** > **Backdrop Image**. The **Backdrop Image** panel opens.



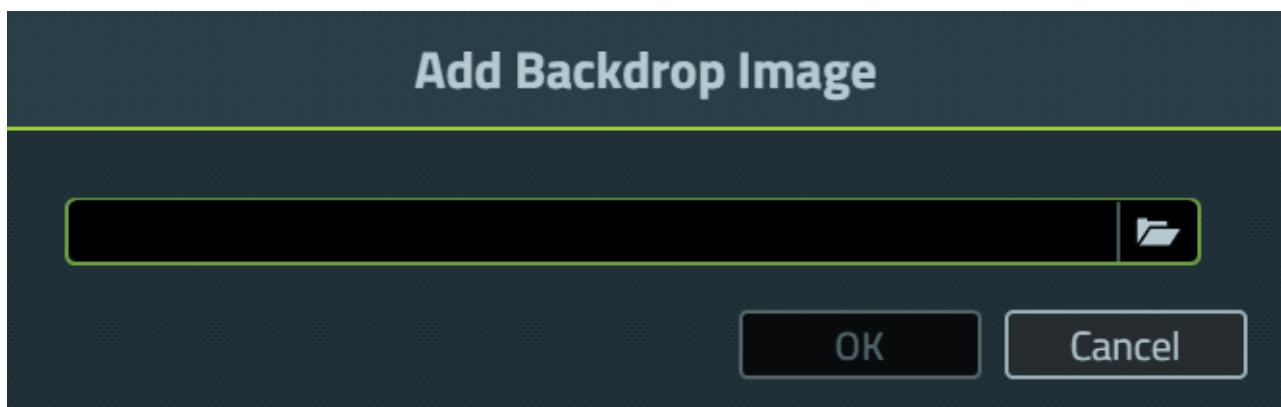
3.1 Adding Backdrop Images

You can add backdrop images to the **Backdrop Image** drop-down menu. Backdrop images that are added are uploaded to the VBS World Server currently connected to VBS4.

Follow these steps:

1. Click the **Add** button.

The **Add Backdrop Image** dialog opens.



2. Click the browse button to open a new File Explorer dialog. Navigate to a location on your machine and select a backdrop image to add.



NOTE

Backdrop images must be in the GeoTIFF format and must be in a geographic coordinate system with WGS84 horizontal datum (EPSG: 4326). Images larger than 4 GB in size must be in the bigTIFF format and we recommend using GeoTIFFs that are tiled, RGB, and include pyramids [LODs].

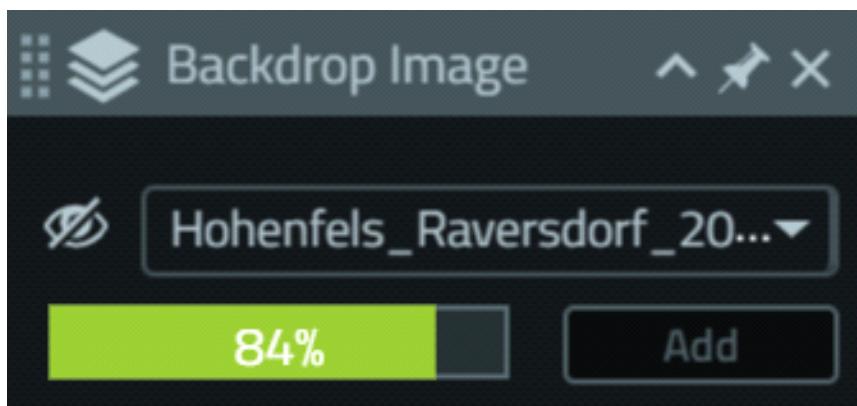
3. Open the selected image and ensure no error messages appear. Error messages will occur if the selected backdrop image does not meet the import requirements.

The image must:

- ✗ Be in the Geographic coordinate system.*
- ✗ Be in the WGS84 horizontal datum.*
- ✓ Be in the correct GeoTIFF specification.*

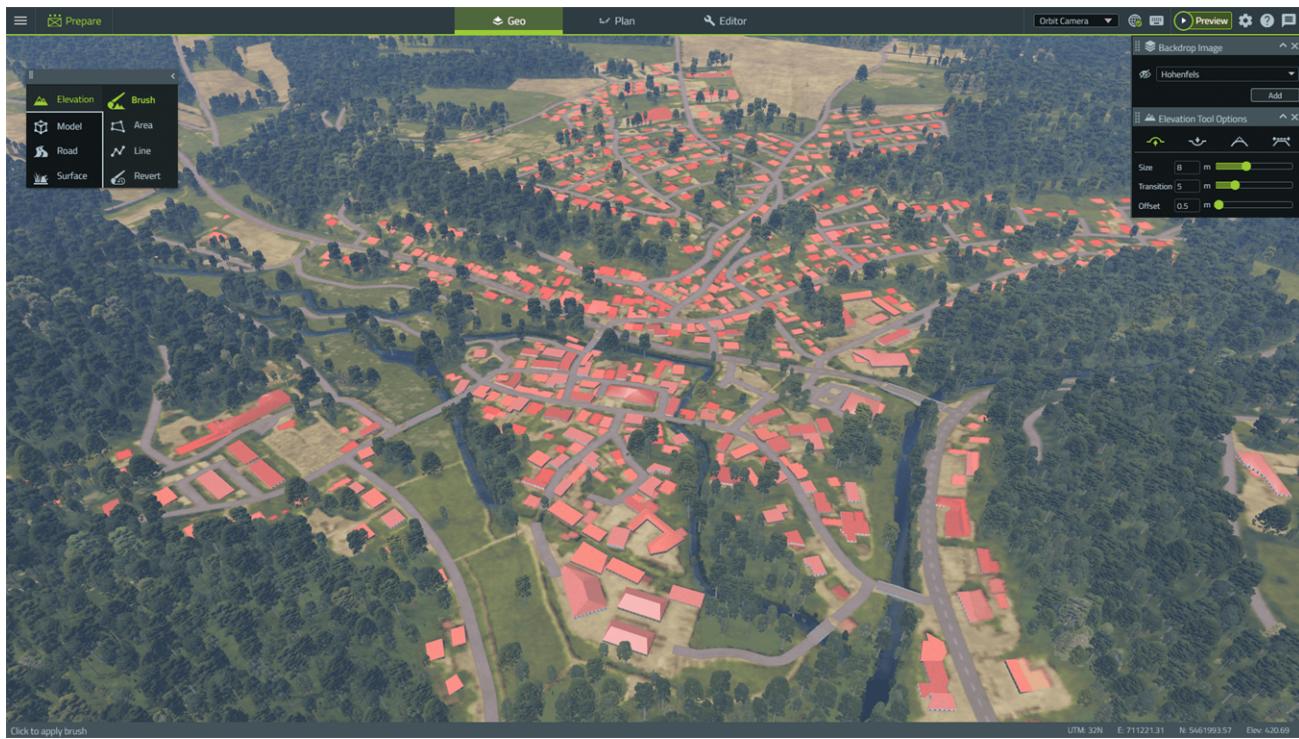
4. Click the **OK** button to upload the selected backdrop image to the connected VBS World Server. A progress bar will appear in the **Backdrop Image** panel showing the image's upload progress.

Once the image is uploaded to the VBS World Server, it is added and selected in the **Backdrop Image** panel's drop-down menu.



3.2 Show/Hide Backdrop Images

Backdrop images that have been added to the drop-down menu can be hidden or shown on top of the terrain surface in VBS Geo.



Follow these steps:

1. Select a backdrop image of the current location in the **Backdrop Image** panel's drop-down menu.
2. Toggle the **Visibility** to **On** for the selected backdrop image to load it over the terrain.

NOTE

It may take a few moments for the backdrop image to initially load.

3. Toggle the **Visibility** to **Off** to hide the image.

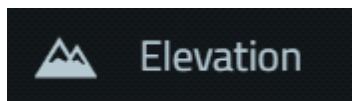
WARNING

Backdrop images cannot be used outside of VBS Geo and will be automatically hidden whenever you exit out of VBS Geo. If you wish to import imagery for use in the simulation, see Data Import in the VBS World Server Manual.

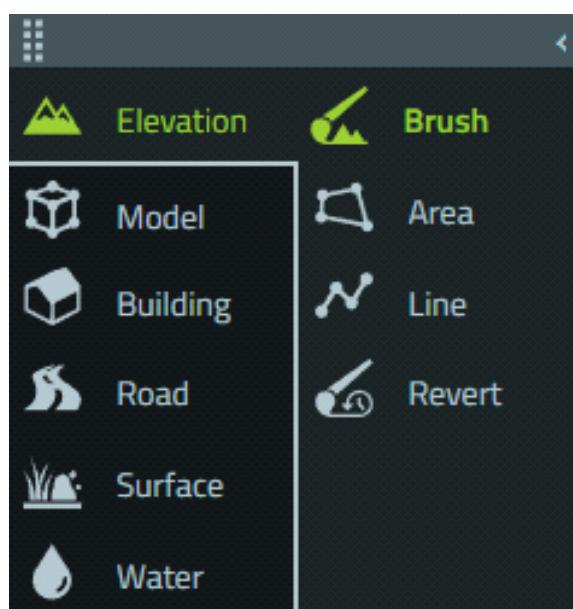
4. Editing Terrain Elevation

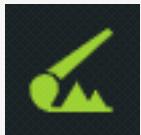
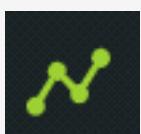
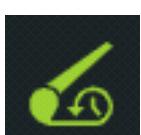
VBS Geo includes an **Elevation** mode to modify the base elevation heightmap data in the VBS4 terrain by modifying the surface of the terrain using a selection of **Elevation Tools**.

- In the **Toolbar**, click the **Elevation** icon.



The VBS Geo toolbar displays a set of **Elevation Tools**.

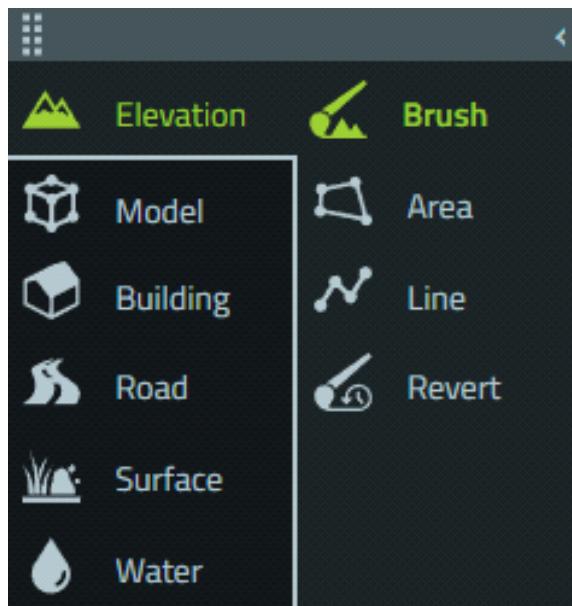


Tool Icon	Tool Type	Description
	Elevation Brush	Modify the terrain using a freehand Elevation Brush . For more information, see Freehand Elevation Editing (on the next page) .
	Elevation Area	Modify the terrain elevation by selecting and editing an area. For more information, see Elevation Area Editing (on page 59) .
	Elevation Line	Modify the terrain by selecting and editing elevation along a line. For more information, see Elevation Line Editing (on page 62) .
	Elevation Revert	Revert the terrain elevation back to the underlying dataset. For more information, see Reverting Elevation Edits (on page 66) .

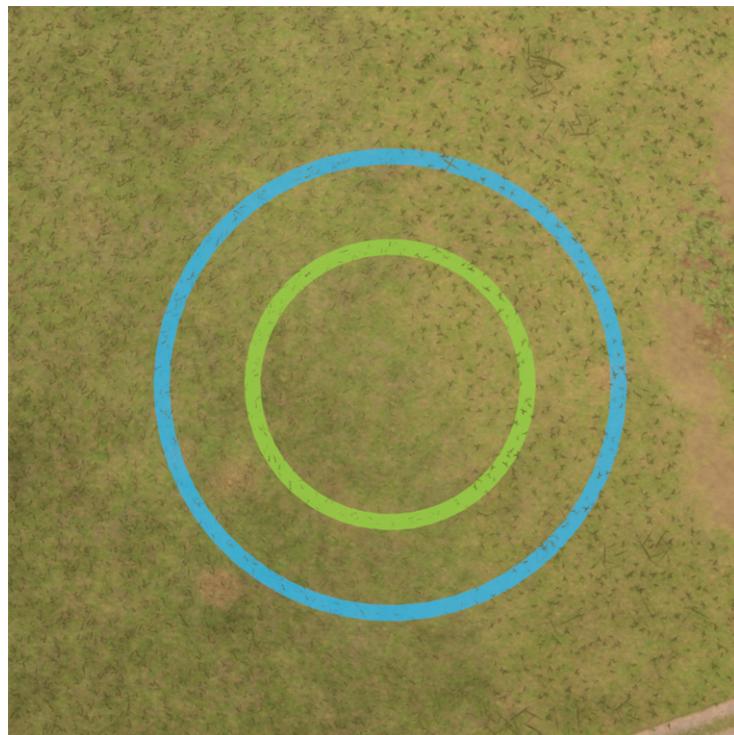
4.1 Freehand Elevation Editing

The **Elevation Brush** enables freehand elevation changes to the terrain.

To begin freehand elevation editing, select **Elevation** mode and click the **Elevation Brush** icon, or right-click and select the **Elevation > Place** from the **Quick Access Toolbar**.



The **Elevation Brush** displays as two rings on the surface of the terrain, centered around the cursor.



The **Elevation Tool Options** panel opens, displaying the **Elevation Brush** controls.



Use the **Elevation Tool Options** panel to control the **Elevation Brush** and apply the effect to the terrain using the brush.

Follow these steps:

1. Use the **Elevation Tool Options** or right-click over the terrain to select the **Elevation Brush** effect.



Effect Icon	Effect	Description
	Raise Elevation	This brush effect raises the terrain where applied. Use this brush effect to create berms or hills.
	Lower Elevation	This brush effect lowers the terrain where applied. Use this brush effect to create ditches and valleys.
	Smooth Elevation	This brush effect smooths the elevation where applied. Use this brush effect to reduce steep slopes and make elevation features less severe.
	Flatten Elevation	This brush effect flattens the terrain to a horizontal surface where applied. Use this brush effect to create flat areas.

2. Use the **Elevation Tool Options** to control the selected **Elevation Brush** effect.

Option	Description
Size	Input or use the slider to specify the radius of the brush, indicated by the green circle around the cursor.
Transition	Input or use the slider to specify the radius of a transitional zone area between the existing elevation and the modified elevation, as indicated by the outer circle around the green circle.
Strength	Specifies the amount the brush will change the elevation with each application: <ul style="list-style-type: none">For Offset, input or use the slider to specify the change that the brush will apply.For Smooth, use the slider to change the amount that the brush will smooth the terrain.
<div style="border: 1px solid #0070C0; padding: 5px; margin-top: 10px;"> NOTE Strength does not apply to Flatten.</div>	
Specify Elevation	Only applies to Flatten . If the check box is not selected, the Flatten effect will flatten the elevation where applied based on the existing elevation in the area. If the check box is selected, enter an elevation above sea level. The elevation will be flattened to the specified value.
Select Elevation	When this button is clicked, it will activate the elevation eyedropper which will automatically configure the elevation value to match a selected location on the terrain.

3. Use the **Elevation Brush** on the terrain surface to apply the specified elevation effect.

- Click **LMB** once to apply a single elevation change based on the selected elevation effect and its options.
- Hold **LMB** and move the cursor to apply the selected elevation effect across a wider area.

Bohemia Interactive Simulations recommends the following best practice for using the **Elevation Brush**:

- Use the **Raise** and **Lower** effects with a low **Strength** to produce your general terrain elevation changes.
- Reduce the **Size** and **Transition** options to enable finer elevation editing.
- Use the **Smooth** effect to modify steep slopes and severe elevation features.
- Use the **Flatten** effect to produce horizontal surfaces, suitable for model placement.

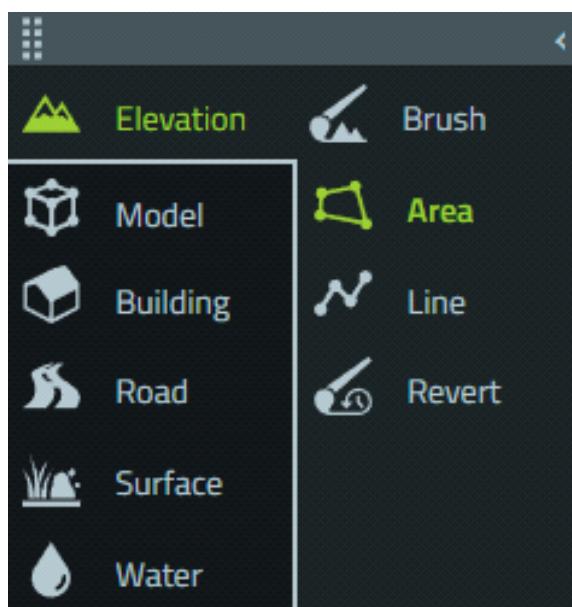
4.2 Elevation Area Editing

The **Elevation Area** tool allows for elevation changes in a selected area.

NOTE

The **Elevation Area** tool also supports the same **Curve** mode as the **Road** tool and move operations as road vectors. For more information see [Adding Curves \(on page 135\)](#) and [Moving Vectors \(on page 124\)](#) respectively.

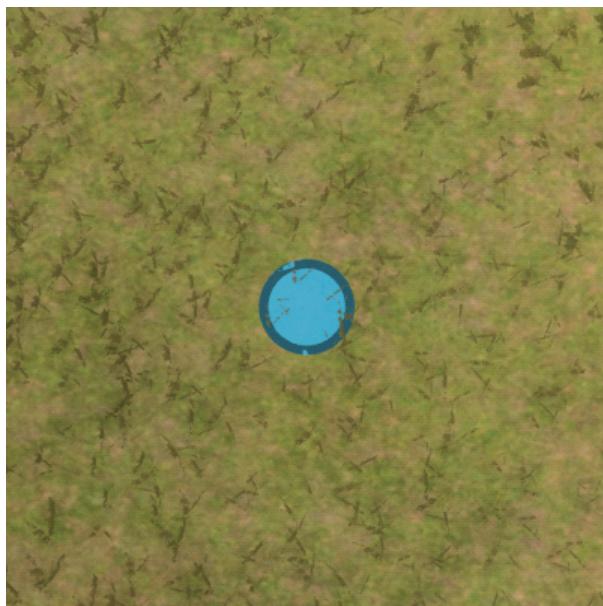
To begin elevation area editing, select **Elevation** mode and click the **Elevation Area** icon, or right-click and select the **Elevation > Area** from the **Quick Access Toolbar**.



The **Elevation Tool Options** panel opens, displaying the **Elevation Area** controls.



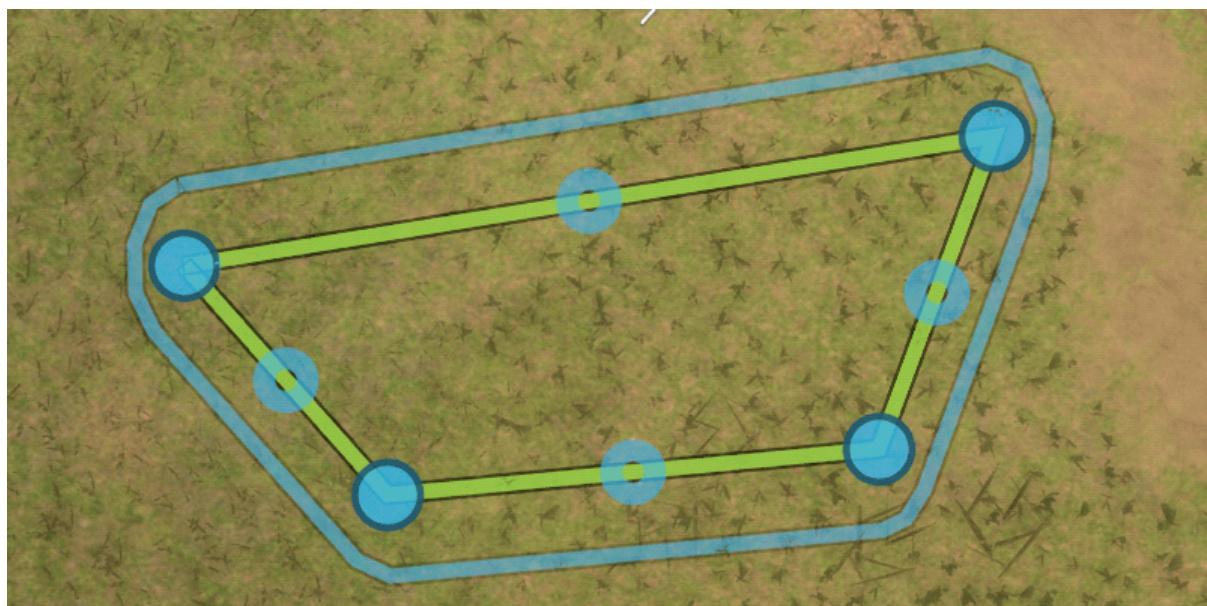
Use the **Elevation Tool Options** panel to control the **Elevation Area** effect and draw on the terrain to apply the effect to an area.



The first vertex of an **Elevation Area** drawing displays under your cursor.

Follow these steps:

1. Select an area to edit by clicking around the terrain surface to draw an area one vertex at a time. You should see the representation of the area, outlined in **green**, after you have begun placing vertices. Place at least three vertices to create a valid area.



2. Press **Enter** or right-click the terrain and select **Complete Drawing** to finish drawing the area.
3. Click and hold **LMB** while hovering over the area to move it.
4. Click and hold **LMB** on the filled vertices to adjust their placement, editing the area.
5. Click **LMB** on one of the hollow vertices between the filled vertices to add a vertex to the drawn area.

6. Use the **Elevation Tool Options** or right-click the terrain to select the **Elevation Area** effect.



Effect Icon	Effect	Description
	Raise Elevation	This effect raises the terrain where applied. Use this effect to create uniform berms.
	Lower Elevation	This effect lowers the terrain where applied. Use this effect to create uniform basins.
	Flatten Elevation	This effect flattens the terrain to a horizontal surface where applied. Use this effect to flatten areas prior to model placement.

7. Use the **Elevation Tool Options** to control the selected **Elevation Area** effect.

Option	Description
Transition	Input or use the slider to specify the extent of the transitional zone between existing and modified elevation, as indicated by the outline around the drawn green polygon.
Offset	Input or use the slider to specify the amount of change to apply in the selected area.
NOTE Offset does not apply to Flatten .	
Flatten Type	Select one. This option only applies to the Flatten effect: <ul style="list-style-type: none"> Minimum - Flattens terrain to the lowest elevation of the selected area. Average - Flattens terrain to the average elevation of the selected area. Maximum - Flattens terrain to the highest elevation of the selected area. Custom - Flattens the terrain to an input elevation above sea level. Select Elevation - Activates the elevation eyedropper to automatically match the elevation value to a selected location on the terrain.
Redraw Area	Click this button to delete the selected area or to begin drawing a new polygon. Only one area can be drawn or modified at a time.
Apply	Click this button to apply the current effect to the selected area.

8. Press the **Delete** key or right-click on the terrain and select **Redraw Area** to draw a new polygon.

Bohemia Interactive Simulations recommends the following best practice for using the **Elevation Area** effect:

1. Use the **Raise** and **Lower** effects to produce your general terrain elevation changes in selected areas. These effects are ideal for creating mounds, berms, basins, and terraces.
2. Use the **Flatten** effect to produce horizontal surfaces suitable for model placement.

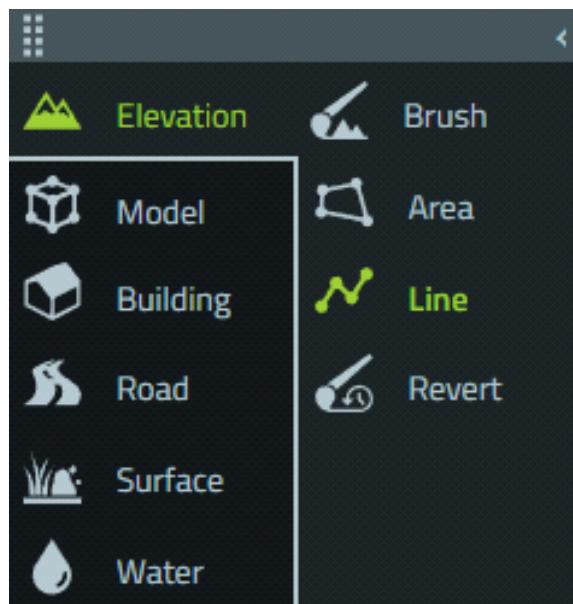
4.3 Elevation Line Editing

The **Elevation Line** tool allows for elevation changes along a selected linear area.

NOTE

The **Elevation Line** tool also supports the same **Curve** mode as the **Road** tool and move operations as road vectors. For more information see [Adding Curves \(on page 135\)](#) and [Moving Vectors \(on page 124\)](#) respectively.

To begin elevation line editing, select **Elevation** mode and click the **Elevation Line** icon, or right-click and select the **Elevation > Line** from the **Quick Access Toolbar**.



The **Elevation Tool Options** panel opens, displaying the **Elevation Line** controls.



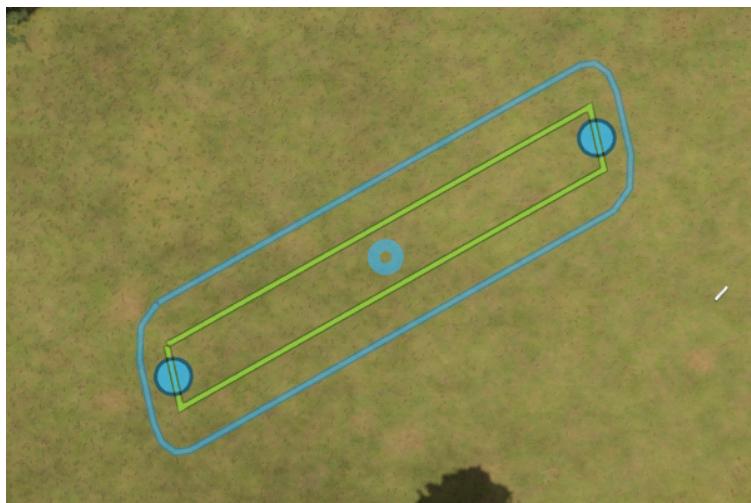
Use the **Elevation Tool Options** panel to control the **Elevation Line** effect and draw a line on the terrain to apply the effect to a linear area.



The first vertex of an **Elevation Line** drawing displays under your cursor.

Follow these steps:

1. Select a linear area to edit by clicking around the terrain surface to draw a line one vertex at a time. You see a representation of the linear area, outlined in **green**, after you have begun placing vertices. Place at least two vertices to draw a valid line.



2. Press **Enter** or right-click on the terrain and select **Complete Drawing** to finish drawing the line.
3. Click and hold **LMB** while hovering over the line to move it.
4. Click and hold **LMB** on the filled vertices to adjust their placement, editing the line.
5. Click **LMB** on one of the hollow vertices to add a vertex to the drawn line.
6. Use the **Elevation Tool Options** or right-click to select the **Elevation Line** effect.



Effect Icon	Effect	Description
	Raise Elevation	This effect raises the terrain where applied. Use this effect to create uniform berms.
	Lower Elevation	This effect lowers the terrain where applied. Use this effect to create ditches and trenches.
	Flatten Elevation	This effect flattens the terrain to a horizontal surface where applied. Use this effect to flatten linear areas prior to road or model placement.

7. Use the **Elevation Tool Options** to control the selected **Elevation Line** effect.

Option	Description
Width	Input or use the slider to specify the thickness of the drawn line, as indicated by the green outline.
Transition	Input or use the slider to specify the extent of the transitional zone between existing and modified elevation, as indicated by the larger outline around the green outline.
Offset	Input or use the slider to specify the amount of change to be applied in the selected linear area.
<div style="border: 1px solid #0070C0; padding: 5px;"> i NOTE Offset does not apply to Flatten. </div>	
Flatten Type	Select one. This option only applies to the Flatten effect: <ul style="list-style-type: none"> • Minimum - Flattens terrain to the lowest elevation of the selected linear area. • Average - Flattens terrain to the average elevation of the selected linear area. • Maximum - Flattens terrain to the highest elevation of the selected linear area. • Follow Terrain Grade - Flattens the terrain to remove the roll along the drawn line while maintaining the grade. • Custom - Flattens the terrain to an input elevation above sea level. • Select Elevation - When this button is clicked, it will activate the elevation eyedropper which will automatically configure the elevation value to match a selected location on the terrain.
Corner	Select whether the corners of the drawn line will be mitered or rounded.
Cap	Select whether the ends of the drawn line will be flat or round.
Redraw Area	Click this button to delete the drawn line or to begin drawing a new line. Only one line can be drawn or modified at a time.
Apply	Click this button to apply the current effect to the selected line.

8. Press the **Delete** key or right-click on the terrain and select **Redraw Area** to draw a new polygon.

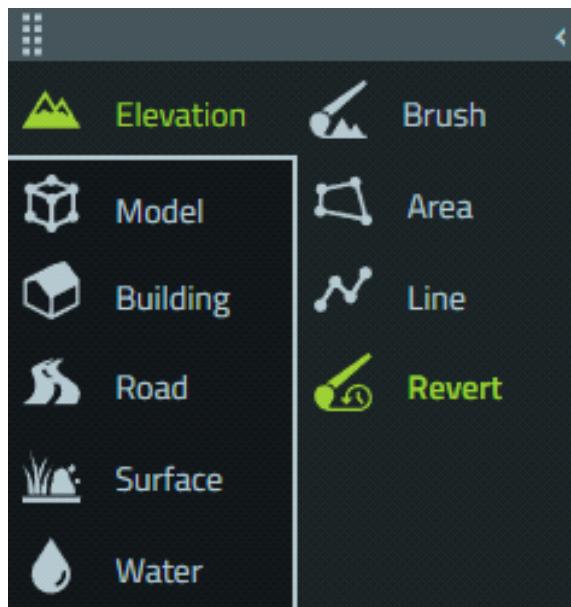
Bohemia Interactive Simulations recommends the following best practice for using the **Elevation Line** effect:

1. Use the **Raise** and **Lower** effects to produce your general terrain elevation changes in selected linear areas. These effects are ideal for creating linear berms, trenches, and ditches.
2. Use the **Flatten** effect to produce horizontal surfaces suitable for road and model placement.

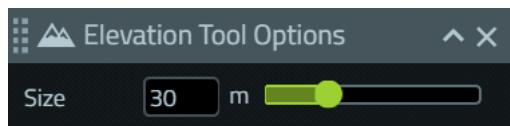
4.4 Reverting Elevation Edits

The **Elevation Revert Brush** tool allows you revert elevation previously made to the terrain (**Ctrl + Z** can also be used to revert edits made in the same edit session), restoring the underlying data.

To begin reverting elevation edits, select **Elevation** mode and click the **Elevation Revert Brush** icon, or right-click and select the **Elevation > Revert** from the **Quick Access Toolbar**.



The **Elevation Tool Options** panel will open, displaying the **Elevation Revert Brush** controls.



Use the **Elevation Tool Options** panel to control the size of the **Elevation Revert Brush** and apply the brush to the terrain to revert previous edits.



The **Elevation Revert Brush** displays one ring on the surface of the terrain, centered around the cursor.

Follow these steps:

1. Select the size of the brush in the **Elevation Tool Options** panel.
2. Use the **Elevation Revert Brush** on the terrain where elevation edits were previously made to revert the edits.
 - a. Hold **LMB** and move the cursor to revert elevation changes across the terrain.

Bohemia Interactive Simulations recommends the following best practice for using the **Elevation Revert Brush** effect:

- Use the brush to revert elevation edits when using **Ctrl + Z** is no longer an option for restoring the base elevation data.

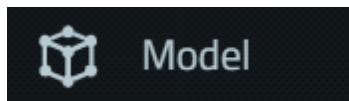
5. Placing and Editing Models

VBS Geo includes a **Model** mode used to populate the VBS4 terrain with any of the thousands of high-quality models included in the VBS Geo built-in model library.

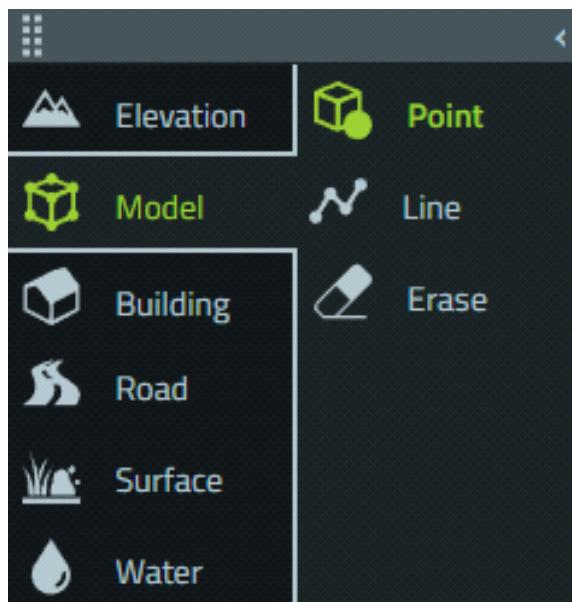
NOTE

Building mode also includes a set of buildings that can be applied with a custom footprint. For more information, see [Placing and Editing Buildings \(on page 102\)](#).

- In the **Toolbar**, click the **Model** icon.



The VBS Geo toolbar will display a set of **Model Tools**.



Tool Icon	Tool Type	Description
	Point	Place and edit selected models on the terrain surface one at a time with a simple point-and-click process. For more information, see Model Point Placement (on the next page) .
	Line	Place and edit models based on a vector using predefined styles. For more information, see Model Line Placement (on page 78) .

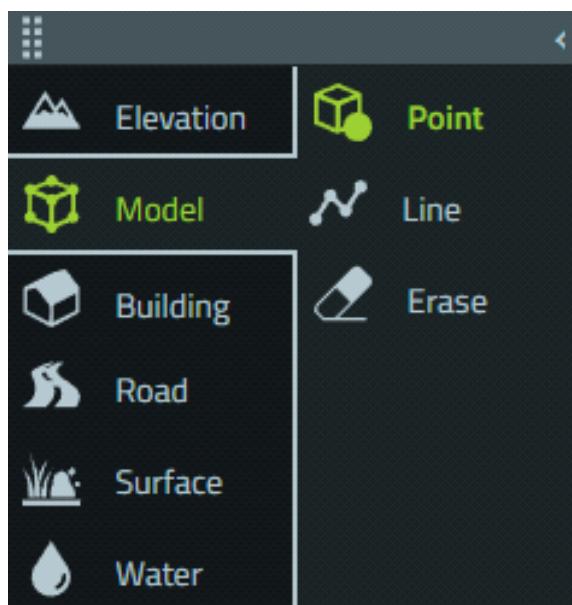
Tool Icon	Tool Type	Description
	Erase	Erase placed models, inset terrain models, and procedural buildings with a freehand eraser tool. For more information, see Model Erasing (on page 99) .

5.1 Model Point Placement

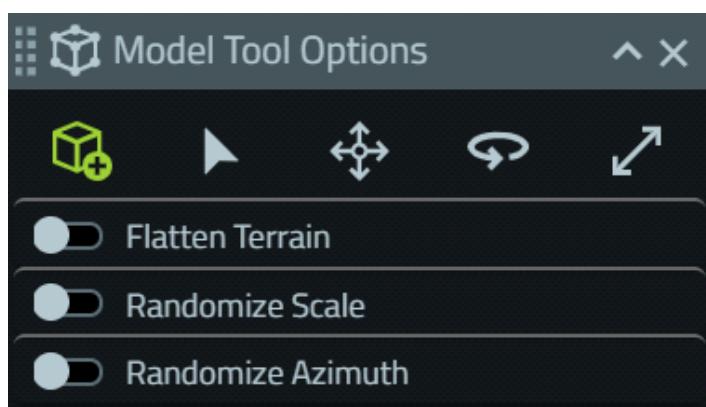
The **Model Point** tool provides a simple point-and-click process for placing models on the terrain surface.

5.1.1 Model Point Placing

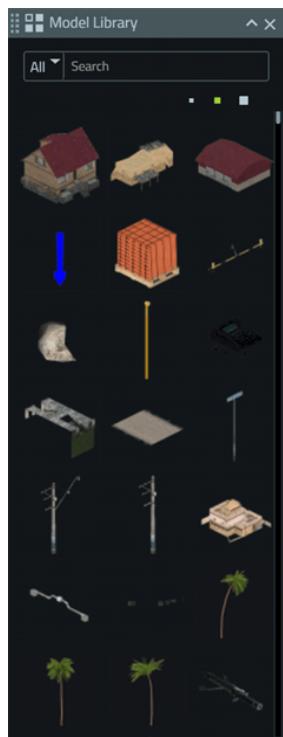
To begin placing models, select the **Model** mode in the toolbar and click the **Point** icon, or right-click and select the **Model > Point** option from the **Quick Access Toolbar**.



The **Model Tool Options** panel will open, displaying the **Point** controls. From the **Model Tool Options** toolbar, select the **Place** option.



The **Model Library** will also open, displaying thumbnail images of each available model and controls to quickly search and filter models.



Click a model in the **Model Library** to select it for placement. Use the **Model Tool Options** to control the model's placement parameters.



The **Point** tool displays a solid **green** circle on the surface of the terrain, centered around the cursor.

Follow these steps:

1. Use the **Model Library** to select a model to place. Once a model is selected, you will see it hovering on the terrain surface under your cursor with a **green** highlight beneath the model.

Control	Description
Search Bar	Filter library models and search for specific models using keywords.
Thumbnail Size Selection	Select the size that the style thumbnail images will be displayed.
Model Thumbnails	Preview images of each model. Hover over a thumbnail to see its name at the top of the library panel. Click a model to select it.

2. Use the **Model Tool Options** to control model placement parameters.

Option	Description
Flatten Terrain	When this option is enabled, models will automatically flatten terrain elevation when placed. Use the sliders or input a value (in meters) in the Transition field to control the extents of the terrain to be flattened around the placed model.
Randomize Scale	When this option is enabled, models will be randomly scaled relative to their original size when placed on the terrain. Use the sliders or input values (as a decimal) in the Min and Max fields to control the minimum and maximum scale of the placed model.
Randomize Azimuth	When this option is enabled, models will be assigned a random azimuth value when placed. Use the sliders or input values (in degrees) in the Min and Max fields to control the minimum and maximum azimuth of the placed model.

3. Use the **Point** tool on the terrain surface to place the selected model.

- a. Click **LMB** once to place the selected model.
- b. Hold the **Alt** key and move the mouse to rotate the model prior to placement.
- c. Hold the **Ctrl + Alt** keys to scale the model prior to placement.
- d. Hold the **Ctrl + Shift** keys to offset the model prior to the placement.

Bohemia Interactive Simulations recommends the following best practices for using the **Point** tool:

1. Use **Model Library** filters and search terms to quickly find the types of models you wish to place.
2. Only use the **Flatten Terrain**, **Randomize Scale**, and **Randomize Azimuth** options when necessary.

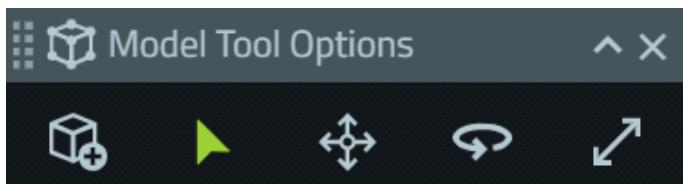
3. Use **Flatten Terrain** when models need to sit on a flat surface, when placing multiple models that should all be on the same flat surface, or to flatten the terrain in **Elevation** mode prior to model placement.
4. Use **Randomize Scale** and **Randomize Azimuth** options to quickly vary environmental models (such as stones and bushes) during model placement.

5.1.2 Model Point Editing

The **Edit** sub-tool can select, move, rotate, scale, delete, group, and copy/paste placed models.

To begin editing placed models, select the **Model** mode and click the **Point** tool, or right-click and select the **Model > Point > Edit** from the **Quick Access Toolbar**.

The **Model Tool Options** panel opens, displaying a set of model transformation gizmos. Click the **Edit** sub-tool to begin.



The **Model Properties** panel also opens, displaying several editable properties for the selected model.



When you hover over a placed model with the **Edit** sub-tool equipped, the model highlights in white.



Select one or more placed models to transform, group, or copy/paste the models using your selected gizmo or use the **Model Properties** options to change the properties of the models.

Use the **Model Tool Options** or right-click the terrain to select a model transformation gizmo.

Gizmo	Description
Edit 	Select and edit models without a gizmo. Models can be individually selected or you can click and drag on the terrain to select multiple models. <ul style="list-style-type: none"> Move - Hold LMB and move the cursor to move the selected model(s). Press the arrow keys ($\uparrow\downarrow\leftarrow\rightarrow$) to directionally nudge the model based on the camera direction. Rotate - Hold LMB + Alt and move the cursor to rotate the selected model(s). Press Alt + ← or → to change the azimuth of the selected model(s). Scale - LMB + Alt + Ctrl and move the cursor to scale the selected model(s). Press Ctrl + Alt + ↑ or ↓ to change the scale of the selected model(s). Offset - Hold LMB + Ctrl + Shift and move the cursor or press Page Up or Page Down to change the offset of the selected models(s).
Translation 	Select and edit models using a translation gizmo. The gizmo will appear above the selected model. <ul style="list-style-type: none"> Click and drag one of the three colored arrows to move the model along the associated axis. Click and drag one of the three colored polygons to move the model along the associated plane. Click and drag the white circle to freely move the model.
Rotation 	Select and edit models using a rotation gizmo. The gizmo will appear around the selected model. <ul style="list-style-type: none"> Click and drag on one of the three rings to adjust the model along the associated axis.

Gizmo	Description
Scale 	Select and edit models using a scale gizmo. The gizmo will appear above the selected model. <ul style="list-style-type: none">Click and drag one of the three cubes to scale the model along the associated axis.

Follow these steps:

1. Click on a placed model in the terrain to select it. The model highlights in **green** when selected.



If **Translation**, **Rotation**, or **Scale** is selected in the **Model Tool Options**, the associated gizmo will appear. To select multiple models, do one of the following:

- a. Hold **Ctrl** and click multiple models.
b. Click the **LMB** and drag the cursor to draw a selection box over multiple models.
2. Make the desired free hand edits.
 - a. **Move** - Hold **LMB** over the selected model and move the mouse, or use the **Translation** gizmo.
 - b. **Rotate** - Hold **LMB + Alt** and move the cursor, or use the **Rotation** gizmo.
 - c. **Scale** - Hold **LMB + Alt + Ctrl** and move the cursor, or use the **Scale** gizmo.
 - d. **Group** - Select multiple models and press **Ctrl + G**. Groups highlight in blue.
 - e. **Ungroup** - To ungroup models, select a group and press **Ctrl + Shift + G**.
 - f. **Copy/Paste** - Press **Ctrl + C**, click the location and press **Ctrl + V** to paste the copied model.
 - g. **Delete** - Press the **Delete** key to delete selected models.

3. Make precise edits using **Model Properties**.

Property	Description
Selection	<p>Displays information about the selected model(s):</p> <ul style="list-style-type: none"> • Number - Number of selected models. • Selected Path - File location of selected model (for single models only). <ul style="list-style-type: none"> ◦ Copy Path - Copy model file path to clipboard.
Position	<p>Displays the coordinate position details of the model selection. Edit the inputs to change the model position.</p> <ul style="list-style-type: none"> • Type - Choose Absolute view and edit the model position in UTM coordinates, or select Relative to quickly offset the selected model from its current location (Relative is automatically chosen when more than one model is selected). • Easting / Northing - Displays the model UTM coordinates when Absolute is selected.
Elevation	<p>Displays the elevation details of the model selection. Edit the inputs to change the model elevation.</p> <ul style="list-style-type: none"> • Absolute - Displays the selected model elevation above sea level. • Offset - Displays the selected model elevation relative to the terrain surface.
i	NOTE <p>When multiple objects are selected the value is applied as a relative offset to the individual objects within the selection.</p>
Rotation	<p>Displays the rotation details of the model selection. Edit the inputs to change the model rotation.</p> <ul style="list-style-type: none"> • Type - Choose to view and edit the Absolute rotation in the world space, or select Relative to quickly offset the model rotation. • Azimuth / Pitch / Roll - Displays the rotation values.
Scale	<p>Displays the scale details of the model selection. Edit the input to change the scale.</p> <ul style="list-style-type: none"> • Scale X / Scale Y / Scale Z - Displays the scale on the X/Y/Z-axes.
i	NOTE <p>When multiple objects are selected the value is applied as a relative scale to the individual objects within the selection.</p>

4. Optionally flatten the terrain under a model, randomize its scale, or randomize its azimuth using the right-click menu.

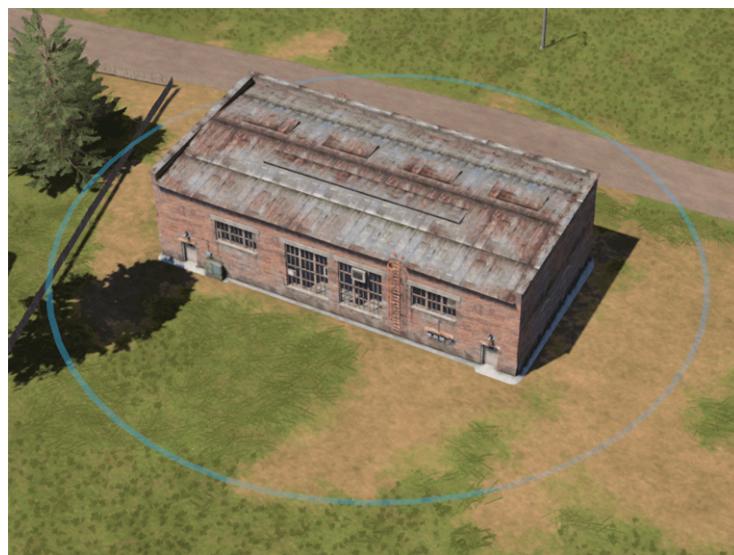
Note the following best practices for using the **Model Point** tool:

1. Select and edit no more than 50 models at a time.
2. Group models and copy them around to quickly populate your terrain.
3. Edit **Model Properties** to make precise edits.

5.1.2.1 Unlocking Inset Objects

Inset objects placed into inset terrains outside VBS4 can be unlocked for editing in VBS Geo.

To unlock inset objects in certain areas of the globe, equip the **Edit** sub-tool, press and hold **Alt**, then mouse over an object. If the inset object can be unlocked, a **blue** circle appears around it.



Click the object with the **LMB** to unlock the inset object. Once unlocked, the object behaves like any other object in VBS Geo and can be moved, modified, deleted, and so on, accordingly.



 **TIP**

Unlocking an object is similar to the VBS3 Editor Promote functionality that has been removed from VBS4.

 **NOTE**

Unlocking an object does not work for procedurally-generated global buildings. These types of buildings are not highlighted in blue when moused over.

5.1.3 Search Refinement Operators

The VBS Geo **Point Model Library** has several search refinement operators that can be used to perform specific searches.

5.1.3.1 Usage

Multiple operators can be used in conjunction with one another, though each operator must be separated by a space. Multiple terms can be searched for within a single operator, but these must be separated by a comma.

 **EXAMPLE**

```
@category:trees,bushes @name:almond
```

Operators also function with the category drop-down and with normal text searches.

Search operators and their accompanying text are case sensitive.

5.1.3.2 Operators

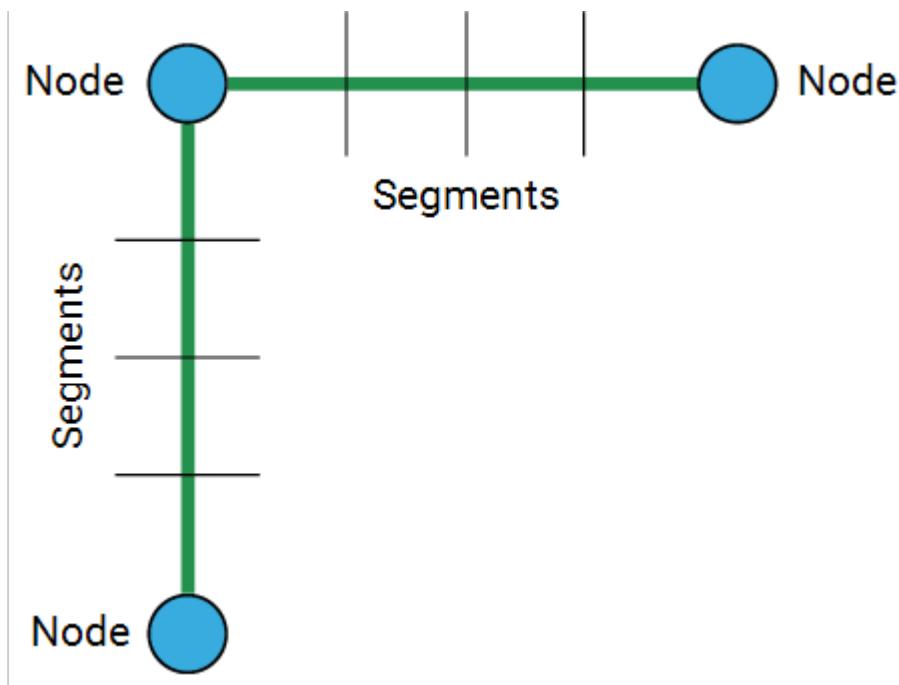
The following operators can be used with the **Point Model Library**:

- **@name:** - Searches the name of the specified model(s) in the **Model Library**.
- **@category:** - Searches for models in the specified category.
- **@config:** - Searches the **config_class** of the specified model(s) in the **Model Library**
- **@id:** -

5.2 Model Line Placement

The **Model Line** tool provides a simple point-and-click process for placing linear models (such as walls, lamps, and barriers) on the terrain surface. **Model Lines** consist of **Node** models and **Segment** models.

- **Segment** - A model that is placed along the linear feature geometry.
- **Node** - A model that is placed on the vertices of a linear feature.

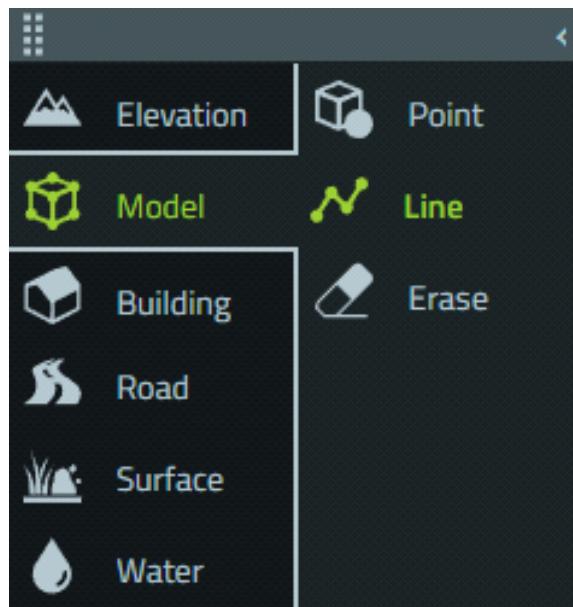


5.2.1 Placing Model Lines

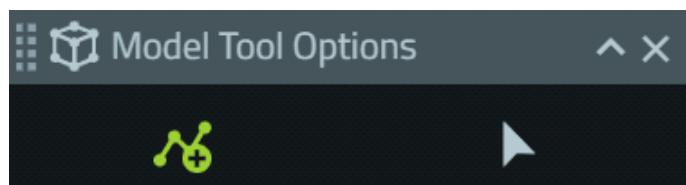
To begin placing linear models, select the **Model** mode in the toolbar and click the **Line** icon, or right-click and select **Model > Line > Place** from the **Quick Access Toolbar**.

NOTE

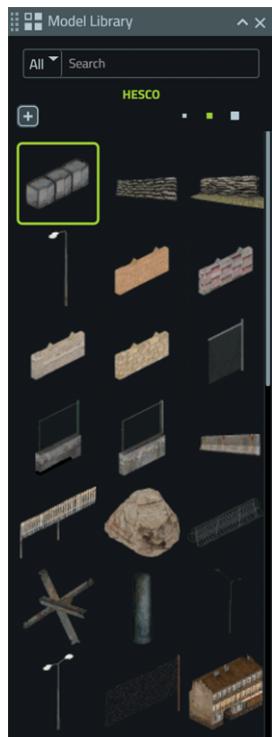
The **Line Place** tool also supports the same **Curve** mode as the **Road** tool and move operations as road vectors. For more information, see [Road Management \(on page 127\)](#), [Adding Curves \(on page 135\)](#), and [Moving Vectors \(on page 124\)](#) respectively.



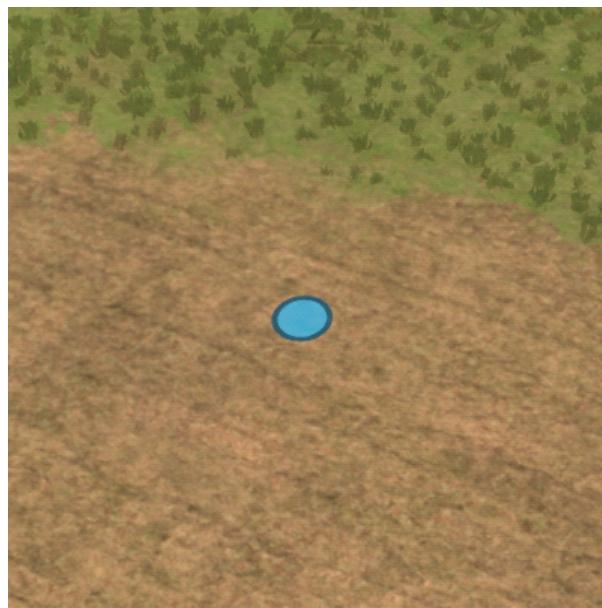
The **Model Tool Options** panel will also open, displaying the line placement controls. From the **Model Tool Options** toolbar, select the **Place** option.



The **Model Library** will also open, displaying thumbnail images of each line model style. Thumbnails represent the first segment defined in the model style.



Click a model line style in the **Model Library** to select it for placement.



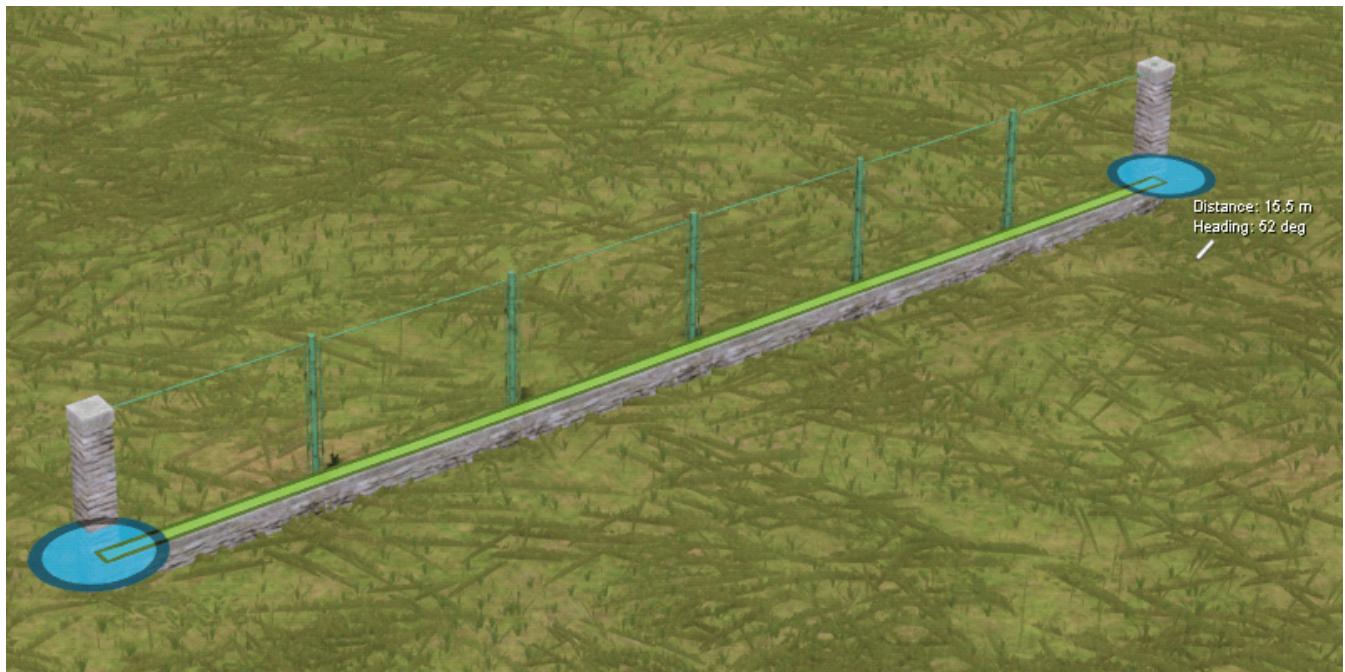
The **Line** tool displays the first vertex under your cursor before you begin placement.

Follow these steps:

1. Use the **Model Library** to select a style to place. The first style in the library will be selected by default.

Control	Description
Search Bar	Filter library models and search for specific models using keywords.
Add Style	Create your own model line style.
Thumbnail Size Selection	Select the size that the model thumbnail images will be displayed.
Style Thumbnails	Representative images of each model line style. There are two types of Style Thumbnails : <ul style="list-style-type: none"> • Default - Default model line styles that are included with VBS Geo. These cannot be edited or removed. Default model line styles are stored in the following file: <code>\VBS_Installation\Components\GeoCore\Presets\LinePlacement.json</code> • User-made - User-made model line styles are created by the user and are Battlespace-specific. These styles appear at the top of the Model Library and are indicated with an icon in the lower-right corner. User-made model line styles are saved in the <code>LinePlacement.json</code> file and transferred to and from VWS with the rest of the Battlespace.
User-made 	
Library Mouse-over Menu	Mouse-over menu containing Style Thumbnail management options. This menu appears when you hover the cursor over the selected Style Thumbnail . Options include: <ul style="list-style-type: none"> • Edit Style - Existing User-made model styles can be edited by pressing the Edit Style button in the mouse-over menu in the library. For the editing process, see Creating, Editing, and Managing Model Line Styles (on page 86).
Edit 	
Copy 	<p>NOTE</p> <p>Editing a model style affects all existing linear features that have that style assigned.</p> <ul style="list-style-type: none"> • Copy Style - Any of the model styles in the library can be copied by pressing the Copy Style button. The style will be duplicated with the "copy" suffix as a custom style for the given Battlespace.
Remove 	<ul style="list-style-type: none"> • Remove Style - Any User-made model style can be removed by pressing the Remove Style icon in the mouse-over menu in the library. Upon style removal, all the linear features using this style are switched to the first default preset, HESCO.

2. Click **LMB** on the terrain surface to draw a model line one vertex at a time. You will see a representation of the model style appear as you draw.



3. Press **Enter** to finish drawing the model line.
4. Edit the model line as necessary.
 - a. Click and hold **LMB** while hovering over the model line to move it.
 - b. Click and hold **LMB** on the filled vertices and move the cursor to adjust their placement.
 - c. Click **LMB** on one of the hollow vertices (between filled vertices) to add a vertex to the model line.
 - d. Click a different model style in the **Model Library** to apply a different style.
 - e. Press the **Delete** key while hovering over a filled vertex to delete that vertex.
 - f. Press the **Delete** key to delete the model line.

i **NOTE**

Some model line styles are configured to **Auto-adjust Vector Length**. This means that the vector is stretched to be properly filled with segments if necessary. For more information, see [Creating Model Line Styles \(on page 86\)](#).



WARNING

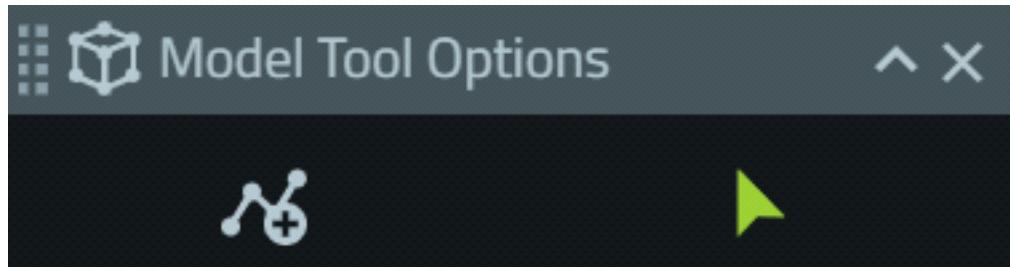
When using **Curve** mode with the **Model Line** tool, the preview does not correctly follow the curve. It is recommended to use a radius bigger than the individual model segments to ensure that the models curve properly.

5.2.2 Editing Model Lines

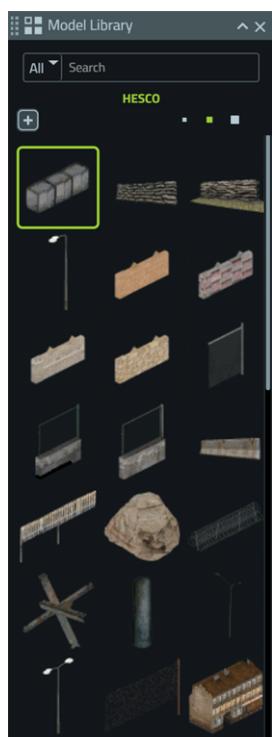
To begin editing placed line models, select the **Model** mode in the toolbar and click the **Line** icon and select **Edit**, or right-click and select the **Model > Line > Edit** from the **Quick Access Toolbar**.

NOTE

The **Line Edit** tool also supports the same **Curve** mode as the **Road** tool and move operations as road vectors. For more information, see [Road Management \(on page 127\)](#), [Adding Curves \(on page 135\)](#), and [Moving Vectors \(on page 124\)](#) respectively.



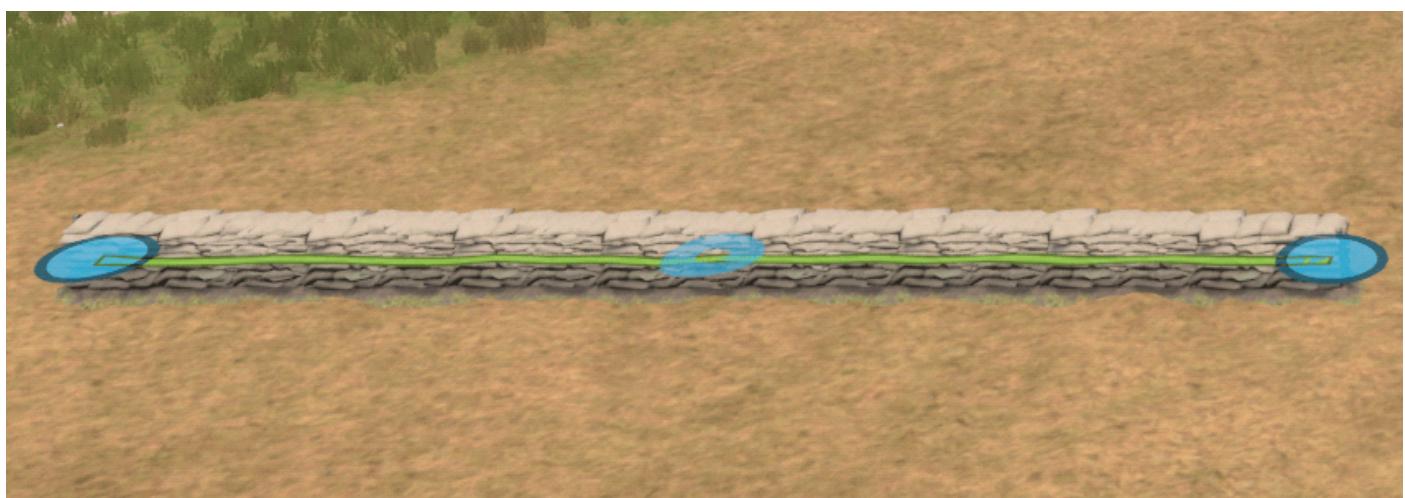
The **Model Library** also opens, displaying thumbnail images of each line model style.



When you hover a placed mode line with the **Model Edit** tool equipped, it will be highlighted in gray.



Select a placed model line to edit its path, change the model line's style, or to delete the model line. When a model line is selected, it is highlighted in **green**.



Follow these steps:

1. Click on a placed model line in the terrain to select it. The model line is highlighted in gray when hovered and turns **green** when selected.

NOTE

Only one model line can be selected at a time.

2. Edit the model line as necessary.
 - a. Click and hold **LMB** while hovering over the model line to move it.
 - b. Click and hold **LMB** on the filled vertices when the highlight changes to red and move the cursor to adjust their placement.
 - c. Click **LMB** on one of the hollow vertices (between the filled vertices) to add a vertex to a drawn model line.
 - d. Select a different model line style in the **Model Library** to change the selected model line's style.
 - e. To delete an individual vertex, press the **Delete** key while hovering over that vertex and the highlight changes to **red**.
 - f. To delete the entire model line, press the **Delete** key.

5.2.3 Unbinding Model Line Objects

By default, the model line acts as a single vector. As a result, models in a model line cannot be individually selected using the **Model Point** tool. Model lines can be unbound when the **Model Line** tool is equipped and the **Model Edit** subtool is selected.

NOTE

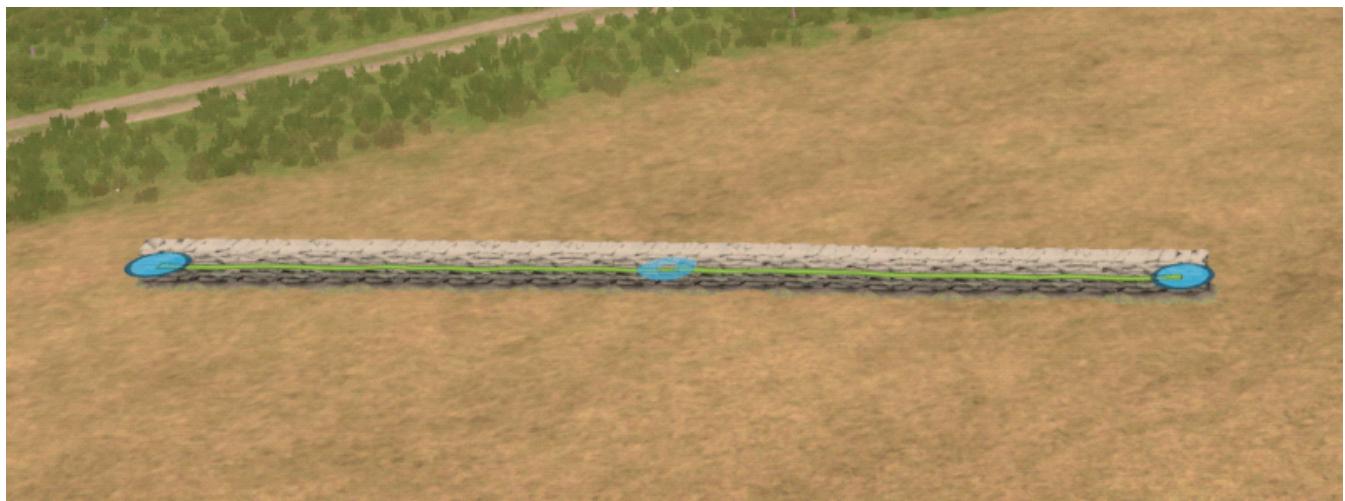
Skewed objects will remain skewed if unbound.

WARNING

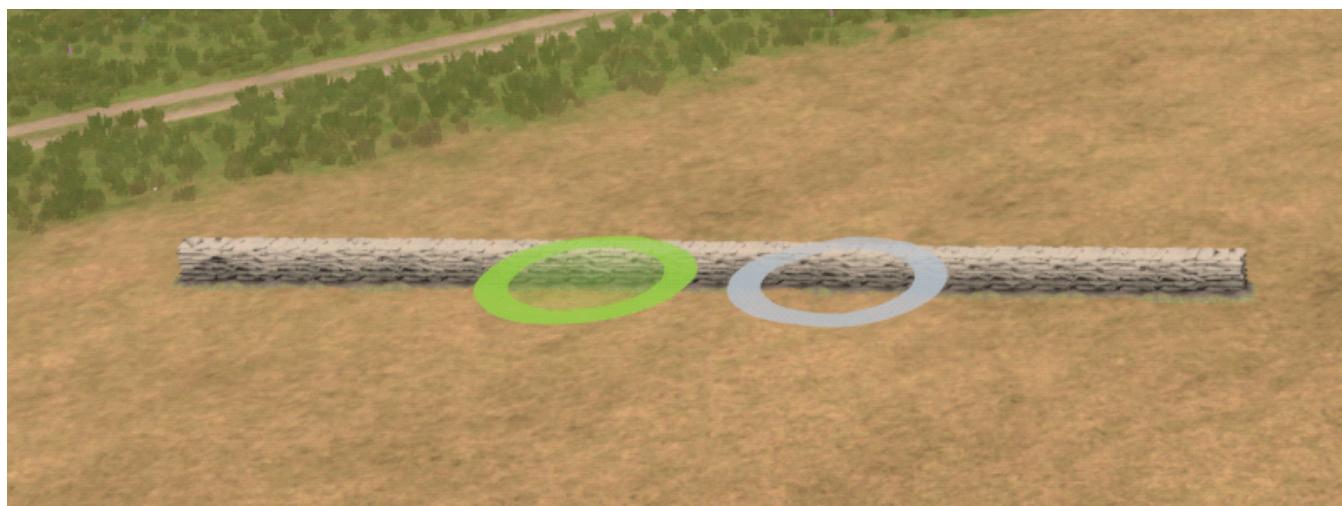
Unbinding models from a model line cannot be undone.

Follow these steps:

1. Select a model line with **Model Edit** equipped.



2. Hover over the model line with your cursor and press **Shift + Delete**.



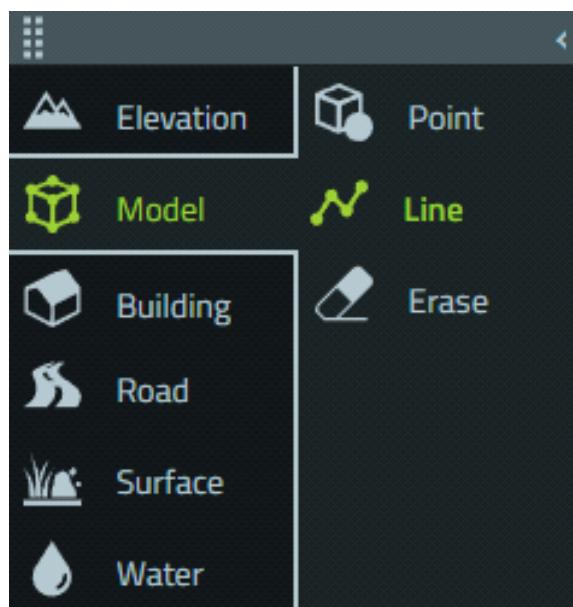
The model line will be unbound and its individual components can be interacted with using the **Model Point** tool.

5.3 Creating, Editing, and Managing Model Line Styles

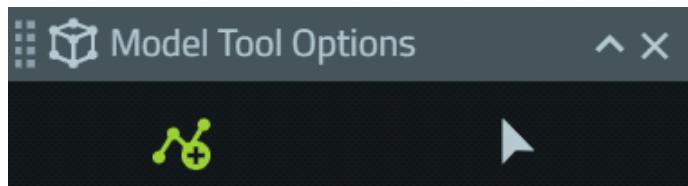
Users can also add their own user-made model line styles. To create your own model line style, define a ruleset and choose which models from the full model library to use.

5.3.1 Creating Model Line Styles

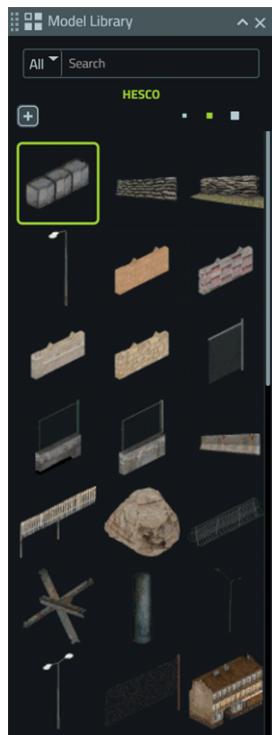
To begin creating model line styles, select the **Model** mode in the toolbar and click the **Line** icon, or right-click and select the **Model > Line** option from the **Quick Access Toolbar**.



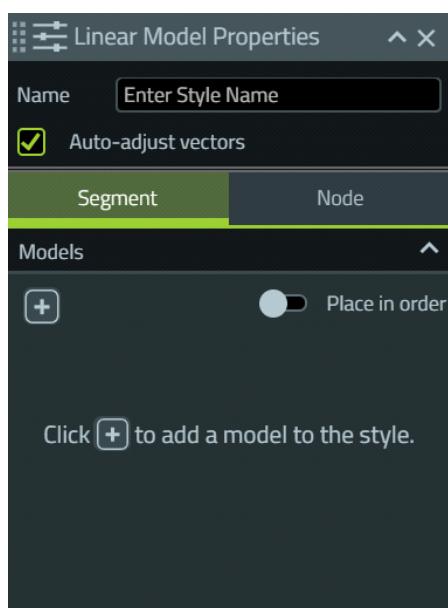
The **Model Tool Options** panel will open, displaying the **Line** controls. You can select either the **Place** or **Edit** option from the **Model Tool Options** toolbar.



The **Model Library** will also open, displaying thumbnail images of existing model styles as well as an **Add Style** button.



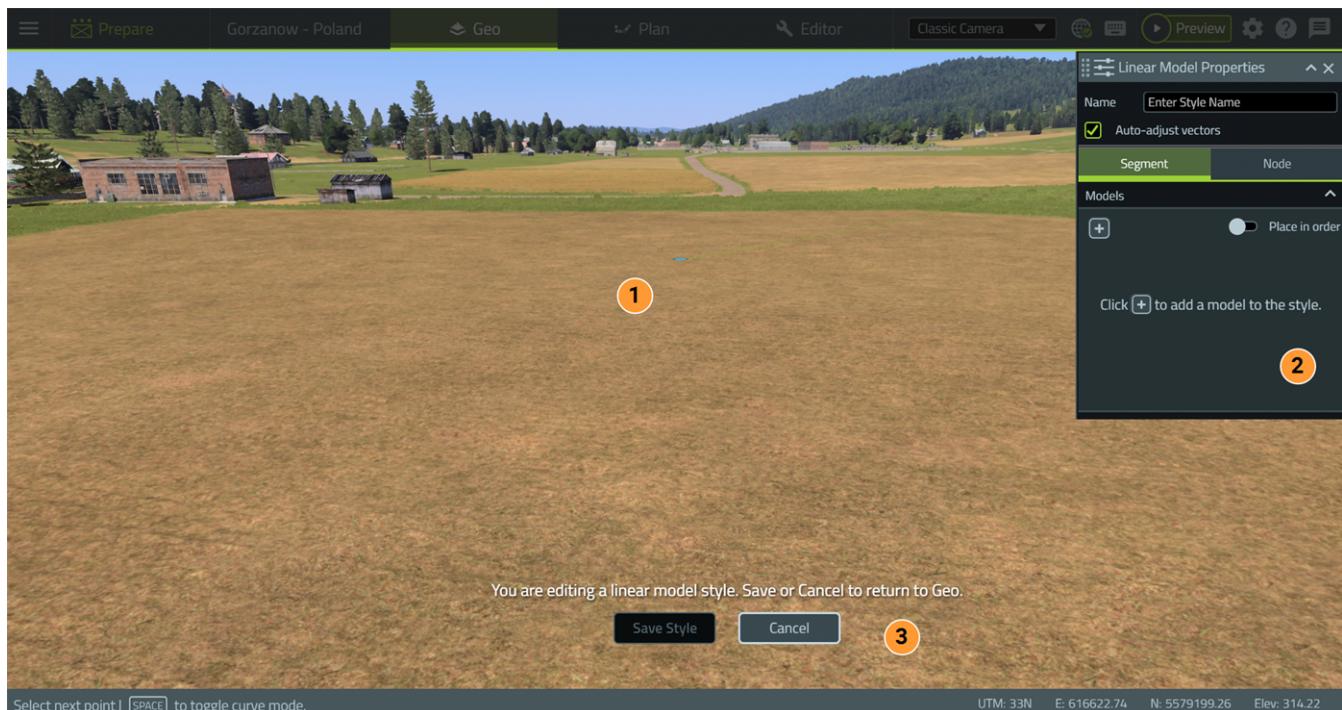
Click the **Add Style** button in the **Model Library**. The user interface will update to a special model line creation state and the **Linear Model Properties** panel will appear.



You will need to name the style and add at least one model before saving. There are 40+ parameters in the **Linear Model Properties** that can be manipulated to customize your unique model line style.

Follow these steps:

1. Click the **Add Style** button in the **Model Library** to begin creating a new style. The user interface will update to a special model line creation state.

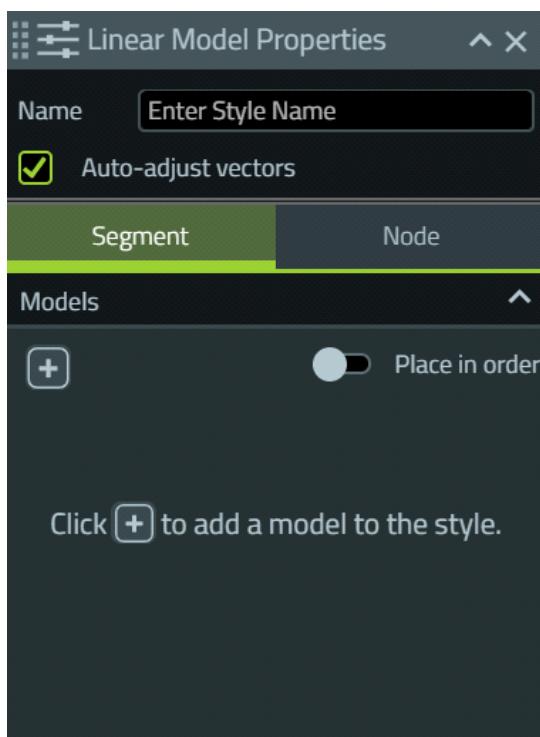


1	3D Camera View	View of the world terrain where you can draw a line to preview your style during creation.
2	Linear Model Properties	A panel for defining the Model Line Style ruleset.
3	Save Style and Cancel	Save your style after setting it up or cancel creating a style.

WARNING

All VBS Geo and VBS4 user interface options not described above are disabled during style creation.

2. Give the new style a Name.



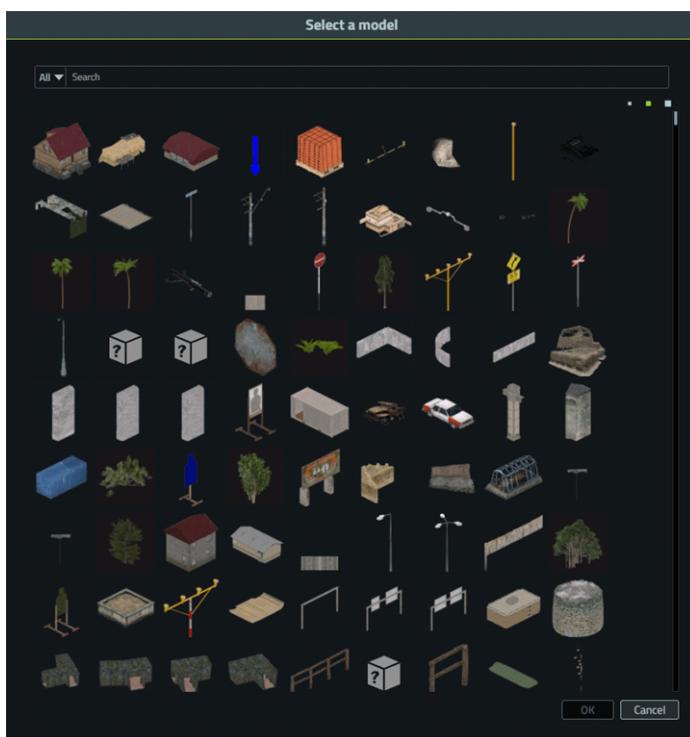
Style Property	Description
Name	Name of the style to be shown in the library.
Auto-adjust vectors	When this option is enabled, drawn vectors will adjust themselves to fit the contents of the style. This option should be used for styles containing continuous objects such as walls and fences to ensure that there is no overlap in the corners. When this option is disabled, vectors will not be adjusted to fit the style's contents; this is preferable for randomized or non-continuous styles.
Segment and Node Tabs	Determines if the models you add to the style will be placed as a Segment or a Node . This option will affect the model's behavior along the line depending on the selected tab: <ul style="list-style-type: none">• Segment - A model that is placed along a line. The first Segment model that is selected will define the thumbnail once the style is added to the Model Library.• Node - A model that is placed on the vertices of a model line.

Style Property	Description
Models	<p>Displays controls for adding and selecting individual models for placement.</p> <ul style="list-style-type: none">• Add Model - Launches the Point Model Library so you can select which model(s) you would like to place with your new style. Added models will become Segments or Nodes depending on which tab is selected.• Model Carousel - Displays selected models for selection and ordering. This area displays a help message when no models have been added. Once added, models on the carousel can be rearranged via click and drag.• Place in order - Determines if model segments should be placed in the order they appear in the carousel or placed randomly based on each segment's Probability property. Placing order is restarted after each vertex. This option only affects segments.

NOTE

Linear Model Styles must contain at least a name and one defined segment model to be valid and saveable. Once a model is added to the **Model Carousel**, additional options and properties are made available.

3. Add at least one **Segment** model to the style by selecting the **Segment** tab and clicking the **Add Style** button. A **Model Library** will appear containing all selectable models. Select all models you would like to add and click **OK**.



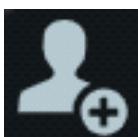
4. Draw a line to preview the style's appearance (see [Placing Model Lines \(on page 79\)](#)).
5. Modify the **Model Style Properties** (on the next page) of the selected **Segment** and **Node** models as desired.



NOTE

All style properties listed above are set on a per-model basis.

6. Save the style using the **Save Style** button at the bottom center of the **3D Camera View**.
7. The new model line style is added to the **Model Library** with the icon in the lower-right corner of the associated thumbnail.



8. Follow steps in the [Placing Model Lines \(on page 79\)](#) section to place additional copies of the new model style in your terrain.

NOTE

User-made model styles are Battlespace-specific, saved in the `LinePlacement.json` file, and transferred to and from VWS with the rest of the Battlespace.

Model Style Properties

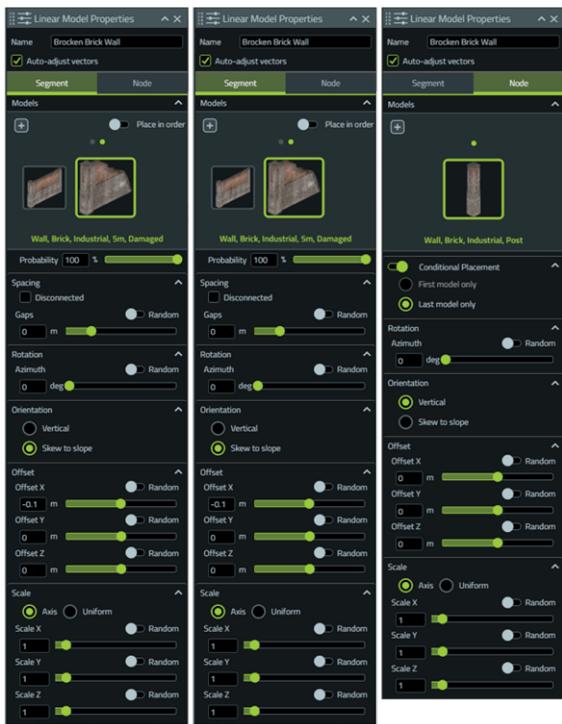
Style Property	Description
Carousel Model	<p>Thumbnail image associated with each selected Segment or Node model. Thumbnails will be arranged in the order in which they were added to the model style. Click and drag to rearrange the thumbnails. Segment thumbnails will be numbered if the Place in order option is enabled.</p> <div style="border: 2px solid red; padding: 5px; margin-top: 10px;"> <p> WARNING</p> <p>All properties beneath the carousel will only affect the selected carousel item.</p> </div>
Carousel Mouse-over Menu	<p>Moving the mouse over the selected Carousel Model will reveal a menu with two options:</p> <ul style="list-style-type: none"> • Copy - This option will duplicate the selected Carousel Model retaining all of the unique properties set for it.  <ul style="list-style-type: none"> • Remove - This option will remove the selected Carousel Model from the model style. 
Probability	<p>Defines how often the selected Carousel Model will appear on the model line. The probability is normalized between models. This property will appear in both Segment and Node tabs under the following circumstances:</p> <ul style="list-style-type: none"> • Segment - The Place in order option is disabled and more than one model is added. • Node - More than one model is added with the Conditional Placement property disabled.
Conditional Placement	<p>Optionally place a selected Node model only a single time at the beginning or end of a drawn line.</p> <ul style="list-style-type: none"> • First model only / Last model only - When selected, the Node model only appears at the start / end of drawn lines.

Style Property	Description
Spacing	<p>Defines how the selected Segment model will be spaced along a drawn line.</p> <ul style="list-style-type: none"> • Disconnected - Defines whether the selected model is meant to snap end to end with adjacent models or not. • Gaps - Defines the amount of space to occur after an instance of the selected model on a drawn line before the next model is placed. • Random - Sub-option to set minimum and maximum thresholds for randomized gap spacing.
Rotation	<p>Defines the rotation of the selected Carousel Model when placed along a line.</p> <ul style="list-style-type: none"> • Azimuth - defines the azimuth rotation value of the selected model relative to a drawn line. • Random - Sub-option to set minimum and maximum thresholds for randomized azimuth values.
Orientation	<p>Defines how the selected model will be oriented to the underlying elevation.</p> <ul style="list-style-type: none"> • Vertical - Places the segment vertically along the linear feature not adjusting their shape and form in any way. Used when placing trees / street lamps when it is not desired to change the shape of the model. • Skew To Slope - Places the models along the linear feature and adjusts their skew to the underlying elevation. Skew is dynamically adjusted when the line is edited and underlying elevation changes are made. Used on segment models when placing fences and walls.
Offset	<p>Defines the position of the selected model's placement relative to the drawn line and Spacing properties.</p> <ul style="list-style-type: none"> • Offset X / Offset Y / Offset Z - Adjusts the model position along the X/Y/Z-axes, moving the model back and forth along the line. • Random (all Offset options) - Sub-option to set minimum and maximum thresholds for randomized offsets.
Scale	<p>Defines how the selected model will be scaled.</p> <ul style="list-style-type: none"> • Axis - With this option selected, each axis can be scaled separately. • Scale X / Scale Y / Scale Z - Adjust the model scale in the X/Y/Z-axes, changing its width, height, and depth. • Uniform - With this option selected, all axes can be scaled together. • Random (all Scale options and Uniform option) - Sub-option to set minimum and maximum thresholds for randomized scaling.

5.3.2 Model Line Style Configuration Examples

There are two main types of model line styles, those containing continuous models like walls and fences, and those containing spaced out models like streetlights and trees. The following examples present one of each of these types.

Continuous Style - Broken Brick Wall



Final Model Style Placed



Non-Continuous Style - Street Side Models

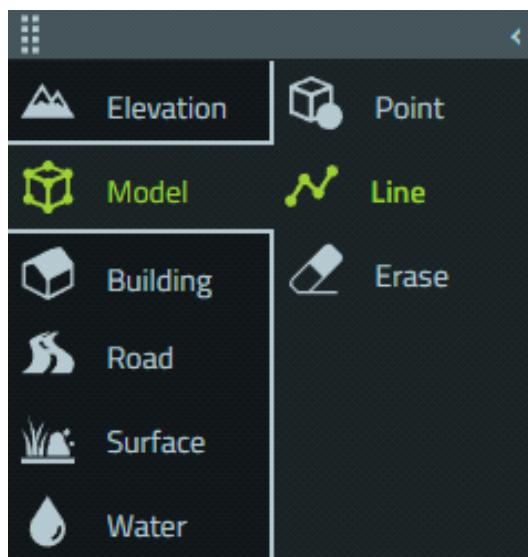


Final Model Style Placed

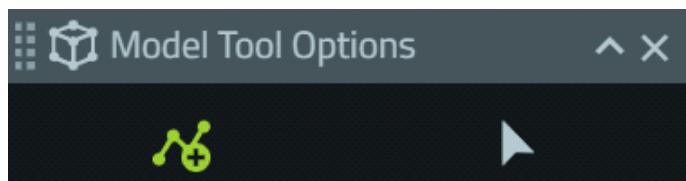


5.3.3 Editing Model Line Styles

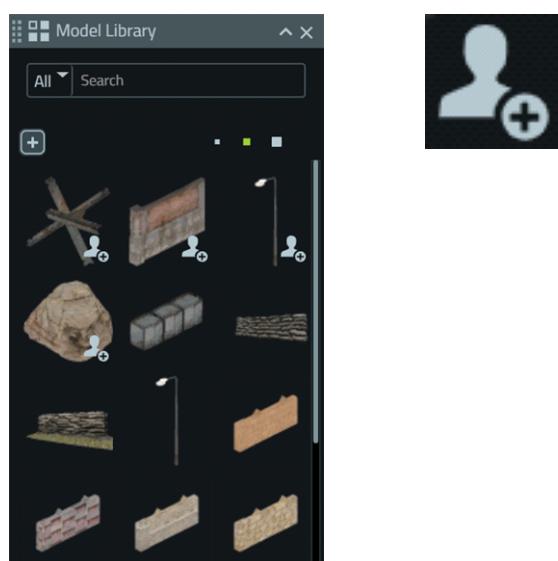
All **User-made** model line styles can be subsequently edited. To begin editing a model line style, select the **Model** mode and click the **Model Line** icon, or right-click and select the **Model > Line** from the **Quick Access Toolbar**.



The **Model Tool Options** panel opens, displaying the line placement controls. From the **Model Tool Options** toolbar, you may choose either option.



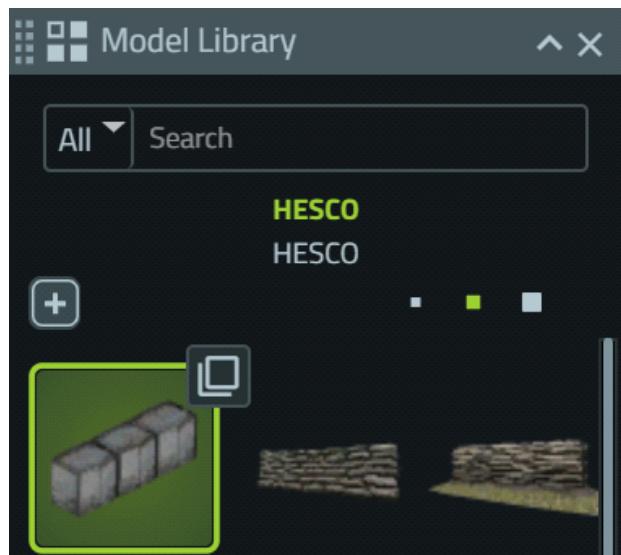
The **Model Library** also opens, displaying thumbnail images of each line model presets. Editable **User-made** thumbnails appear at the top of the library and are indicated with an icon in the lower-right corner.



Select a **User-made** style you would like to edit, hover over the selection, and click the **Edit Style** option in the resulting menu.

NOTE

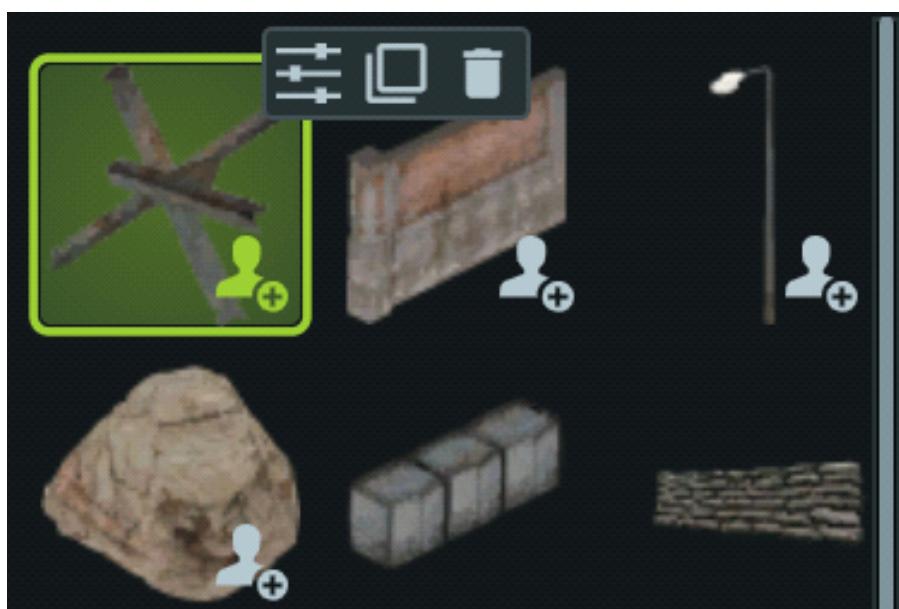
If a **User-made** style does not exist, you can quickly create one by selecting a **Default** style and making a copy of it using the **Copy** mouse-over menu option.



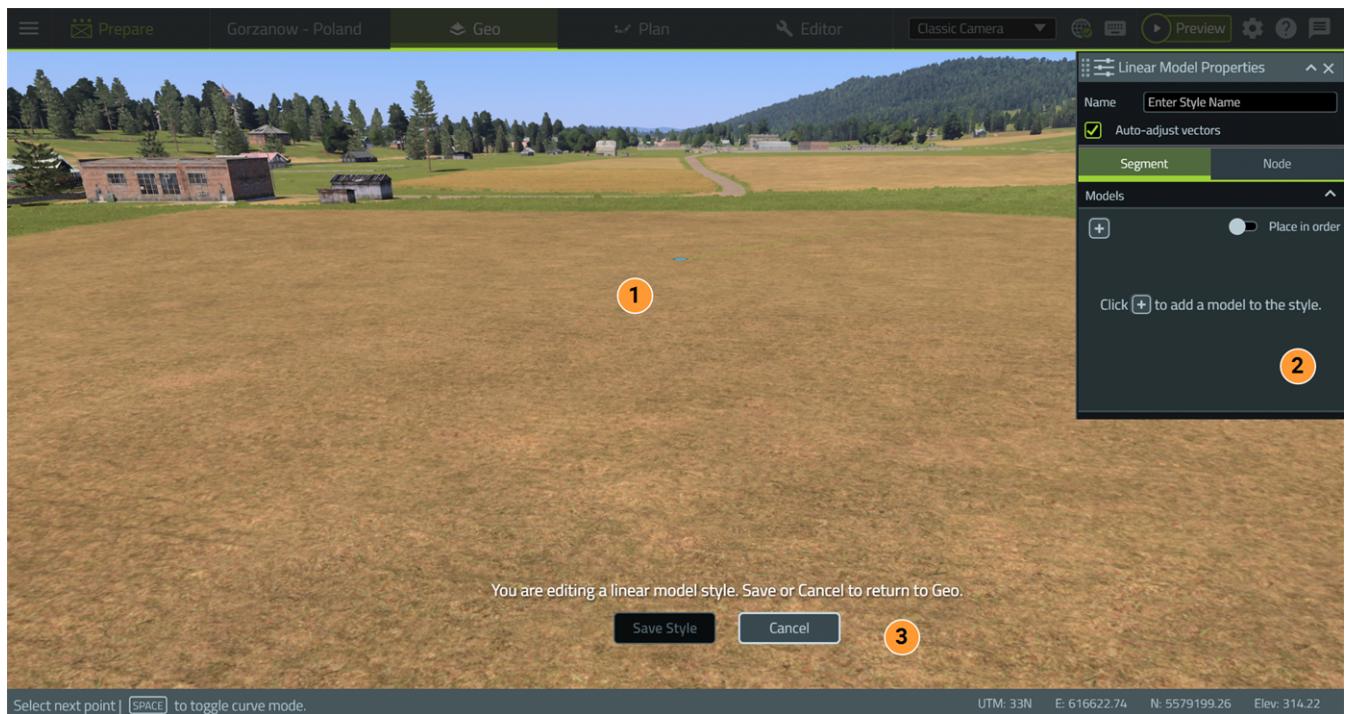
Edit the style as needed and save the changes. Saved changes propagate to all existing copies of the edited style.

Follow these steps:

1. Select a **User-made** style in the **Model Library**. Mouse over the selected style and click **Edit Style** from the resulting menu.



2. The user interface updates to a special model line editing state with the properties of the selected style loaded.



1	3D Camera View	View of the world terrain where you can draw a line to preview your style during creation.
2	Linear Model Properties	A panel for defining the Model Line Style ruleset.
3	Save Style and Cancel	Save your style after setting it up or cancel creating a style.

3. Draw a line to preview the style appearance (see [Placing Model Lines \(on page 79\)](#)).
4. Interact with the **Linear Model Properties** panel to modify the style definition. Properties at the top affect the entire style, whereas the properties below the **Models** section only affect the selected **Model**. See the tables in [Creating Model Line Styles \(on page 86\)](#), steps 2 and 5, for more information.
5. Click the **Save Style** button to save the style once you have finished making edits, or click the **Cancel** button to cancel out of the edit session.

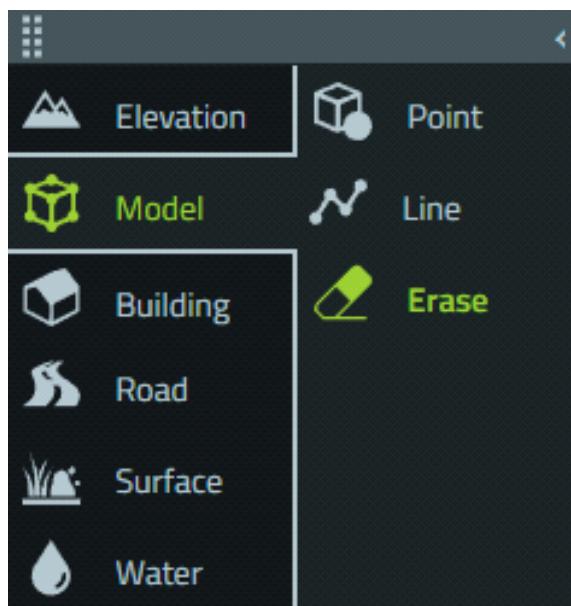
5.4 Model Erasing

The **Erase** tool allows for rapid freehand deletion of multiple models at once.

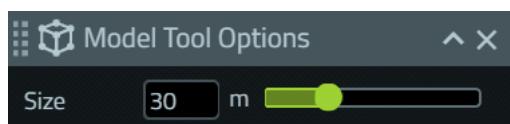
NOTE

The **Erase** tool can delete models previously placed with VBS Geo, inset terrain models, and procedural building models included in the VBS4 base data.

To begin erasing models, select the **Model** mode in the toolbar and click the **Erase** icon, or right-click and select the **Model > Erase** from the **Quick Access Toolbar**.



The **Model Tool Options** panel will open, displaying the **Erase** controls.



Use the **Erase** tool to specify the size of the eraser and to apply the eraser to the terrain in an area containing previously placed models.



The **Erase** tool displays a **red** ring on the surface of the terrain, centered around the cursor.

Deletable models will be highlighted by a semi-transparent red ring when the **Erase** tool hovers over them.



Follow these steps:

1. Select the size of the eraser in the **Model Tool Options**.
2. Use the **Erase** on the terrain where there are one or more placed models to remove them.
 - a. Hold **LMB** and move the cursor to erase models across the terrain.

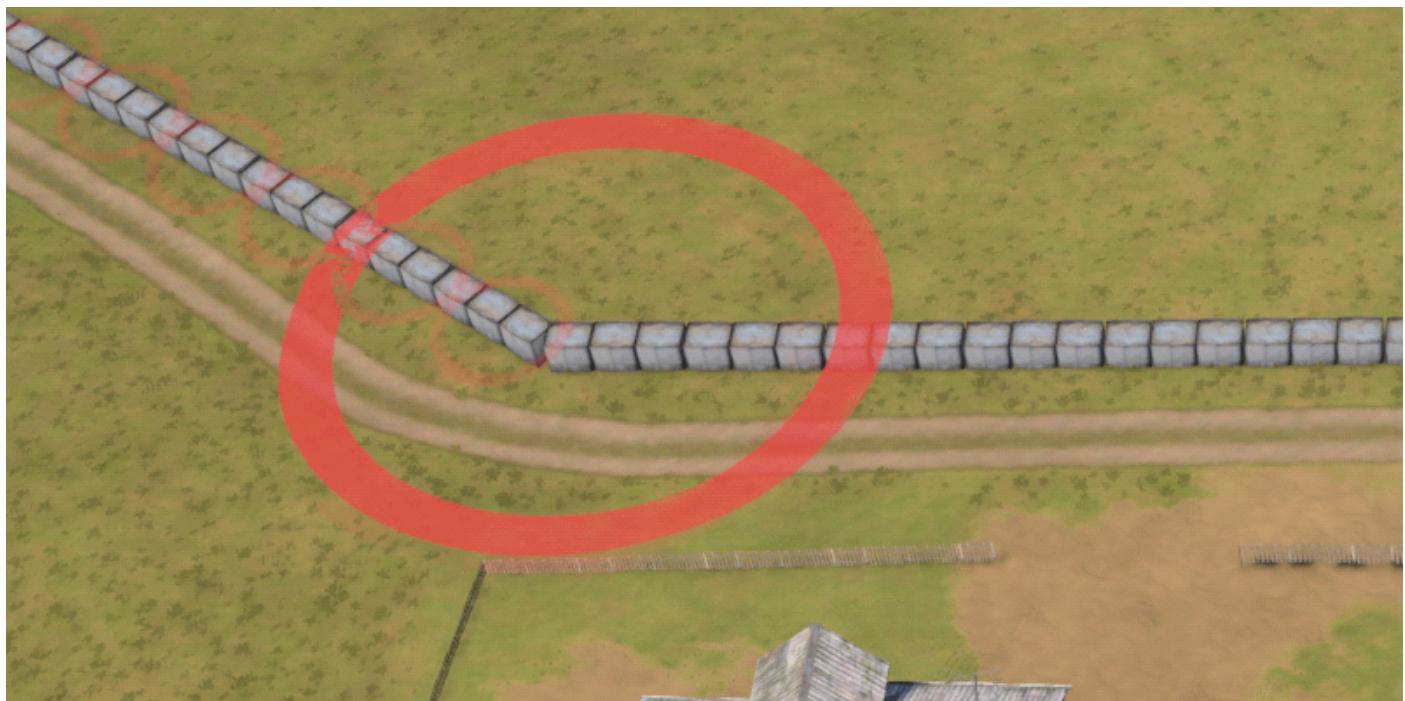
Bohemia Interactive Simulations recommends the following best practices for using the **Erase** tool:

- Use the eraser to remove multiple models along a traceable path.

5.4.1 Erase Brush for Line Placement

The **Erase** tool can also remove models placed with the **Model Line** tool. If models are bound to the line and the **Erase** tool is applied to part of the line, both the line and the attached models will be removed.

Placed lines and attached models will be highlighted by a semi-opaque red ring when the **Erase** tool hovers over them.



6. Placing and Editing Buildings

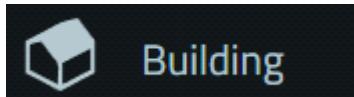
VBS Geo includes a **Building** mode to place and edit building models in VBS4 using a selection of **Building Tools**.

NOTE

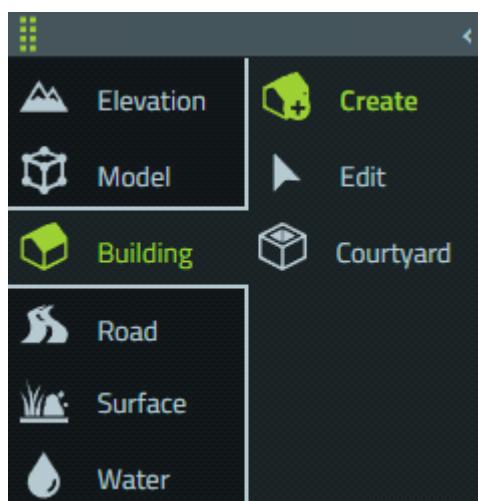
The **Building Tools** can also modify procedural buildings generated from World Data, and some buildings placed in Insets.

The **Model Library** also contains a set of buildings, but these are not editable using the **Building Tools**. For more information, see [Placing and Editing Models \(on page 68\)](#).

- In the **Toolbar**, click the **Building** icon.



The VBS Geo toolbar displays a set of **Building Tools**.

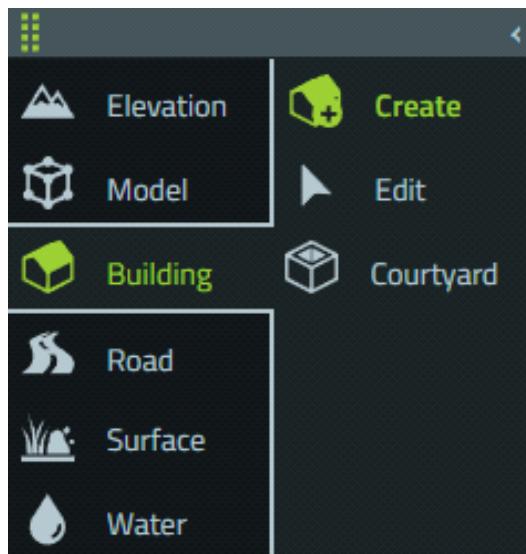


Tool Icon	Tool Type	Description
	Building Create	Place a building footprint and generate a default building. For more information, see Place Buildings (on the next page) .
	Building Edit	Modify a previously placed building. For more information, see Building Footprint Editing (on page 104) and Building Properties Editing (on page 106) .
	Building Courtyard	Create internal spaces by cutting areas out of the building footprint. For more information, see Adding Courtyards (on page 108) .

6.1 Place Buildings

The **Building Create** tool allows you to place buildings by drawing a custom building footprint.

To begin placing a building, select the **Building** mode in the toolbar and click the **Building Create** icon, or right-click and select the **Building > Create** option from the **Quick Access Toolbar**.



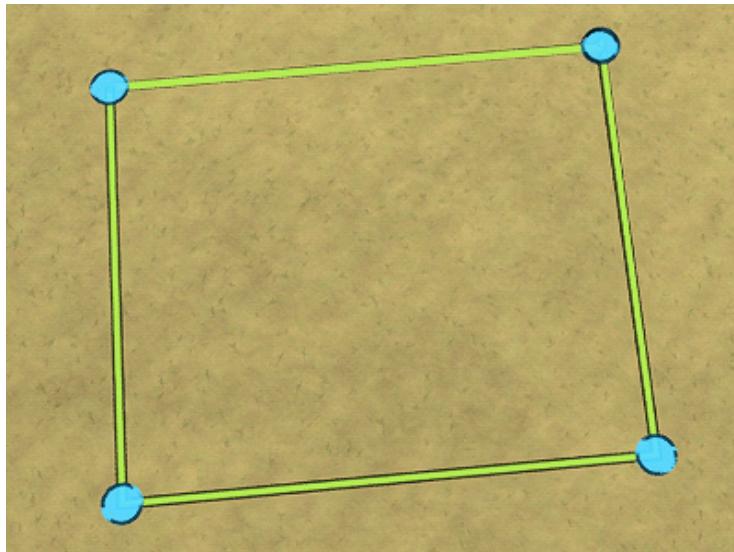
Follow these steps:

1. Click on the terrain surface to draw the building footprint one vertex at a time. The building footprint displays in **green** after you have placed at least 3 vertices.



TIP

Hold **Shift** while drawing to display right-angle guidelines and to auto-snap the vertices to right-angles.



2. Press **Enter** to finish drawing the building footprint and to place the building.

VBS Geo places a default building using the **Automatic** selection in the **Building Library** and **1 Floor** from the **Building Tool Options**.



To modify placed buildings, see the following:

- [Building Footprint Editing \(below\)](#)
- [Building Properties Editing \(on page 106\)](#)
- [Adding Courtyards \(on page 108\)](#)

To delete a building, select **Building Edit** tool, select the building, and press **Delete**, or use [Model Erasing \(on page 99\)](#).

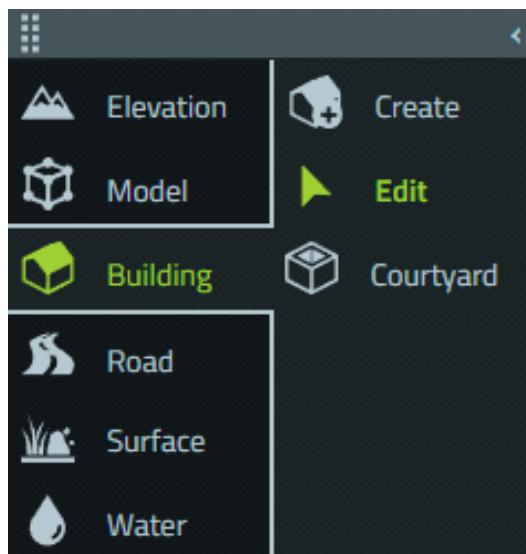
6.2 Building Footprint Editing

The **Building Edit** tool allows you to modify the footprint of a selected building.

i NOTE

The **Building Edit** tool also supports the same **Curve** mode as the **Road** tool and move operations as road vectors. For more information, see [Adding Curves \(on page 135\)](#) and [Moving Vectors \(on page 124\)](#) respectively.

To edit building footprints, select **Building** mode in the toolbar and click the **Building Edit** icon, or right-click and select the **Building > Edit** from the **Quick Access Toolbar**.

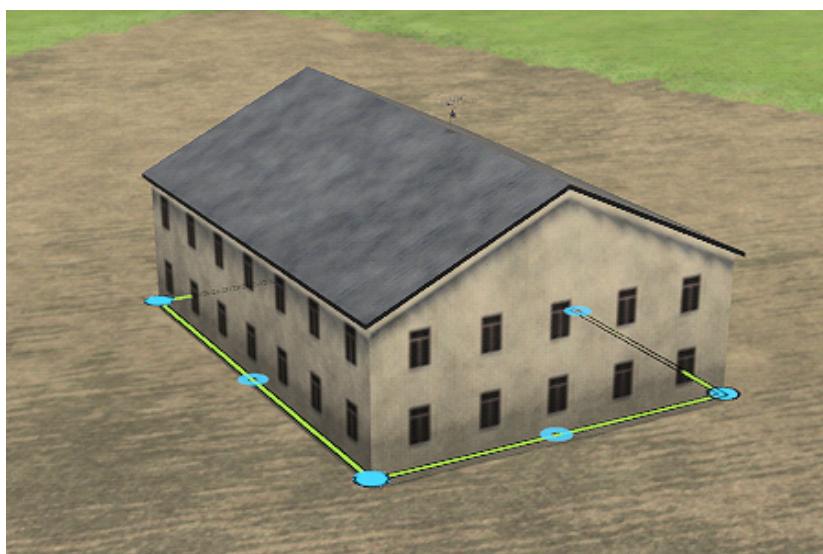
**Follow these steps:**

1. Select the building to edit by clicking within its footprint.

NOTE

The existing footprint displays in gray when the cursor is over an editable building.

The selected building footprint is displayed.



2. Drag and drop the solid circles to move the current building footprint vertices.
3. Drag and drop the hollow circles to create new vertices and to change the building footprint.

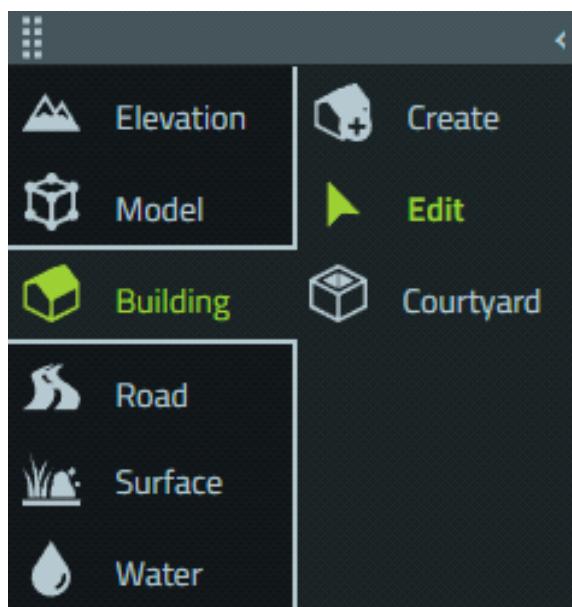
NOTE

Right-angle snapping is only available in **Place** mode.

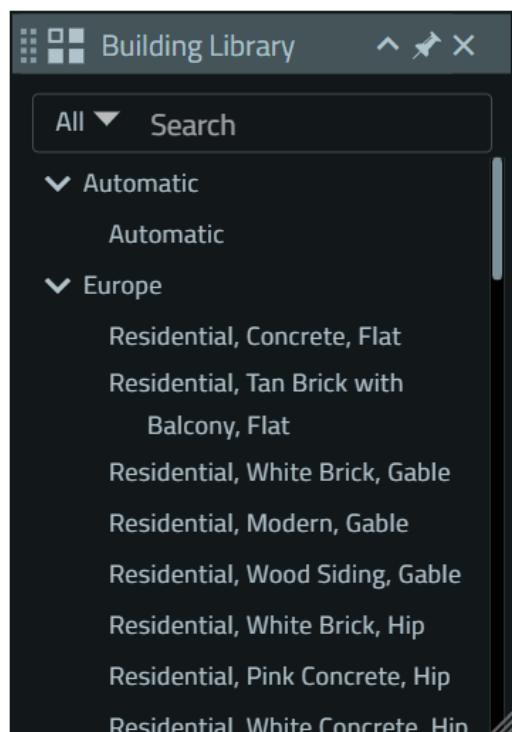
6.3 Building Properties Editing

The **Building Edit** tool allows you to change the building type and modify its properties.

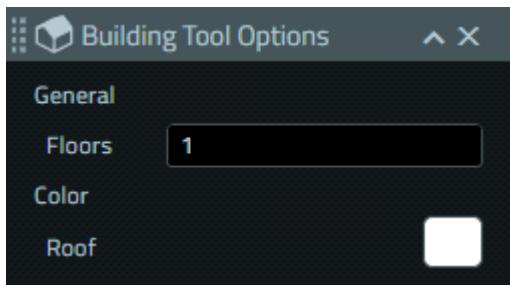
To edit building properties, select the **Building** mode in the toolbar and click the **Building Edit** icon, or right-click and select the **Building > Edit** from the **Quick Access Toolbar**.



The **Building Library** panel opens, displaying the available building models.



The **Building Tool Options** panel opens to modify the selected building properties.

**Follow these steps:**

1. Select the building to edit by clicking within its footprint. The **Building Library** and **Building Tool Options** panels open.
2. To change the building model, select a different building from the **Building Library**.



Select **Automatic** for VBS Geo to select a model based on the location. The shape and height of such a building is determined based on the model that is automatically placed.

3. Use the **Building Tool Options** to adjust the selected building properties:

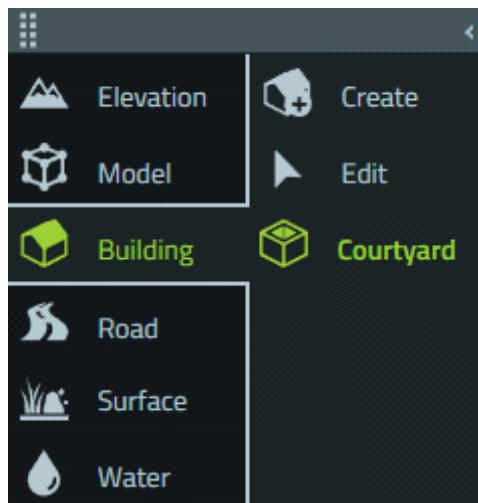
- To adjust the building height, input the number of **Floors**.
- To change the **Roof Color**, click the color box and use the **Color Selector**.



6.4 Adding Courtyards

The **Building Courtyard** tool allows you to cut areas out of a building footprint to create open areas within the building shape.

To create courtyards, select the **Building** mode in the toolbar and click the **Building Courtyard** icon, or right-click and select the **Building > Courtyard** from the **Quick Access Toolbar**.



Follow these steps:

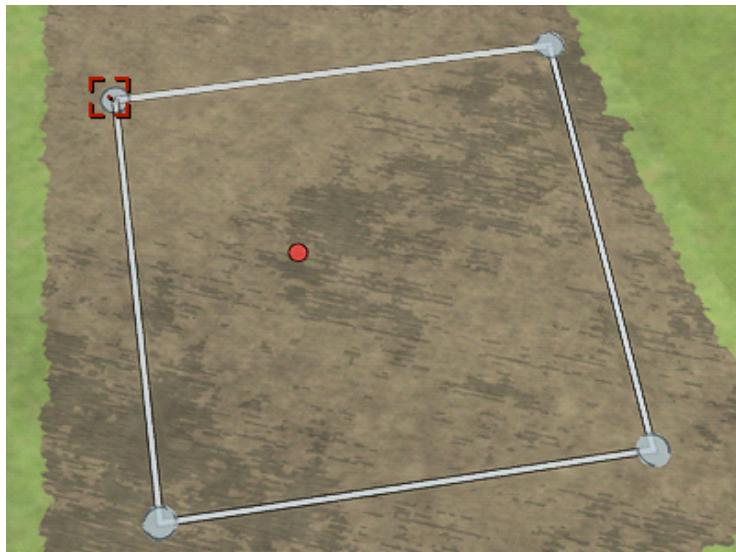
1. Move the cursor over the building footprint.

When the cursor is in an appropriate position, the building footprint is displayed in gray and the building model disappears to assist with courtyard placement.



TIP

Use the **Top-Down Camera** for a better perspective.



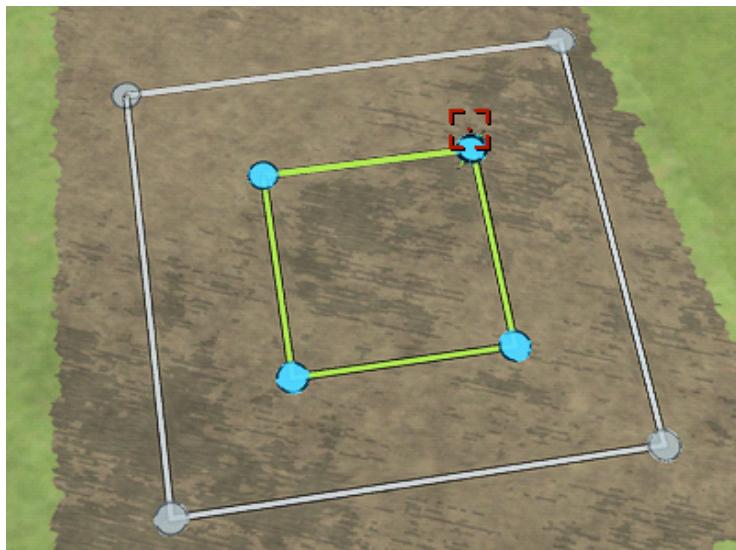
- Click on the terrain surface to draw the courtyard shape one vertex at a time.

 **WARNING**

The shape of the courtyard must be completely inside the building footprint.

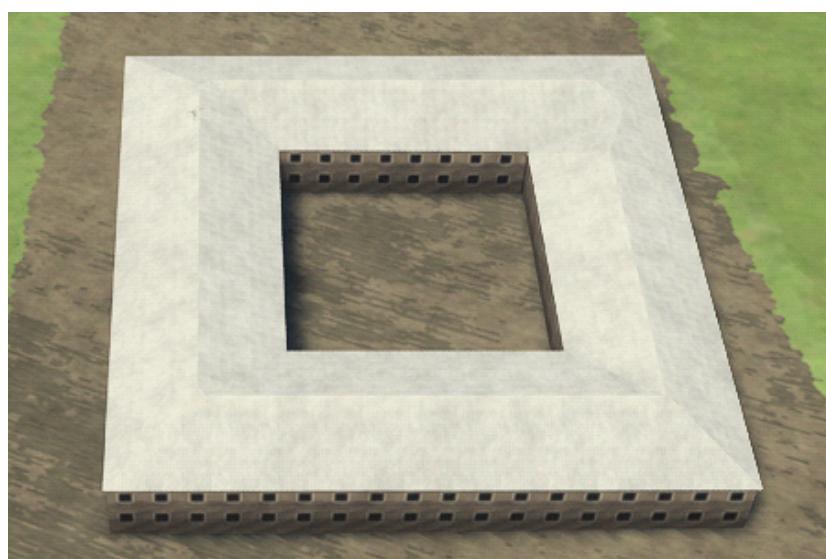
 **TIP**

Hold **Shift** while drawing to display right-angle guidelines and to auto-snap the vertices to right-angles.



- Press **Enter** to finish drawing the courtyard shape and to modify the building.

VBS Geo cuts the courtyard shape out of the building and reinstates the modified building model.

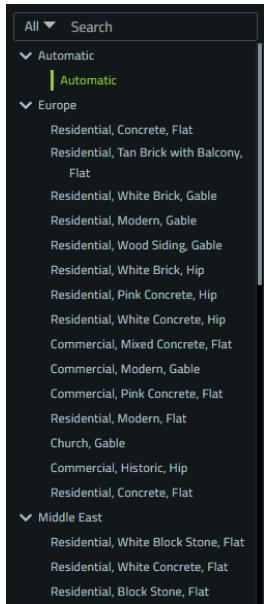


To modify the courtyard shape, use [Building Footprint Editing \(on page 104\)](#) to select the courtyard and adjust its vertices.

To delete the courtyard, select the **Building Edit** tool, select the courtyard, and press **Delete**.

6.5 Building Templates

The **Building Template Library** contains various building facade and roof combinations that are specific to regions in the world.



The names of each template follow this scheme:

1. **Zone** - The type of building. Can be either residential or commercial.
2. **Facade** - A small descriptor of the facade texture.
3. **Roof** - The roof type of the template.

The following building templates exist:

Automatic

- Automatic

South Asia

- Residential, Green Rattan, Gable
- Residential, Ribbed, Gable
- Residential, White Brick, Flat
- Residential, Stacked Brick, Flat
- Residential, Concrete with Balcony, Flat
- Residential, Stacked Brick with Balcony, Flat
- Commercial, Mixed-Use Modern, Flat
- Commercial, Mixed-Use Brick, Flat
- Commercial, Mixed-Use Concrete, Flat

Middle East

- Residential, White Block Stone, Flat
- Residential, White Concrete, Flat
- Residential, Block Stone, Flat
- Residential, Stone, Flat
- Residential, Tan Stone, Flat
- Residential, White Stone, Flat
- Residential, Stone with Balcony, Flat
- Commercial, Mixed-Use Stone, Flat
- Commercial, Mixed-Use Stone with Balcony, Flat

Europe

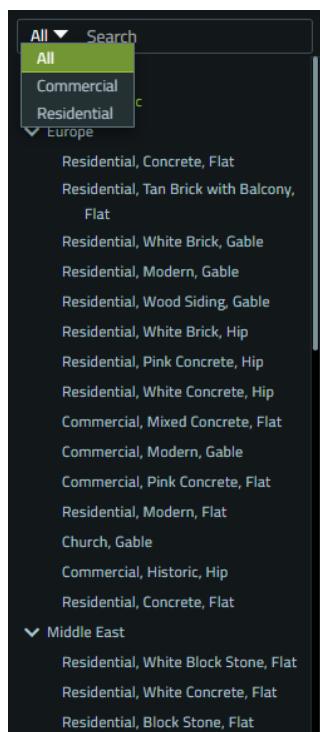
- Residential, Concrete, Flat
- Residential, Tan Brick with Balcony, Flat
- Residential, White Brick, Gable
- Residential, Modern, Gable
- Residential, Wood Siding, Gable
- Residential, White Brick, Hip
- Residential, Pink Concrete, Hip
- Residential, White Concrete, Hip
- Commercial, Mixed Concrete, Flat
- Commercial, Modern, Gable
- Commercial, Pink Concrete, Flat
- Residential, Concrete, Flat
- Residential, Modern, Flat
- Church, Gable
- Commercial, Historic, Hip

North America

- Residential, White Siding, Gable
- Residential, Modern, Flat Inset
- Residential, Brick, Gable
- Residential, Mixed Brick, Gable
- Commercial, Mixed Concrete, Flat Inset
- Residential, Modern, Hip
- Commercial, Blue Siding, Gable
- Commercial, Tan Concrete, Flat Inset
- Commercial, White Blocks, Flat
- Commercial, Skyscraper, Flat Inset
- Residential, Red Concrete, Flat Inset
- Commercial, Modern, Flat Inset
- Commercial, Modern Skyscraper, Flat
- Commercial, Glass Skyscraper, Flat
- Residential, Brick, Flat
- School, Flat Inset

6.5.1 Search and Filter

The template list can be filtered by keywords or quickly searched for a specific preset.



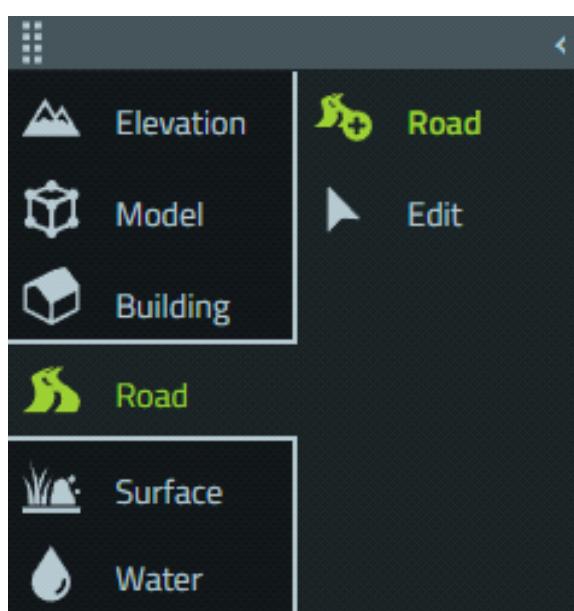
7. Placing and Editing Roads

VBS Geo includes a **Road** mode to populate the VBS4 terrain with new roads and to edit global road data.

- In the **Toolbar**, click the **Road** icon.



The VBS Geo toolbar will display a set of **Road Tools**.

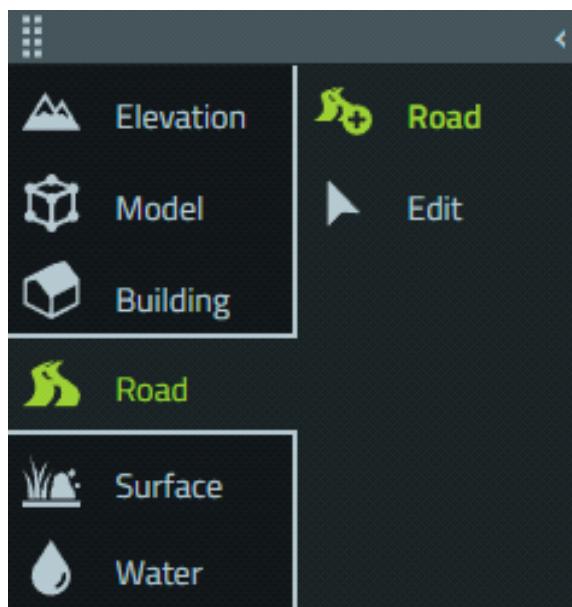


Tool Icon	Tool Type	Description
	Road Place	Place new roads on the terrain surface. For more information, see Road Placing (on the next page) .
	Road Edit	Select and edit existing roads. For more information, see Road Editing (on page 121) .

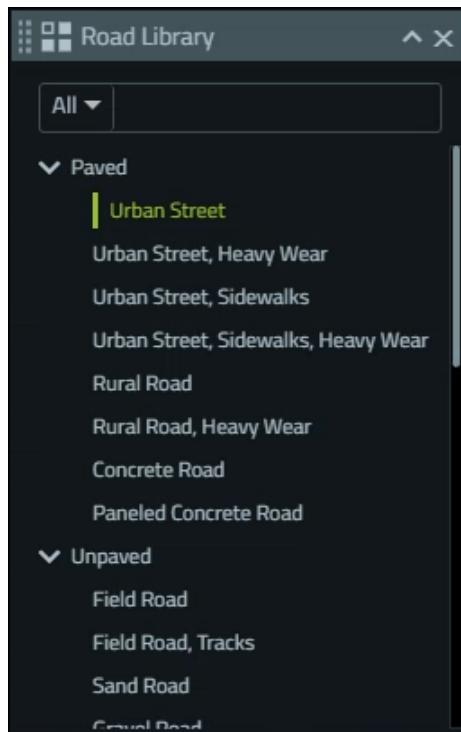
7.1 Road Placing

The **Road Place** tool allows you to place a selected road preset on the terrain using a linear drawing process.

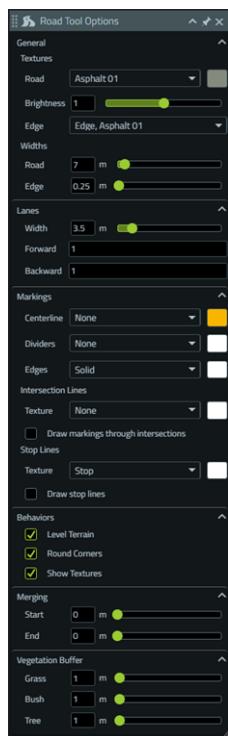
To begin placing roads, select the **Road** mode in the toolbar and click the **Road Place** icon, or right-click and select the **Road > Place** option from the **Quick Access Toolbar**.



The **Road Library** opens, displaying a list of each available road presets that can be placed on the terrain.

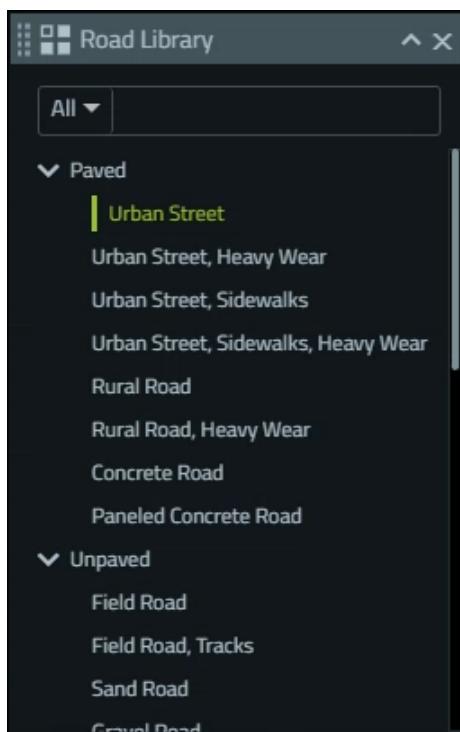


The **Road Tool Options** also opens, displaying controls for adjusting the selected road.



Follow these steps:

1. Use the **Road Library** to select one of the **Road Presets** (on page 138) to place. Click on one of the available road presets in the library to select it.



2. Use the **Road Tool Options** to adjust the values of the road as required.

Road Tool Options are split into the following parts to enable road modification:

- General Section (on the next page)
- Lanes (on page 118)
- Markings (on page 118)
- Behaviors (on page 119)
- Merging (on page 120)
- Vegetation Buffer (on page 120)

3. Click on the terrain surface to draw the road one vertex at a time. You will see a representation of the road, outlined in **green**, after you have begun placing vertices. Place at least two vertices to draw a valid road.



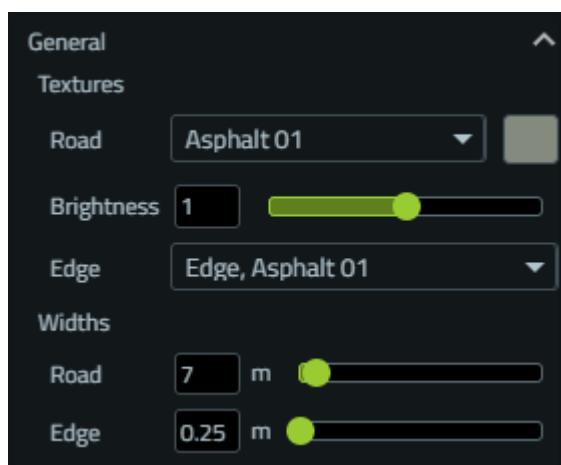
4. Press **Enter** or right-click on the terrain and select **Complete Drawing** to finish drawing the road. You will see the road drawing filled with the road preset you selected in the **Road Library**.
5. Edit the road as necessary.
 - a. Click and hold **LMB** while hovering over the road to move it.
 - b. Click and hold **LMB** on the filled vertices and move the cursor to adjust their placement.
 - c. Click **LMB** on one of the hollow vertices (between filled vertices) to add a vertex to the road.
 - d. Select a different road preset in the **Road Library** to change the road's type.
 - e. Press the **Delete** key while hovering over a filled vertex to delete that vertex.
 - f. Press the **Delete** key to delete the road.
6. Click away from the drawn road or press **Enter** to deselect it and to begin drawing a new road.

Follow these best practices when using the **Road Place** tool:

- Complete all elevation edits before drawing roads.
- Place additional vertices where smooth road curves are required.
- Do not start and end roads at the same point.
- To avoid excessive terrain cutting, place vertices at points where the elevation of the terrain changes significantly.
- Use vertices efficiently by placing the minimum number of vertices necessary to render a road. Too many vertices may result in performance issues.

7.1 General Section

Common settings for roads are found in the **General** section.



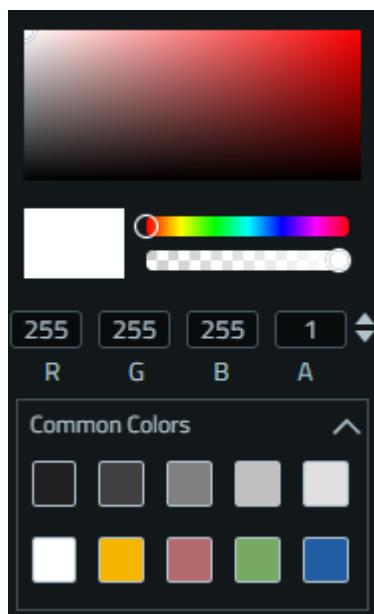
- **Road Texture** - Defines the main texture used throughout the entire road. The textures in the selection drop-down now include:
 - None
 - Asphalt 01
 - Asphalt 02
 - Asphalt 03
 - Asphalt 04
 - Concrete 01
 - Legacy*
 - Field 01
 - Field 02
 - Forest 01
 - Grass 01
 - Gravel 01
 - Gravel 02
 - Railroad**
 - Path, Field 01
 - Path, Field 02
 - Sand 01
 - Sand 02
 - Tracks, Field 01
 - Tracks, Gravel 01
 - Tracks, Sand 01
 - Shoulder, Asphalt 01
 - Shoulder, Asphalt 02
 - Shoulder, Asphalt 03
 - Shoulder, Asphalt 04

NOTE

* This option is only visible when selecting a road from VBS Geo 23.1 or earlier and is NOT available as a selection choice. Whenever a legacy road is selected, all but the road surface texture selection is disabled. To continue, assign a new road surface texture to the legacy road.

** Railroad is only available for the Railroad preset and is NOT available for selection.

- **Road Color** - Select a color block next to Texture to display a color selector. Select a color to apply it to the road. A selection of common colors is also available to quickly apply a color blend. To reset the road color, select or assign the white color.



- **Brightness** - Defines the brightness of the road.
- **Road Edge Texture** - Defines the texture on the edge of the road. Provides a transition from the road to a neighboring surface. The following edge textures are available:
 - None
 - Edge, Asphalt 01
 - Edge, Asphalt 02
 - Edge, Asphalt 03
 - Edge, Asphalt 04
 - Edge, Concrete 01
 - Edge, Field 01
 - Edge, Field 02
 - Edge, Grass 01
 - Edge, Gravel 01
 - Edge, Gravel 02
 - Edge, Sand 01
 - Edge, Sand 02
 - Sidewalks 01
- **Road Width** - Defines the width of the main road. This value defines only the width of the main road and does NOT include the road edge width as they separate. However, any adjustments to the road width affect the lane width in the Lanes section, and the buffer distances in the Vegetation Buffer section.
- **Edge Width** - This setting defines the width of the road edges. This value applies to BOTH sides of the main road. By default, setting an edge width may not yield any result if there is no edge texture selected. For proper results, select an edge texture.

7.1.2 Lanes

Use the **Lanes** settings to define the number of lanes in each direction and their width.

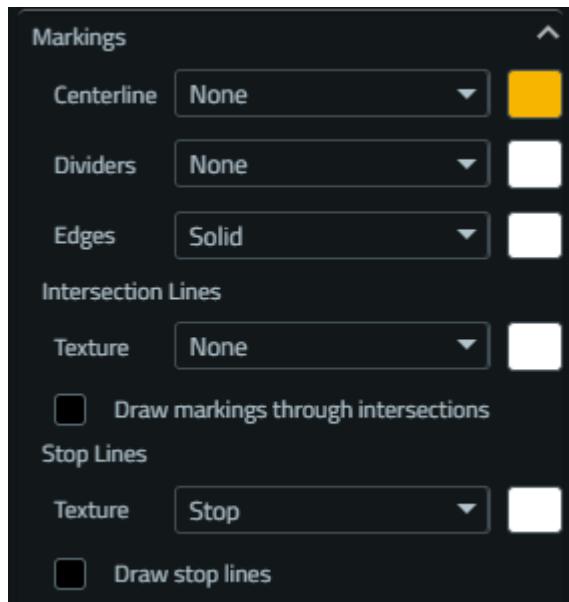


- **Lane Width** - Defines the width for all lanes of a road.
- **Forward Lanes** - Defines the number of lanes in the forward directionality of a road.
- **Backward Lanes** - Defines the number of lanes in the backward directionality of a road.

Modifying the lane width and number of lanes affects the overall road width and the vegetation buffers.

7.1.3 Markings

Use the **Markings** settings to modify the appearance of road markings.



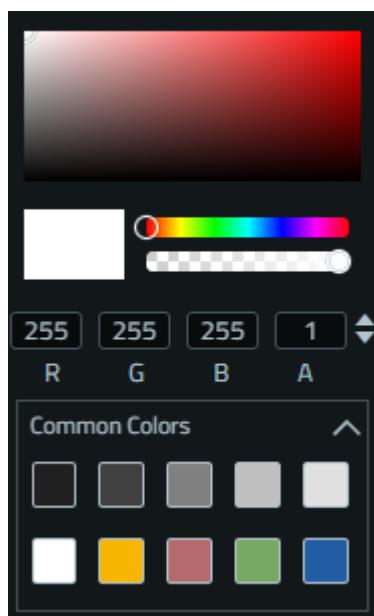
- **Centerline Texture & Color** - Defines the centerline marking texture on the road.
- **Divider Line Texture & Color** - Defines the lane divider marking texture on the road.
- **Edge Line Texture & Color** - Defines the edge marking texture near the edge of the main road.
- **Intersection Line & Color** - Defines the intersection line texture of the selected road at all intersections.

- **Stop Line & Color** - Defines the stop line marking texture of the selected road just before all intersections.

All markings have the same textures available in the selection drop-down:

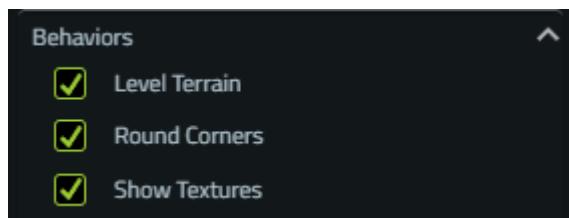
- None
- Solid, Double
- Dotted, Worn
- Broken
- Stop
- Solid, Broken, Worn
- Broken, Double
- Broken, Worn
- Solid, Worn
- Broken, Solid
- Broken, Double, Worn
- Solid, Double, Worn
- Dotted
- Broken, Solid, Worn
- Stop, Worn

All markings have the same rectangular shape that denotes the color blend for each of the corresponding textures. Selecting it displays a color selector. Selecting a color to apply a blend of that color to the marking. A selection of common colors is also available to quickly apply a color blend.



7.1.4 Behaviors

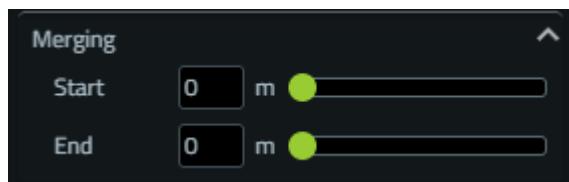
Use the **Behaviors** settings to manage the general road behavior.



- **Level Terrain** - Levels the terrain that road is drawn on.
- **Round Corners** - Rounds and smooths hard corners on a road.
- **Show Textures** - Displays the texture of a road.

7.1.5 Merging

Use the **Merging** settings to taper the start and end of road widths.



- **Start** - Defines the distance of road tapering from the selected road start point (square).
- **End** - Defines the distance of road tapering from the selected road end point (triangle).

Merging settings are most useful when connecting roads of the same type that have different widths. For more information, see [Merging Roads \(on page 130\)](#).

7.1.6 Vegetation Buffer

Use the **Vegetation Buffer** settings to remove vegetation from the side of roads.



- **Grass** - Defines the distance of grass growth from the sides of a road.
- **Bush** - Defines the distance of bush growth from the sides of a road.
- **Tree** - Defines the distance of tree growth from the sides of a road.

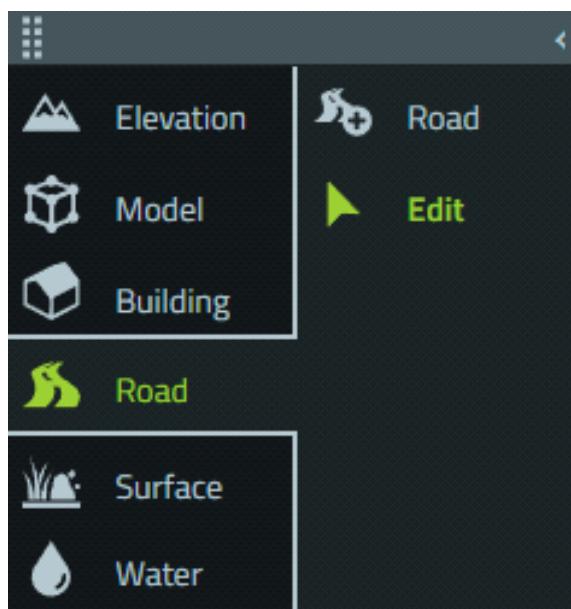
NOTE

All road buffers currently have a maximum range, depending on the road width.

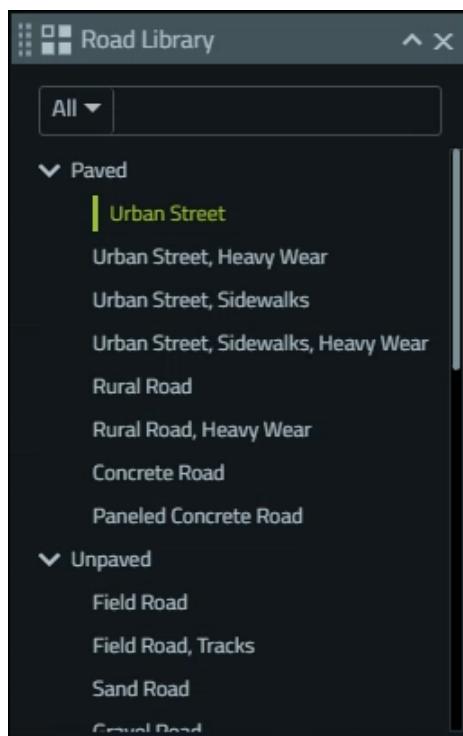
7.2 Road Editing

The **Road Edit** tool can select, edit, and delete placed roads.

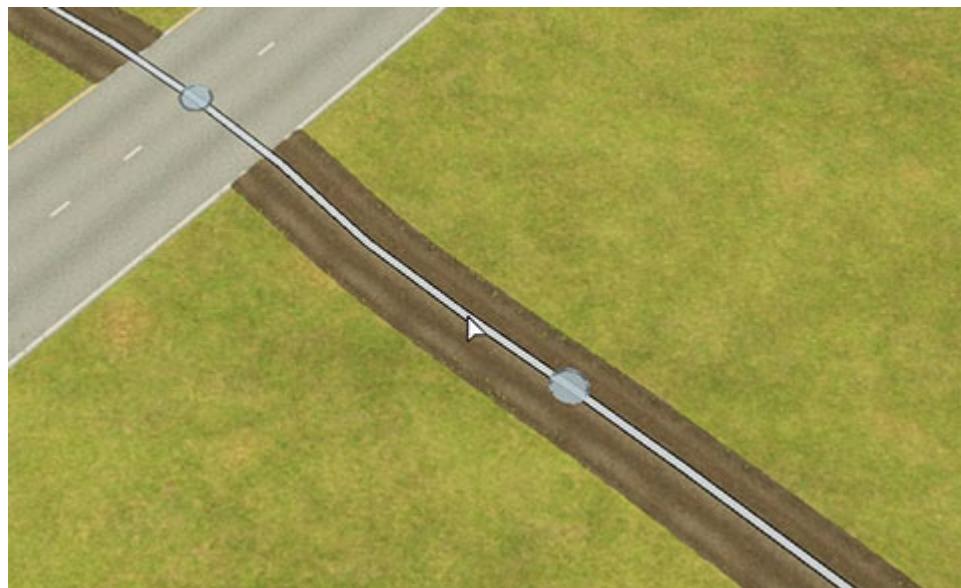
To begin editing placed roads, select the **Road** mode in the toolbar and click the **Road Edit** icon, or right-click and select the **Road > Edit** from the **Quick Access Toolbar**.



The **Road Library** also opens, displaying a list of each available road preset that can be placed on the terrain.



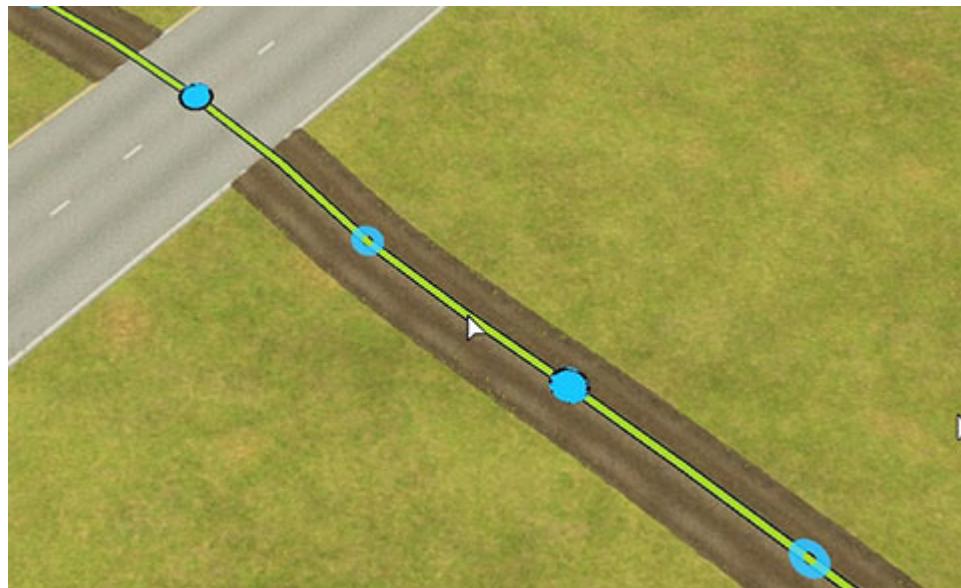
When you hover over a placed road with the **Road Edit** tool equipped, it highlights in gray.



The following road operations become available:

- [Moving Vectors \(on page 124\)](#)
- [Rotating Vectors \(on page 125\)](#)
- [Road Elevation \(on page 126\)](#)

Select a placed road to edit its path or road preset, or to delete the road. When a road is selected, it is highlighted in **green**.



Follow these steps:

1. Click on a placed road in the terrain to select it. The road highlights in **gray** when hovered over and turns **green** when selected.

 **NOTE**

Only one road can be selected at a time.

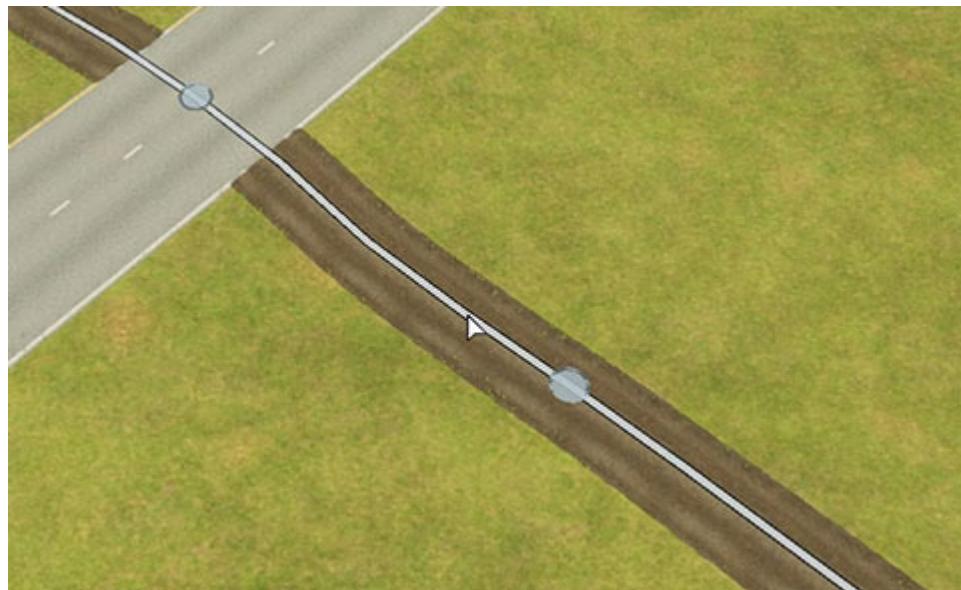
2. Edit the road as necessary.
 - a. Click and hold **LMB** while hovering over the road to move it.
 - b. Click and hold **LMB** on the filled vertices when the highlight changes to **red** and move the cursor to adjust their placement.
 - c. Click **LMB** on one of the hollow vertices (between the filled vertices) to add a vertex to a drawn road.
 - d. Select a different road preset in the **Road Library** to change the selected road's properties.
 - e. To delete an individual vertex, press **Delete** while hovering over that vertex and the highlight changes to **red**.
 - f. To delete the entire road, press the **Delete** key.

We recommend the following best practices for using the **Road Edit** tool:

1. Place additional vertices where smooth road curves are required.
2. Place vertices efficiently when editing or creating roads, as roads with a high number of vertices will suffer from performance issues when edited.

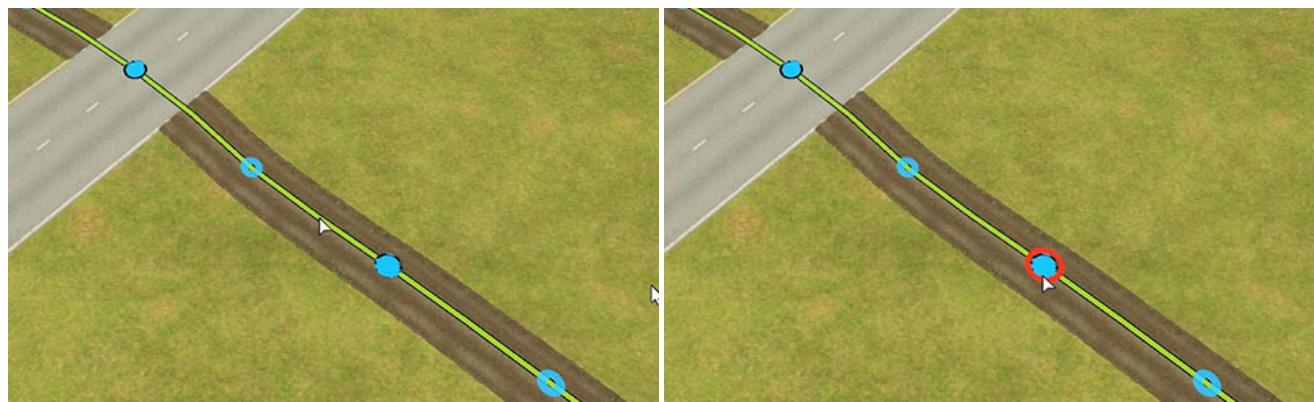
7.2.1 Moving Vectors

In **Edit** mode, when the cursor hovers near a road, that road's vectors and vertices will be highlighted in **gray**.



When a road is selected, that road's line vector will be highlighted as **green**, and all of its vertices will be highlighted in **blue**.

Click and hold **LMB** on the road when it is highlighted **green** or **blue** to move the whole road.

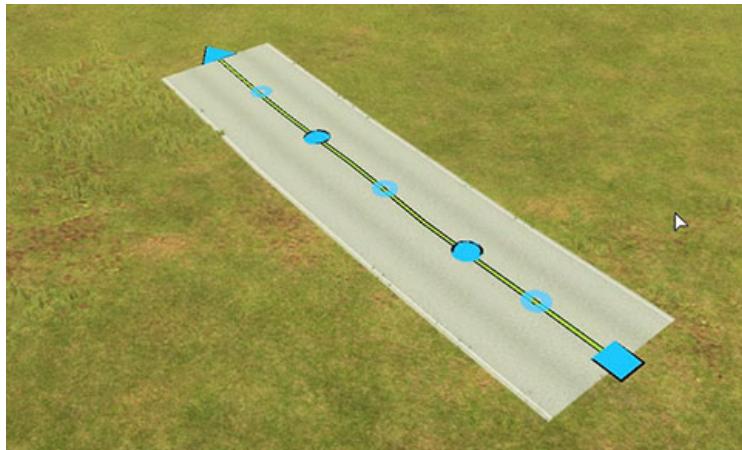


7.2.2 Rotating Vectors

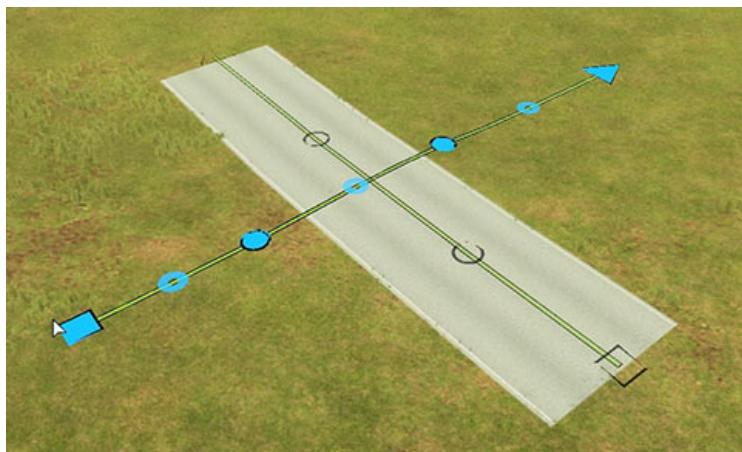
The **Road Edit** tool enables the rotation of entire road vectors.

Follow these steps:

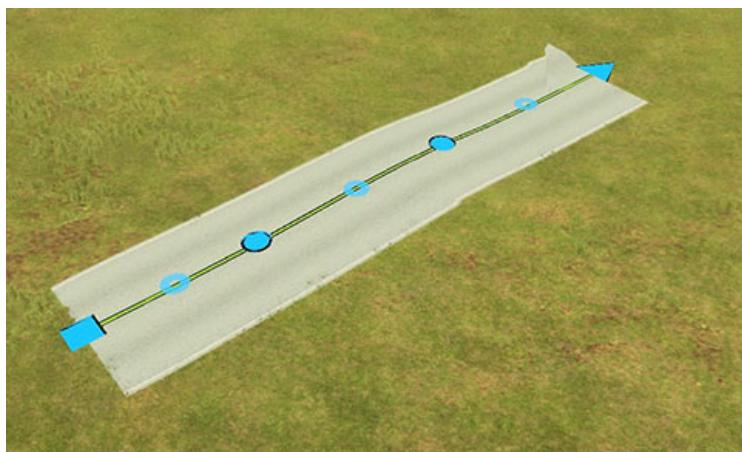
1. With the **Road Edit** tool selected, hover over a road.



2. Hold **Shift** and **RMB** and move the mouse left or right to rotate the vector.



3. Release **Shift** and **RMB**. The road rotates to the selected orientation.



7.2.3 Road Elevation

The **Road Edit** tool also enables you to adjust the elevation of entire roads or individual road nodes.

Follow these steps:

1. While editing a road, hover over it or a specific road node.
2. Hold **Ctrl** and then use the mouse wheel to raise or lower the road or road node.

Positive elevation changes are indicated in **green**, and negative changes in **red**.



3. Release **Ctrl** to apply the elevation change.

The road or road node is raised or lowered, and the nearby terrain automatically adjusts to adapt to the elevation change.

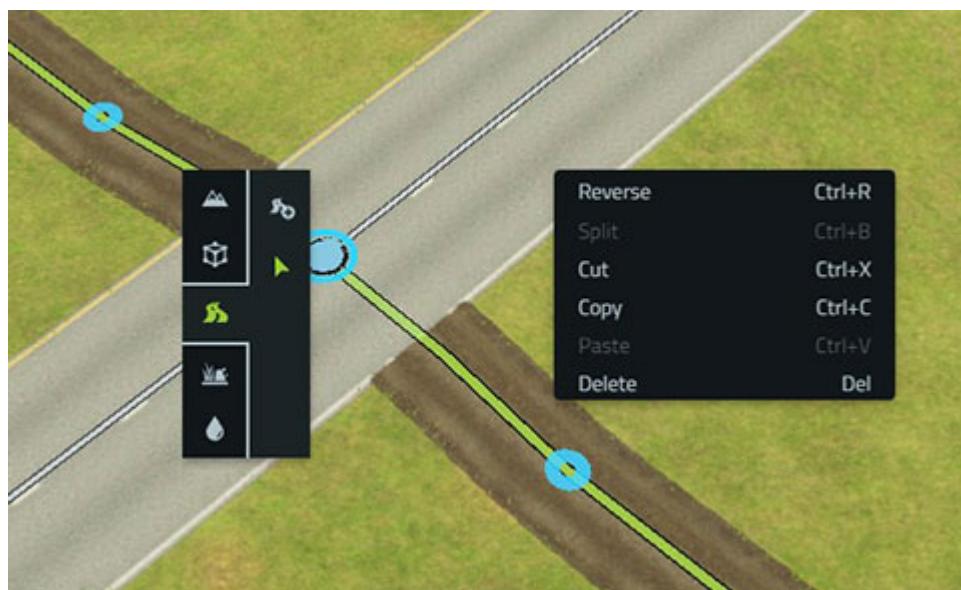
7.3 Road Management

VBS Geo includes automatic and manual operations to modify them.

- [Splitting Roads \(on the next page\)](#)
- [Reversing Roads \(on page 129\)](#)
- [Joining Roads \(on page 130\)](#)
- [Merging Roads \(on page 130\)](#)

Access the **Reverse** and **Split** options from the **Quick Access Toolbar** and its context menu.

To open the **Quick Access Toolbar** and its context menu, click **RMB**.

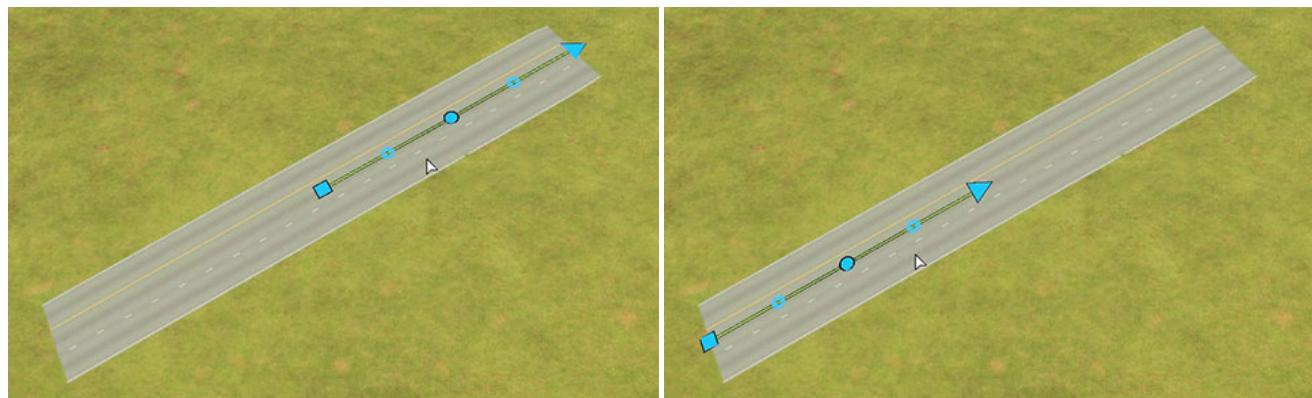


7.3.1 Splitting Roads

Splitting is when a road splits into two separate road vectors at the highlighted vertex.



To split a road, hover over a vertex of a highlighted vector until the vertex becomes highlighted red. Next, click the **RMB**, then select **Split**.

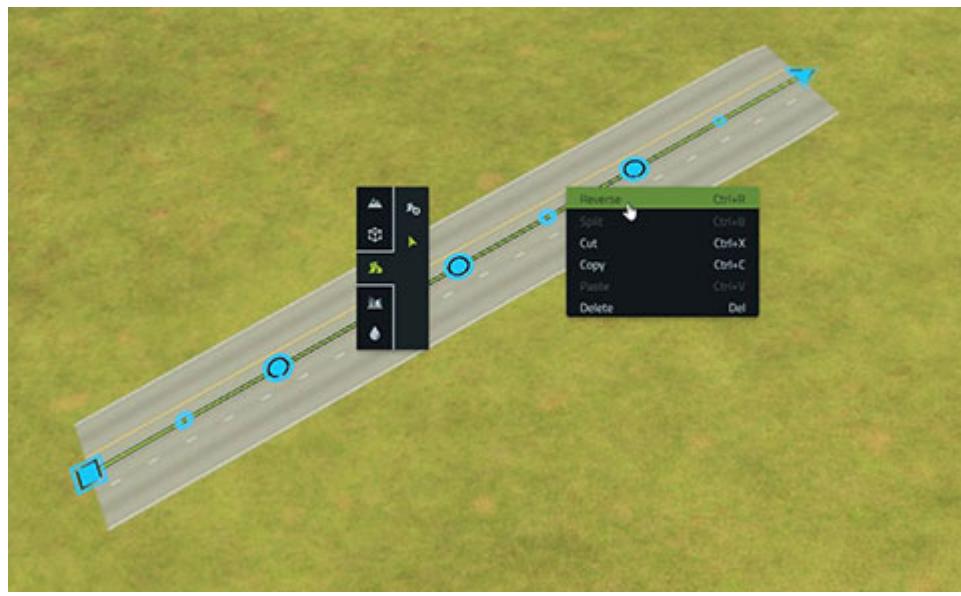


Roads can also be split by hovering over a vertex and pressing **Ctrl + B**.

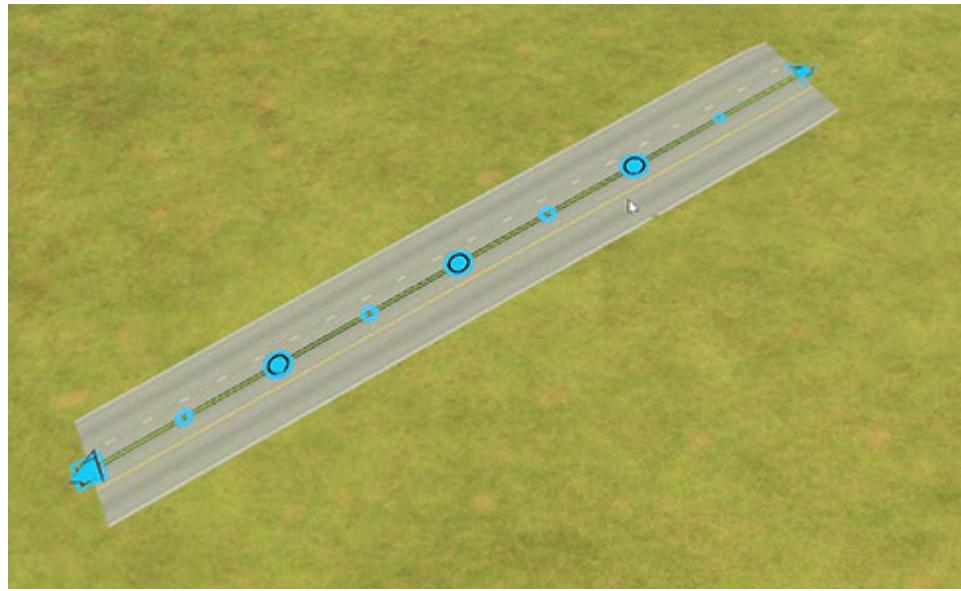
7.3.2 Reversing Roads

Reverse flips the vertices of a road in the opposite direction. This functionality can be used to reverse roads with asymmetric lane counts.

All roads have two unique indicators: a square indicator, which denotes the first vertex—meaning the start of the road—and a triangle indicator, which denotes the last vertex—or the end of the road. Reversing a road will also swap the position of the two indicators.



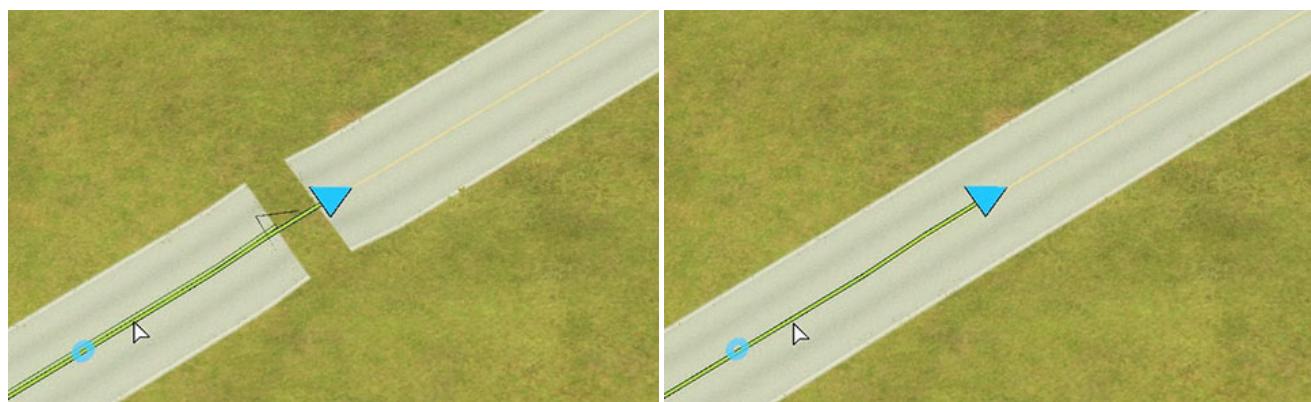
Roads can be reversed by first selecting a road, then selecting the **Reverse** option from the context menu, or by pressing **Ctrl + R**.



7.3.3 Joining Roads

Road joining is an automatic operation triggered by dragging two roads with the same features.

There are two ways that roads can be joined. First, an entire portion of a road can be joined with another road by selecting a road with **LMB**, then dragging end-to-end with another road.



The second method is to select a road with **LMB**, hover over either the start or end vertices of the road until it highlights **red**, then drag it over another start or end vertex until the vertex highlights **orange**. Release the **LMB** to merge the roads.



The result of this operation is to join the roads into a single road.

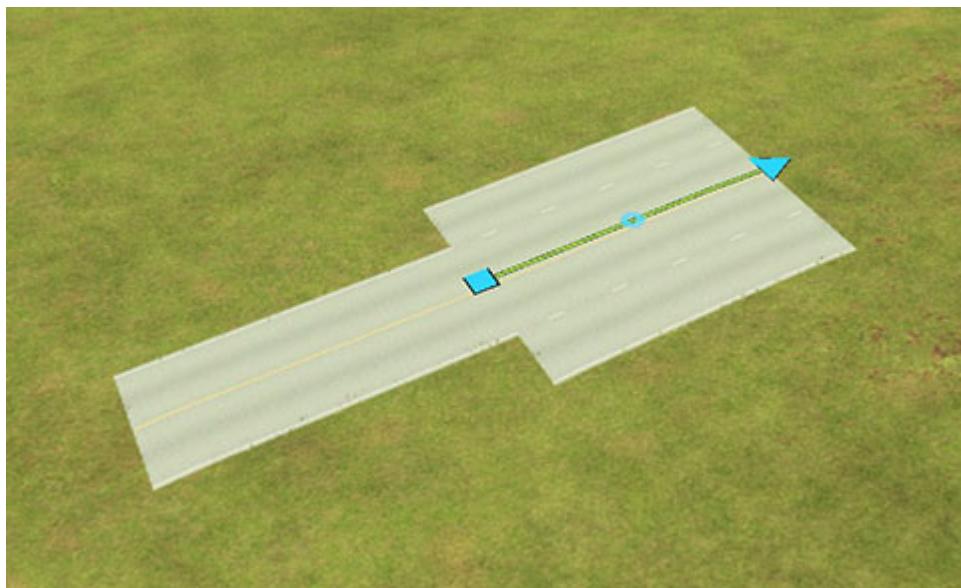
7.3.4 Merging Roads

Roads of the same type, but with different widths can be visually joined by adjusting the widths of the two roads where they meet using the Merging properties of the roads.

To merge two roads, adjust Merging Start and End properties where they meet.

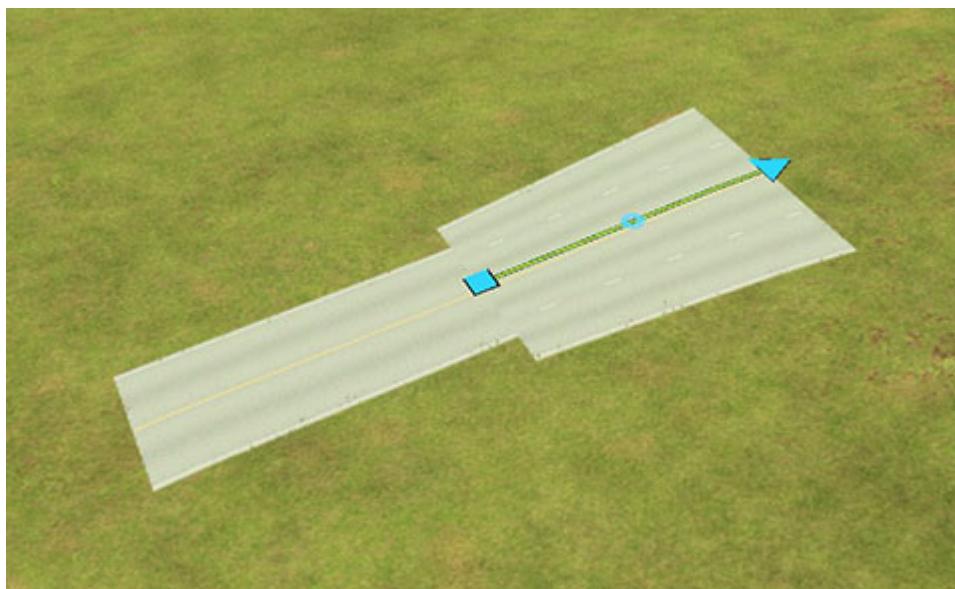


In the image below Road B is significantly wider than Road A.



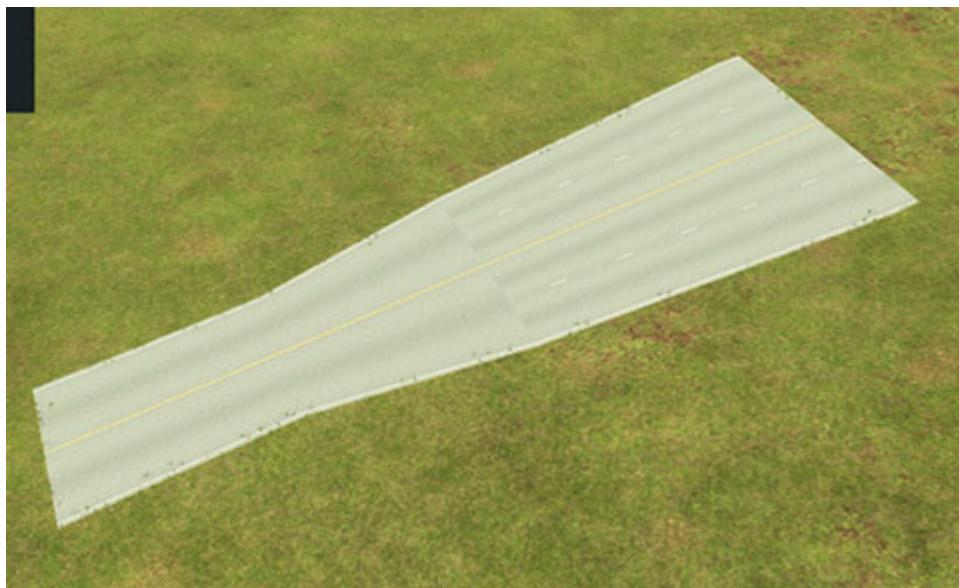
To merge them, follow these steps:

1. Select the wider Road B.
2. Set the **Merging > Start** value to a width smaller than the width of Road B, but larger than the width of Road A.



3. Select the narrower Road A.
4. Set the **Merging > End** value to match the width set for the start of Road B.

The result of this process is two roads that taper to visually join as a single road. However, they are still two separate road vectors.

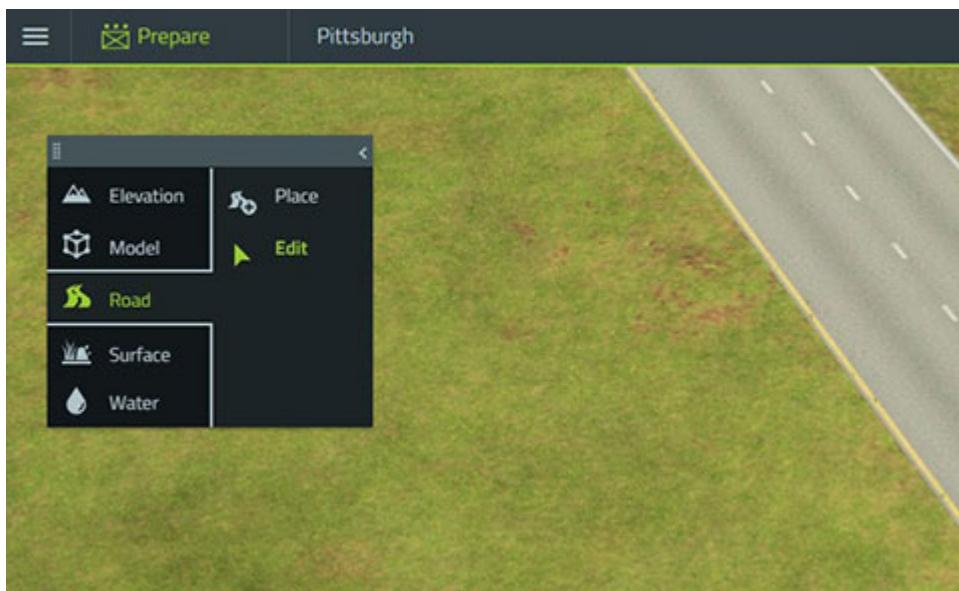


7.4 Automatic Intersection Generation

For AI to correctly recognize intersections, both road vectors have to contain vertices that overlap on the same position. The **Road** tool will automatically place the required vertices when two road vectors cross.

NOTE

Use the **AI Debug** option to view what AI recognizes, such as intersections, lanes, and direction. Enable this setting will render AI road boundaries and lane directions.



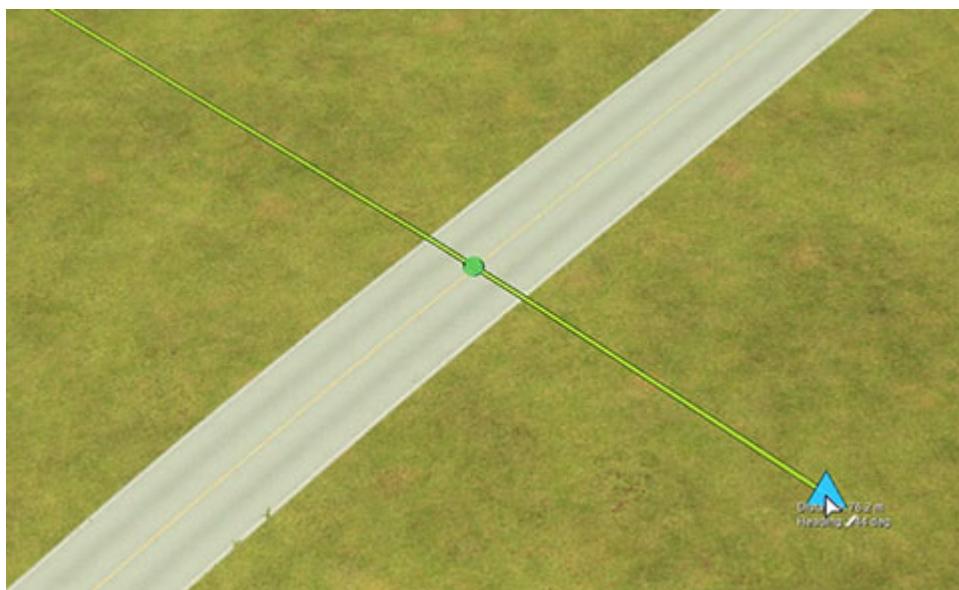
To view AI road boundaries and lane directions, click the **Main Menu** button then select the **AI Debug** option.



In **Place** mode, when starting or ending on an existing road vector, the intersecting placement point will be highlighted in **orange**, indicating that an intersection vertex will be placed.



When your vector crosses one or multiple roads, vertices that will be automatically added will be highlighted in **green**.



The two behaviors also apply to **Edit** mode. Editing a position of a vertex that results with intersecting another road will highlight the vertex **orange** or **green**.

i NOTE

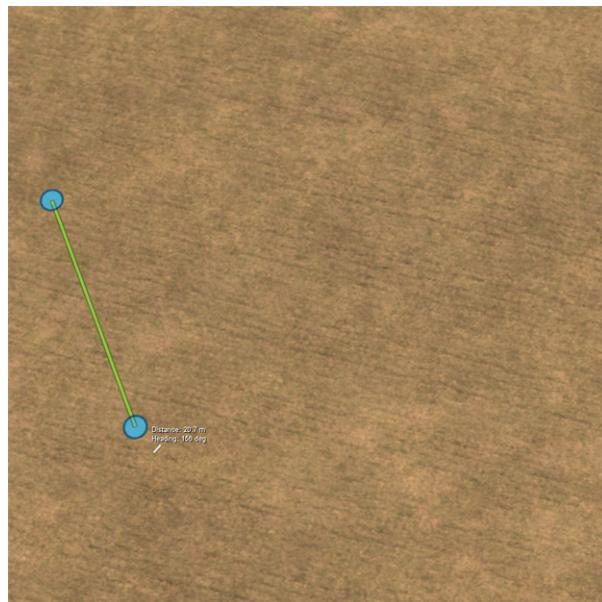
At intersections, there is a level of priority in which the road is rendered on top of other intersection roads. Typically, whichever road is drawn last draws on top of the previous road. However, road attributes are also taken into account, such as the road type, road width, number of lanes, and so on. For desired results, make adjustments to all intersecting roads at intersections.

7.5 Adding Curves

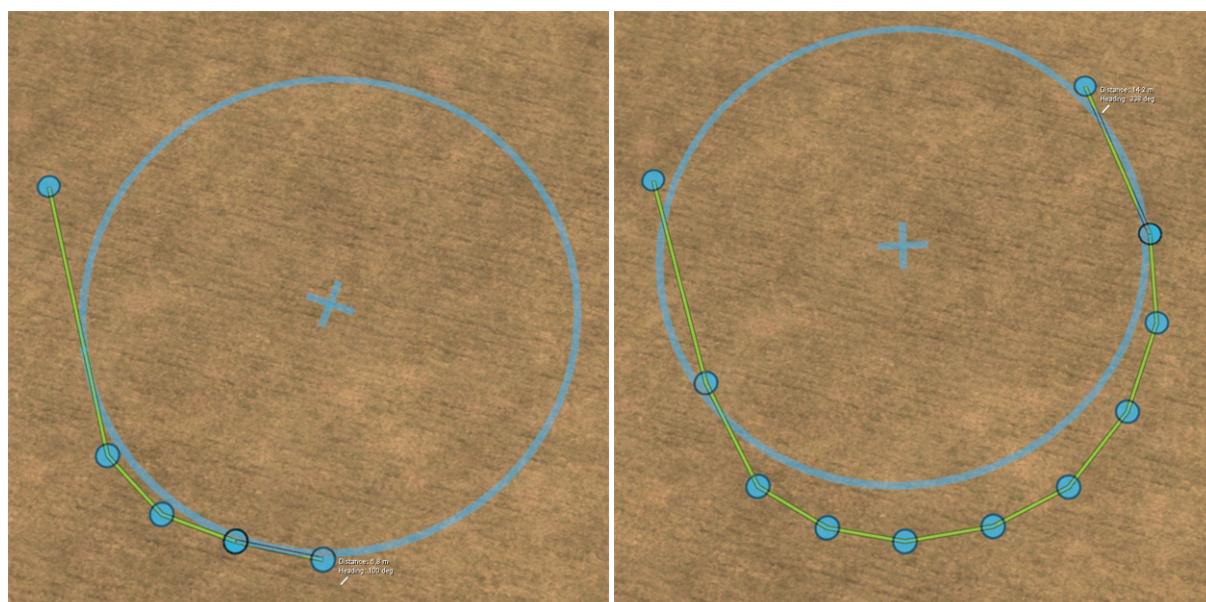
Curve mode can be used to add vertices that make curved roads. This tool can be accessed by pressing **Spacebar** with either the **Place** or **Edit** tools equipped. When the **Curve** mode is enabled, a helper circle will appear any time a curve vertex is to be placed.

NOTE

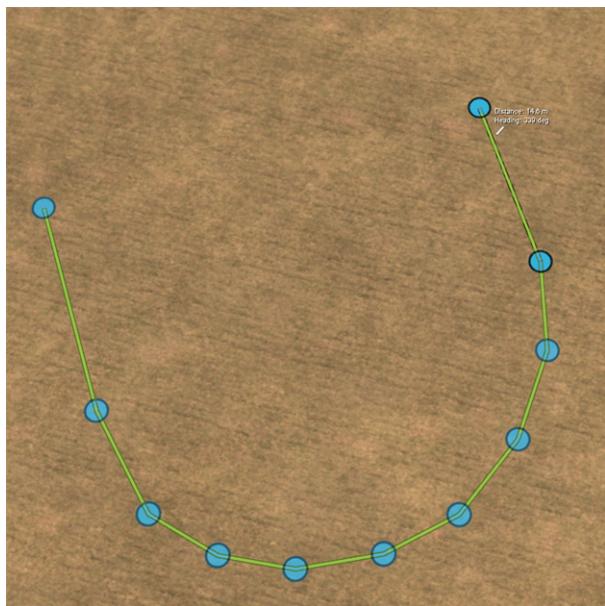
After equipping the **Curve** mode, two or more vertices must be placed along a road vector in order for the helper curve to appear.



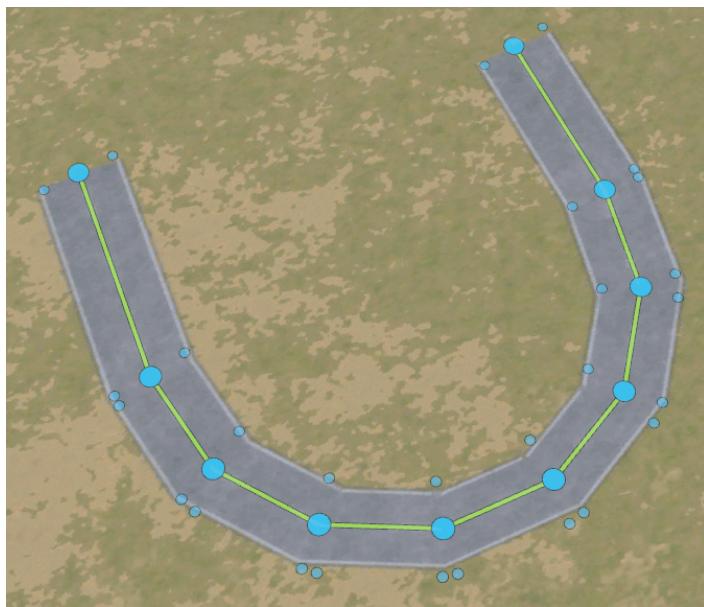
Guide the mouse cursor along the helper circle until all desired vertices appear along the curve.



Click once to place the vertices shown along the helper circle.

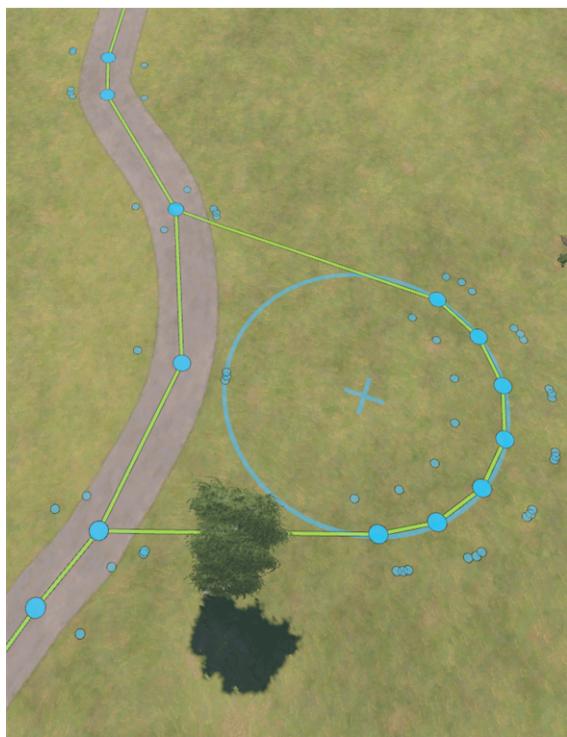


Press **Enter** or right-click on the terrain and select **Complete Drawing** to finish drawing the road. You will see the road drawing filled with the road preset you selected in the **Road Library**.



To adjust the radius of the curve, press and hold **Ctrl** while rotating the mouse wheel. Rotate the mouse wheel up or down to increase or to decrease the radius of the curve respectively.

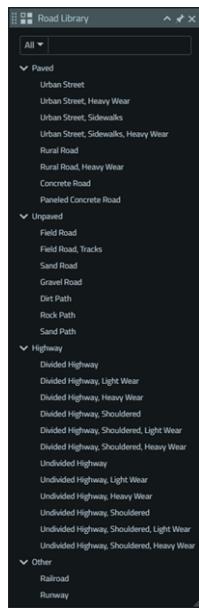
When the **Edit** tool is equipped, the **Curve** mode can be used to create new curves on existing road vectors by pressing **Spacebar**, then dragging a vertex from the road vector until the curve helper circle appears.

**i NOTE**

New vertices cannot be added to an edited road vector when the **Curve** mode is active. If you wish to add more vertices to an existing vector, press **Spacebar** again to deactivate the **Curve** mode and to return to normal editing.

7.6 Road Presets

The **Road Library** contains an extensive set of road presets that support multiple lanes, organized by category:



Selecting a preset populates the settings and values in the Road Tool Options above the Road Library. The available presets are listed below:

Paved

- Urban Street
- Urban Street, Heavy Wear
- Urban Street, Sidewalks
- Urban Street, Sidewalks, Heavy Wear
- Rural Road
- Rural Road, Heavy Wear
- Concrete Road
- Paneled Concrete Road

Unpaved

- Field Road
- Field Road, Tracks
- Sand Road
- Gravel Road
- Dirt Path
- Rock Path
- Sand Path

Highway

- Divided Highway
- Divided Highway, Light Wear
- Divided Highway, Heavy Wear
- Divided Highway, Shouldered
- Divided Highway, Shouldered, Light Wear
- Divided Highway, Shouldered, Heavy Wear
- Undivided Highway
- Undivided Highway, Light Wear
- Undivided Highway, Heavy Wear
- Undivided Highway, Shouldered
- Undivided Highway, Shouldered, Light Wear
- Undivided Highway, Shouldered, Heavy Wear

Other

- Railway
- Runway

Each preset category is expanded by default.

NOTE

Road presets with multiple lanes replace the previous road presets which are no longer available for selection.

7.6.1 Search and Filter

The preset list can be filtered by keywords or quickly searched for a specific preset.



The following keywords are available from the selection drop-down:

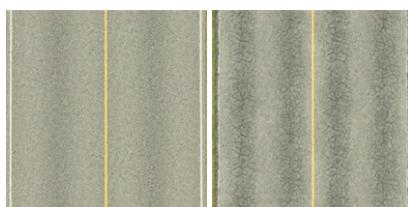
- Highway
 - Divided
 - Undivided
 - Light Wear
 - Heavy Wear
 - Shouldered
 - Urban
 - Rural
 - Sidewalks

For a quick search, type in the text input to the right of the keyword selection drop-down. The preset list automatically updates as you type.

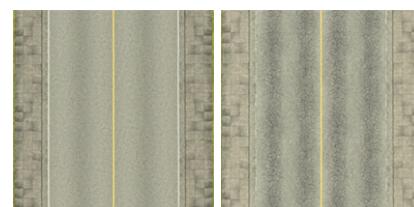
To clear the search input, click the **X** on the right side.

7.6.2 Paved Roads

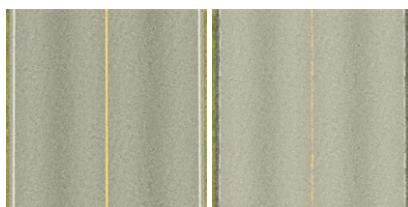
Urban Street / Heavy Wear



Urban Street Sidewalks / Heavy Wear



Rural Road / Heavy Wear



Concrete Road / Paneled Concrete Road



7.6.3 Unpaved Roads

Field Road / Tracks



Sand Road



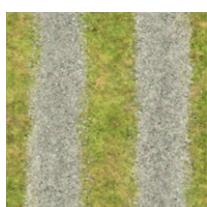
Gravel Road



Dirt Path



Rock Path

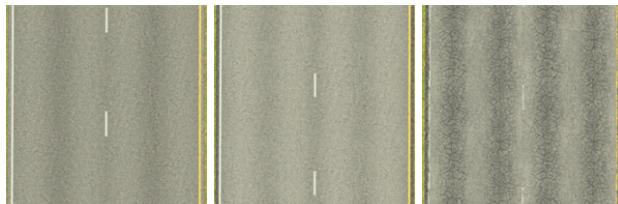


Sand Path

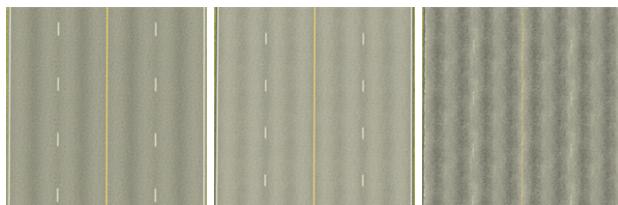


7.6.4 Highways

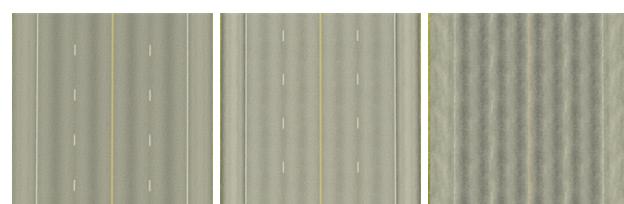
Divided Highway / Light Wear / Heavy Wear Divided Highway Shouldered / Light / Heavy Wear



Undivided Highway / Light / Heavy Wear



Undivided Highway Shouldered / Light / Heavy Wear

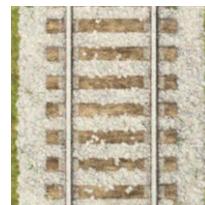


7.6.5 Other Roads

Runway



Railway

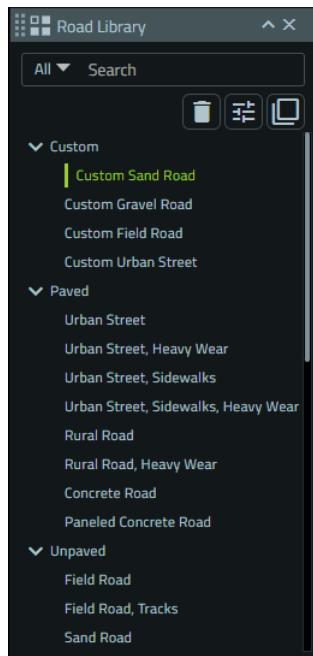


7.7 Custom Road Presets

Custom road presets are created and edited by the user, allowing for the quick reuse of edited roads. Custom road presets can be created from both new and existing roads. These presets can then be used to create new roads with the attributes used in the custom road preset.

7.7.1 Road Library Custom Category

The **Custom** category is always displayed at the top of the **Road Library** and contains all custom road presets. This category displays the presets from both the local presets and any presets contained in the current Battlespace. To save Battlespace presets to the local machine, copy the preset.



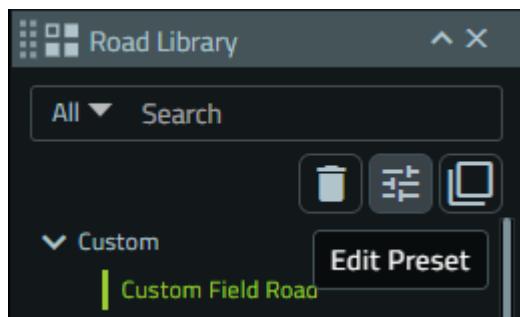
7.7.2 Applying Custom Presets

Default and custom road presets are applied by selecting a road to be edited or by creating a new linear, then selecting the road preset from the **Road Library**.

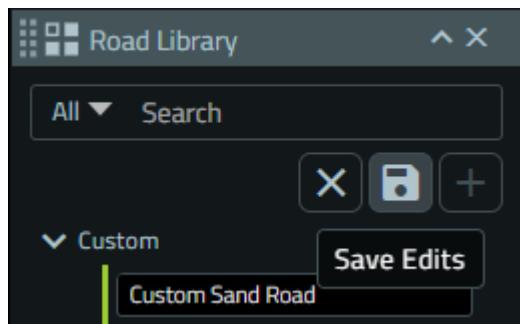


7.7.3 Editing Custom Presets

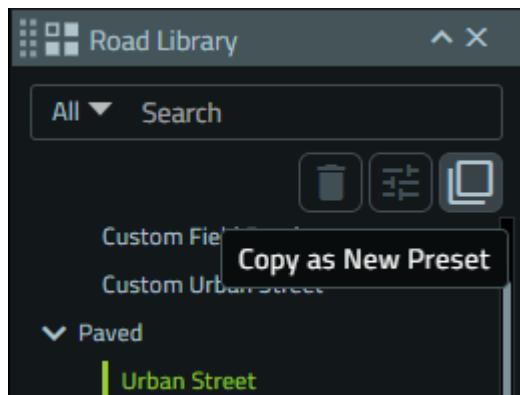
To edit a custom road preset, select the preset, then select the **Edit** button from the **Road Library** toolbar.



Change the name of the road preset or any of its attributes, then click the **Save** button to finalize the changes. Edits to any road preset need to be reapplied to unselected roads for the changes to take effect.

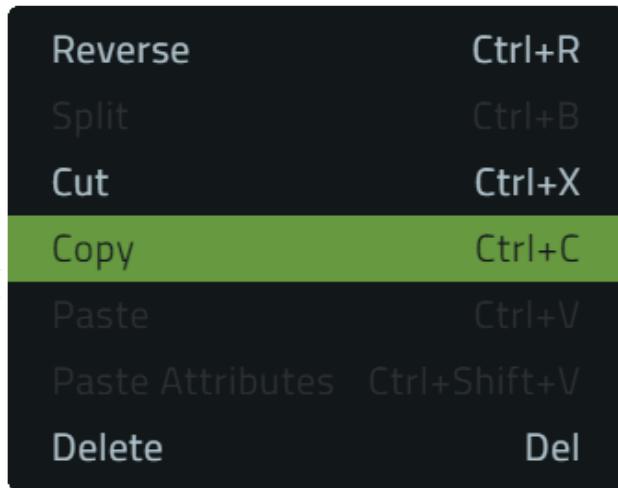


Custom road presets can also be copied or deleted. Default presets, which are included with VBS4, cannot be deleted or edited, but they can be copied then edited.



7.7.4 Copying and Pasting Road Attributes

To copy the attributes of a road, select the road, click **Copy** via the right-click context menu or press **Ctrl + C**.



Select a road to paste the attributes to, then click **Paste** via the right-click context menu or press **Ctrl + V**.



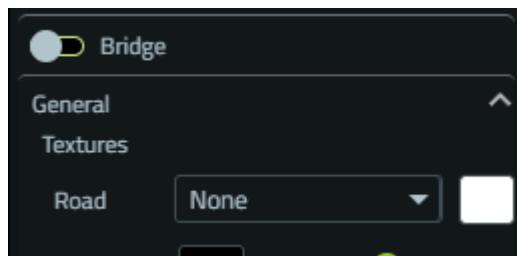
The attributes will be pasted from the copied road to the selected road.

7.8 Bridges

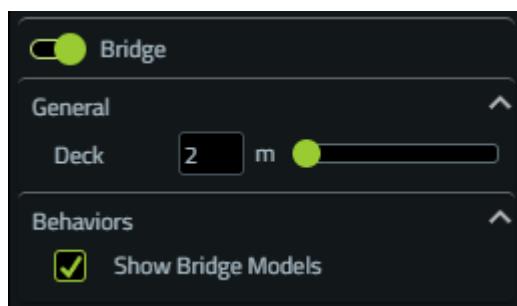
Placing and editing bridges is similar to placing and editing roads.

7.8.1 Bridge Mode

A **Bridge** tool toggle button can be found at the top of the **Road** mode interface for both **Road Place** and **Road Edit** tools. The **Bridge** tool is toggled off by default, allowing roads to be placed and edited as normal.



When the **Bridge** tool is enabled, the **Road** mode switches to the **Bridge Editor**. When this tool is equipped, anything that is placed or edited will be a bridge.



NOTE

The road preset library is hidden when **Bridge** tool is equipped.

The appropriate editor is displayed when a road is selected versus a bridge.

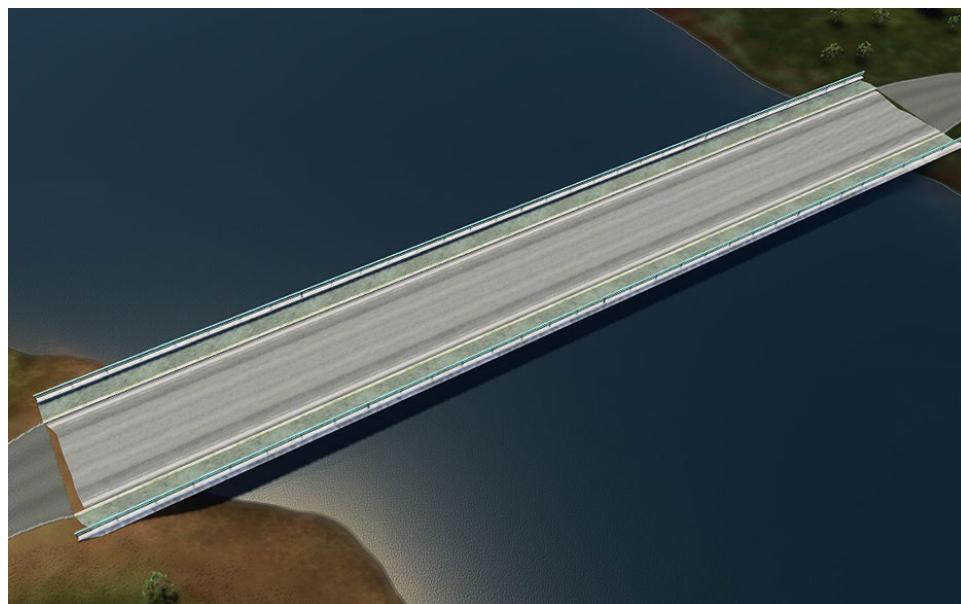
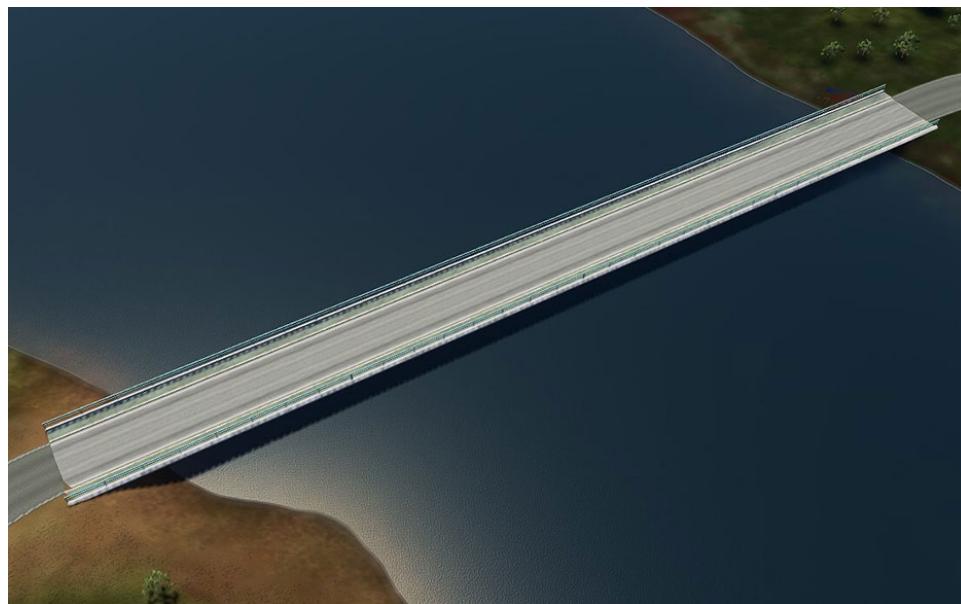
7.8.2 Bridge Placing and Editing

The **Bridge Editor** allows bridges to be customized as desired. The following attributes can be customized:

- Deck width
- Model visibility

7.8.2.1 Deck Width

Similar to road width, the **Deck** option controls the width of the bridge deck.



NOTE

There are no limitations as to how wide the bridge deck can be, but overly large bridge deck sizes may produce aesthetic anomalies to the bridge model itself.

7.8.2.2 Model Visibility

Similar to road texture visibility, the **Show Bridge Models** option renders the bridge model or hides it completely, leaving the vector and the nodes that make up the bridge.

7.8.3 Placing Bridges

While creating bridges is similar to creating roads, the following section describes the best practices for placing bridge models.

Follow these steps:

1. **Create a road.** Determine where a bridge model should be placed. Once determined, place vector nodes and lines to be converted into a bridge. There should be nodes placed on land, just before the body of water. This allows slicing at these nodes in the next step.



Once placed, press the **Enter** key to place the road.



2. **Split the nodes.** After the road is placed, identify nodes that can be split to be the bridge section of the overall road. As discussed in step 1, there should be nodes on each side of the water. These are ideal nodes to split.

Equip the **Road Edit** tool, select the road, then hover over the first node to split until the node appears red. Once the node is red, right-click to bring up the context menu and select **Split**. The singular road is now two roads, meeting at the position of the split node.



Repeat this process on the other end of the road across the body of water.



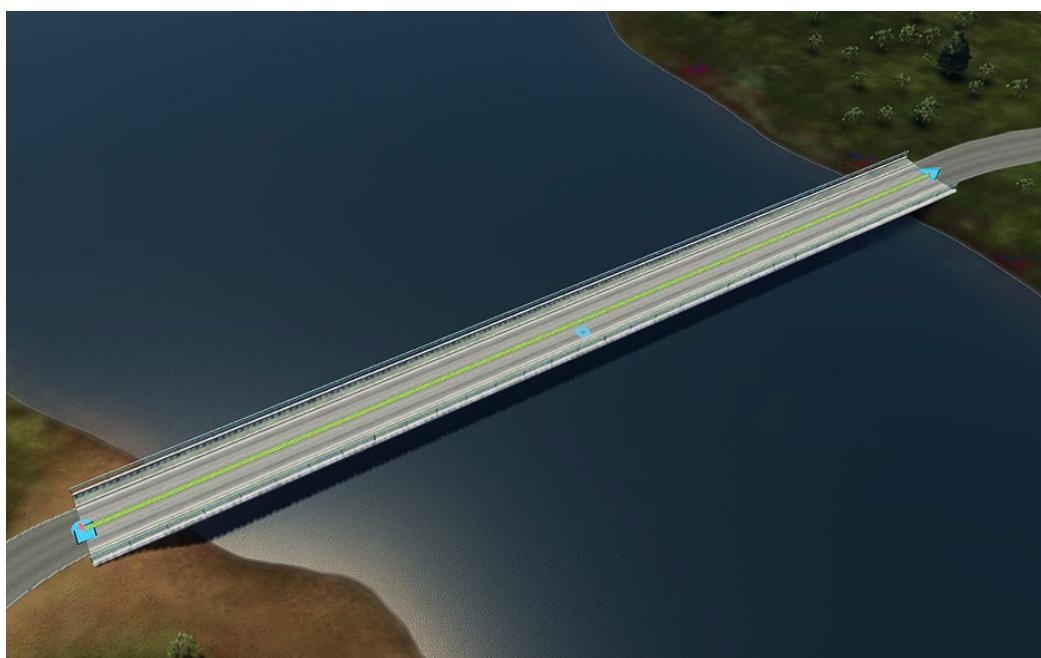
The initial road is now in three parts: the two ends and the middle section that will become the bridge.

3. **Convert the bridge.** The final step is to identify the road section that will become the bridge. In the case of this example, this is the middle section.

Equip the **Road Edit** tool, select the road section, then enable the **Bridge** tool.



Once the **Bridge** tool is enabled, the selected road section is turned into a bridge.



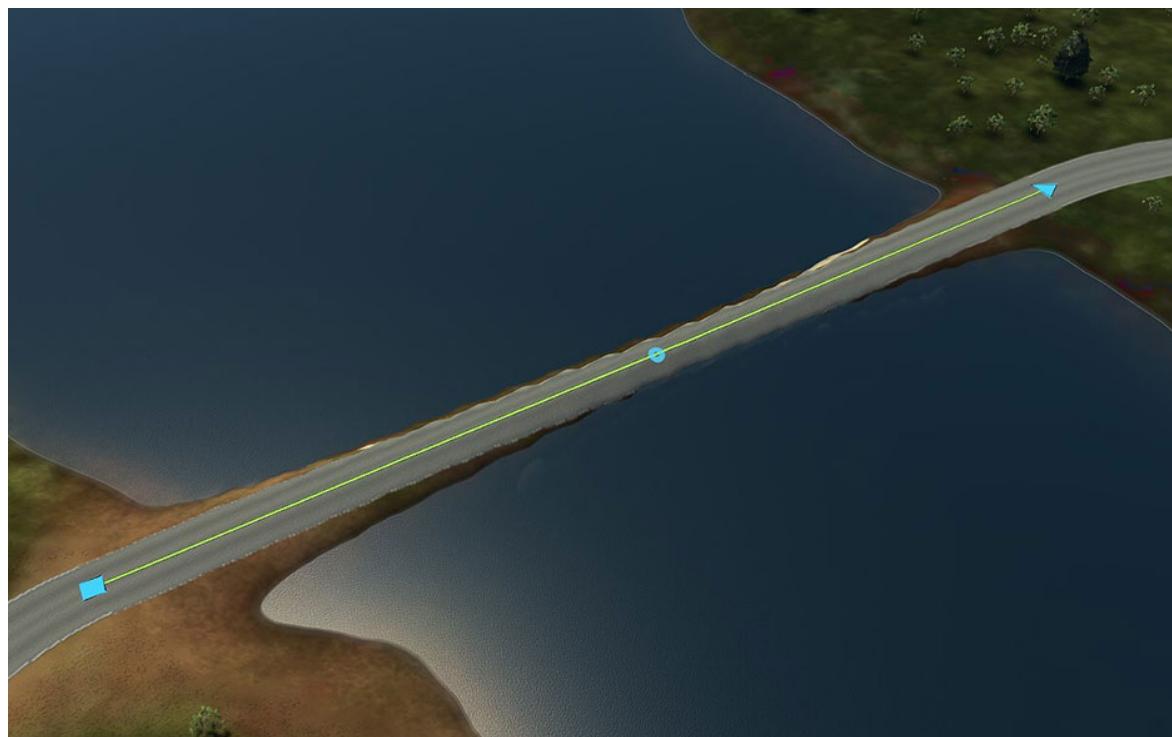
7.8.4 Editing Bridges

Bridges can be edited the same as roads. While there are a limited number of attributes available to be edited, editing bridges rely mainly on node placement and elevation.

To begin editing a bridge, switch to **Road Edit** mode, then select any available bridge. Selecting a bridge will automatically equip the **Bridge** tool and enable the **Bridge Editor**.

7.8.4.1 Toggling Bridge Mode

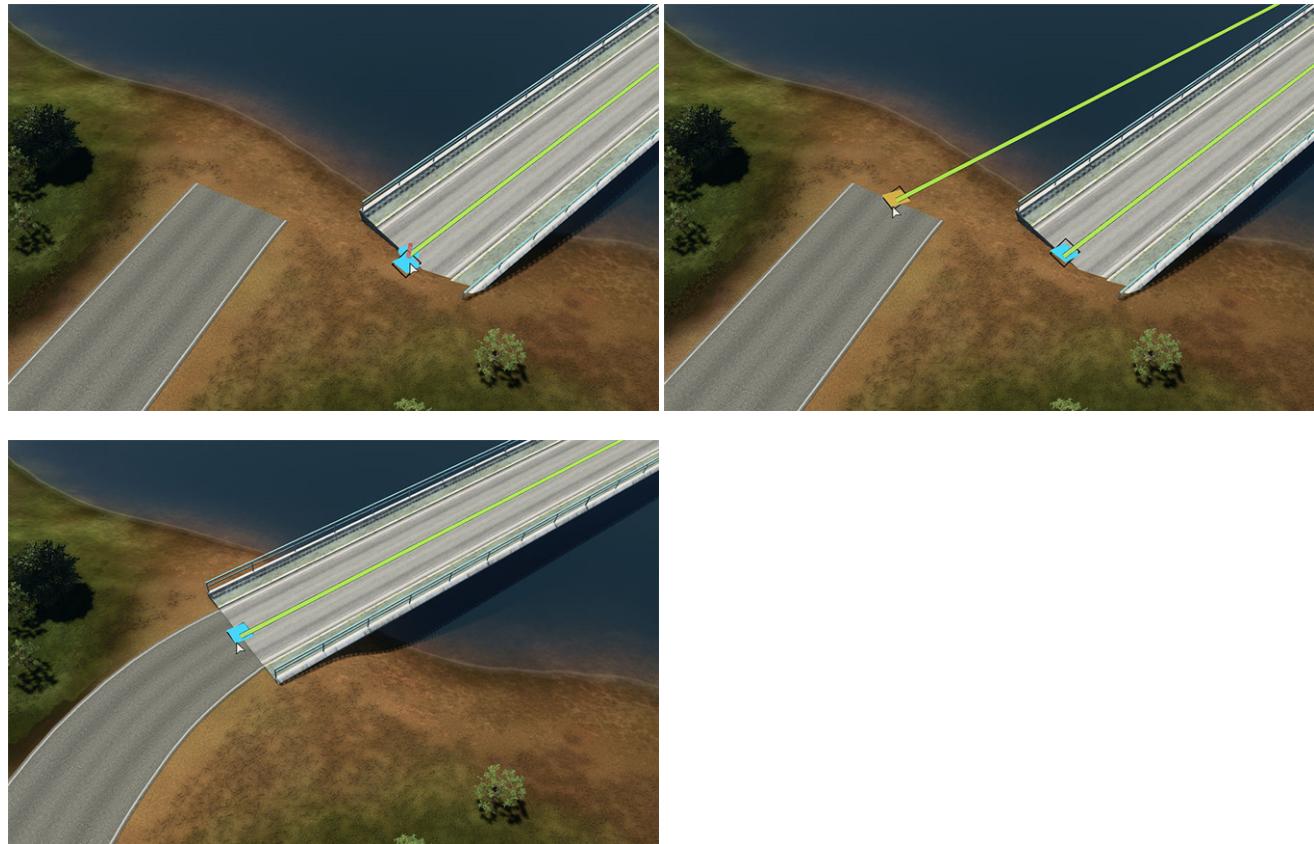
Enabling the **Bridge** tool while a road is selected will cause it to be converted into a bridge. The reverse is also true. Disabling the **Bridge** tool while a bridge is selected will convert the bridge into a road.



7.8.4.2 Snapping Nodes

Similar to how multiple roads can be connected to create a single long but segmented road, snapping nodes together can provide a seamless transition from road to bridge or vice versa.

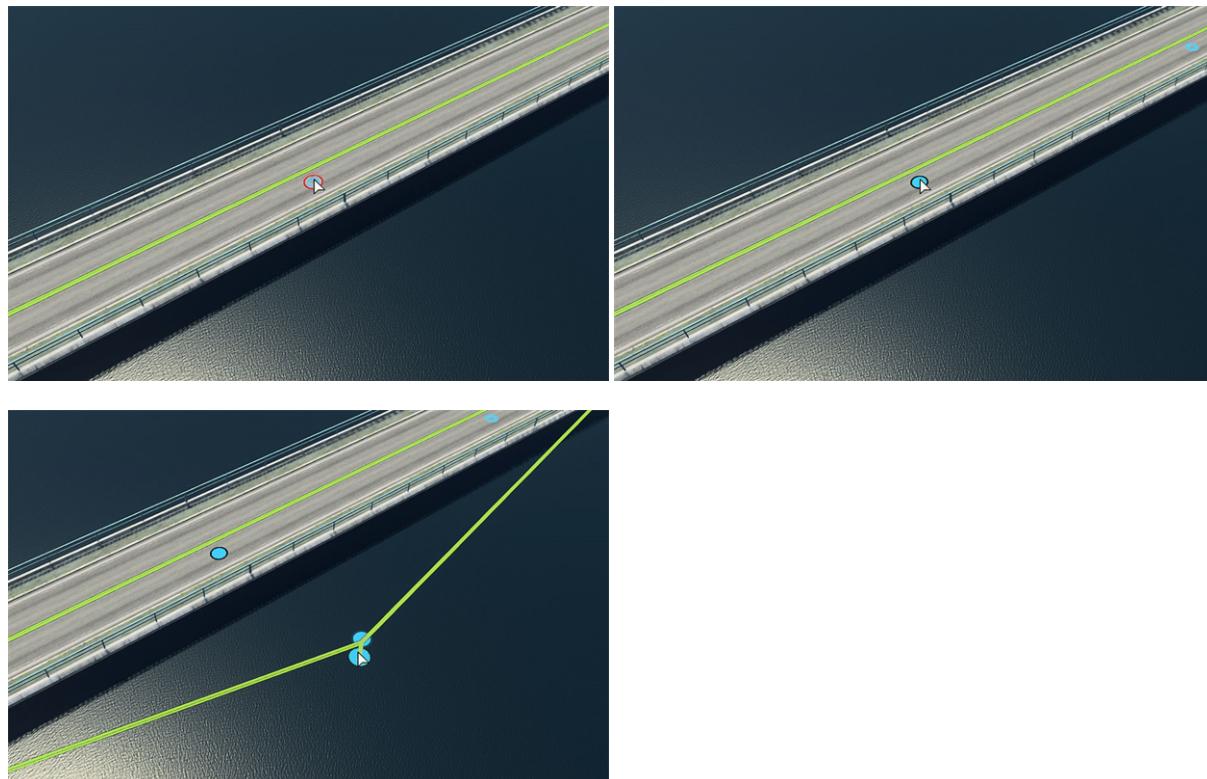
To snap nodes together, select a road or bridge. Move the cursor to either end node, then click and drag the node to another road or bridge end node. The dragged node snaps into position as it nears another road or bridge. Release the mouse button to set the node in its new position.



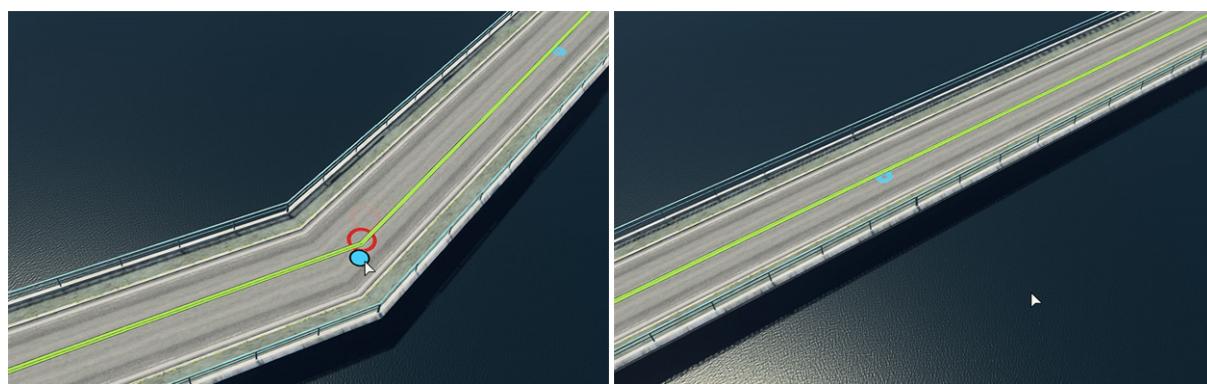
7.8.4.3 Adding and Deleting Nodes

The number of nodes affects bridge articulation. At minimum, two nodes are necessary to create most bridges. Nodes added between the start and end nodes control the slopes and curves of a bridge. However, too many nodes can cause visual artifacts due to the bridge model warping.

To add nodes to a bridge, select it, and hover the cursor over a hollow node between two nodes. Then, click the hollow node to add a new node. The node can be edited after it is placed.



To remove a node, hover over any solid node until it highlights in red. Press **Delete** to delete the node from the bridge. The bridge model updates to follow the new vector line when a node is deleted.



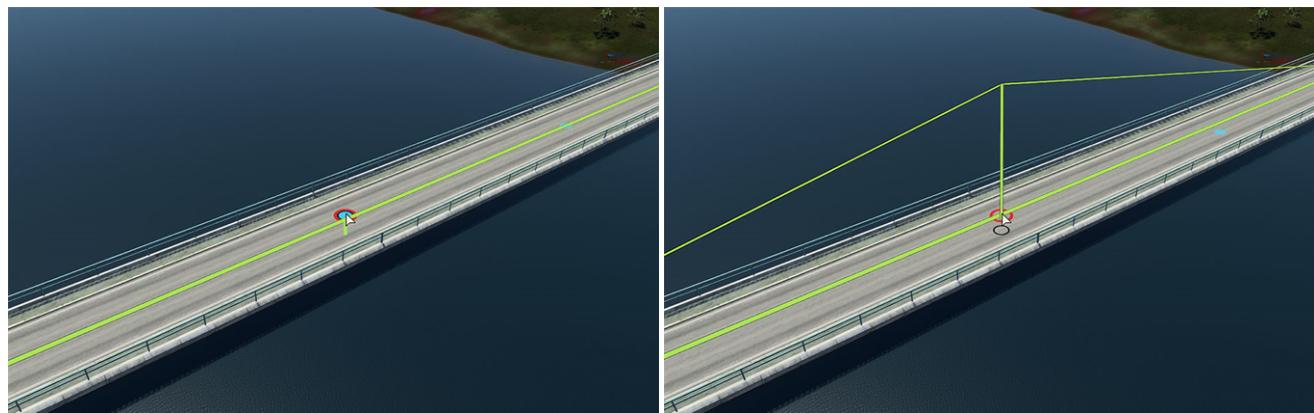
NOTE

Adding or deleting nodes from bridges may reset the bridge elevation.

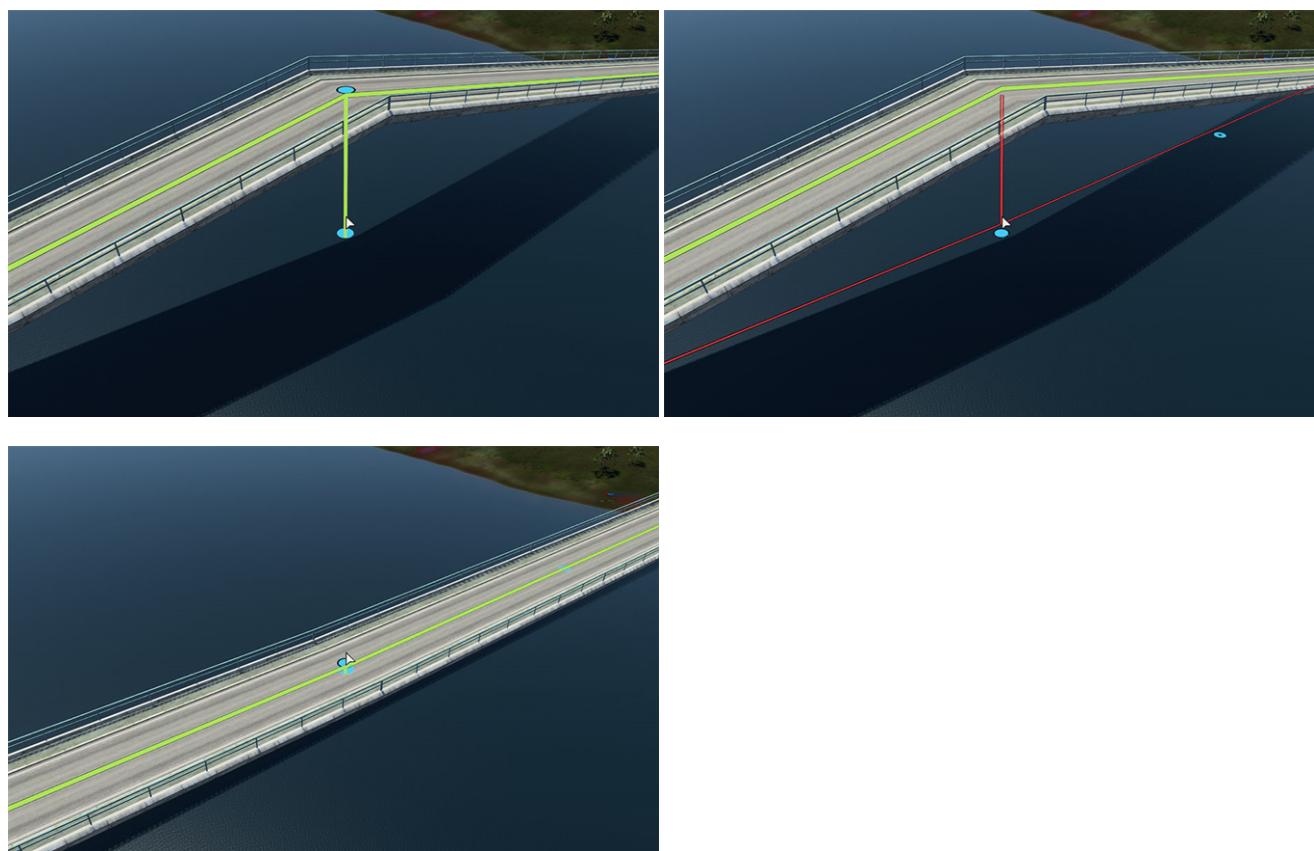
7.8.4.4 Adjusting Node Elevation

The height of each node in a bridge determines the height of the bridge from the surface. As a result, the height of an entire bridge can be edited or a single bridge node to have better slope control.

To edit the height of a bridge, select the desired bridge. Next, hover the cursor close to the vector lines, then press and hold the **Ctrl** key. With the **Ctrl** key pressed, scroll the mouse wheel up or down to adjust the elevation up or down accordingly. Release the **Ctrl** key to finalize the elevation changes to the bridge.



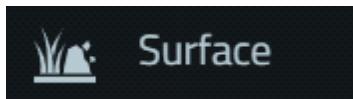
To edit the height of a single node, hover over a node until it appears highlighted in red. Press and hold the **Ctrl** key, then scroll the mouse wheel up or down to adjust the elevation up or down accordingly. Release the **Ctrl** key to finalize the elevation changes to the node.



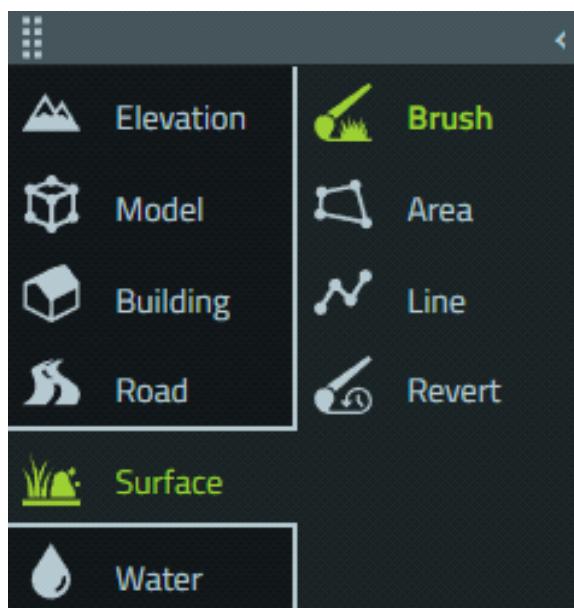
8. Editing Terrain Surfaces

VBS Geo includes a **Surface** mode to modify the base surface data in the VBS4 using a selection of **Surface Tools**.

- In the **Toolbar**, click the **Surface** icon.



The VBS Geo toolbar will display a set of **Surface Tools**.

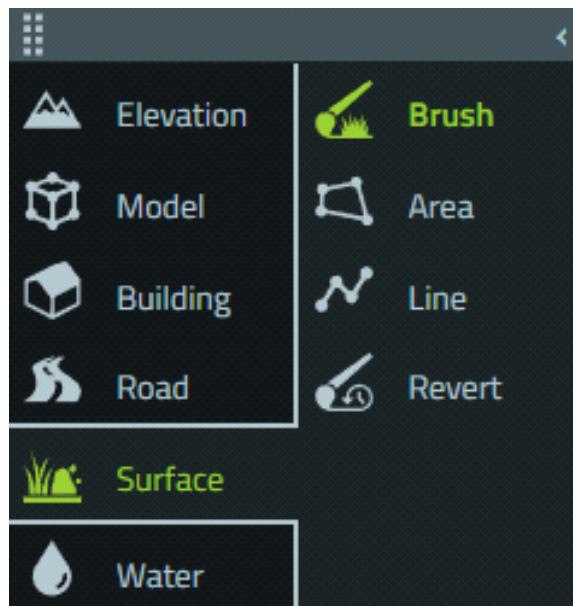


Tool Icon	Tool Type	Description
A brush icon with a green handle and a yellow bristle tip, set against a background of grass.	Surface Brush	Modify the terrain using a freehand Surface Brush . For more information, see Freehand Surface Editing (on the next page) .
A green polygonal shape representing a selected area.	Surface Area	Modify the terrain surface by selecting and editing an area. For more information, see Surface Area Editing (on page 158) .
A green line with circular endpoints, representing a selected line.	Surface Line	Modify the terrain by selecting and editing surfaces along a line. For more information, see Surface Line Editing (on page 162) .
A brush icon with a green handle and a yellow bristle tip, with a small circular arrow icon indicating a revert action.	Surface Revert	Revert the terrain surface back to the underlying dataset. For more information, see Reverting Surface Edits (on page 167) .

8.1 Freehand Surface Editing

The **Surface Brush** tool allows you to make freehand surface edits to the terrain.

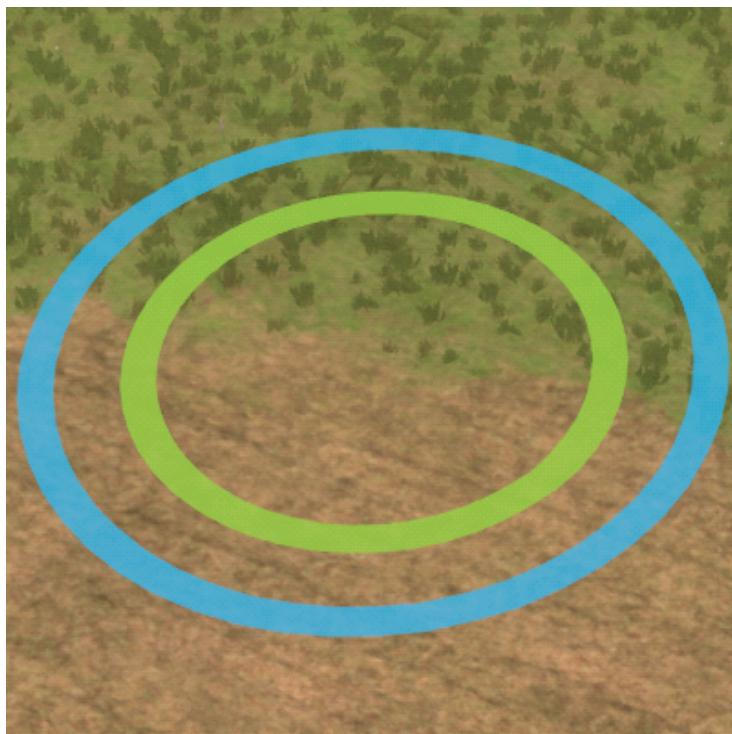
To begin freehand surface editing, select the **Surface** mode in the toolbar and click the **Surface Edit** icon, or right-click and select the **Surface > Brush** option from the **Quick Access Toolbar**.



The **Surface Tool Options** panel will open, displaying the **Surface Brush** controls.



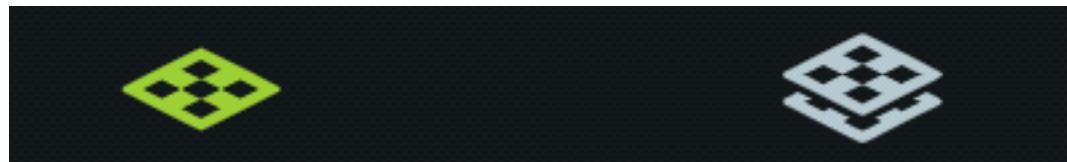
Use the **Surface Tool Options** panel to control the **Surface Brush** effect. Use the **Surface Brush** to apply the effect to the terrain.



The **Surface Brush** displays as two rings on the terrain, centered around the cursor.

Follow these steps:

1. Use the **Surface Tool Options** or right-click on the terrain to select the **Surface Brush** type.



Type Icon	Type	Description
	Single Surface	This edit type allows you to select and apply a single surface. The applied surface can be mixed with the existing surface where it is applied.
	Multi-Surface	This edit type allows you to mix two selected surfaces and combine them into a new multi-surface. The combined multi-surface will overwrite the existing surface where it is applied.

2. Use the **Surface Tool Options** to control the selected **Surface Brush** type.

Single Surface Brush Type

Option	Description
Size	Input or use the slider to specify the radius of the brush, indicated by the green circle around the cursor.
Transition	Input or use the slider to specify the radius of a transitional zone area between the existing surface and the modified surface, as indicated by the outer circle around the green circle.
Strength	Use the slider to change the amount that the selected surface will be mixed in with the existing surface where applied. When the Strength option is set to full, the selected surface will completely cover the existing terrain surface.
Surface	Select one of the 38 preconfigured surfaces to be applied by the brush.
Select Surface	When this button is clicked, it will activate the surface eyedropper which will automatically configure the Surface setting to match a selected location on the terrain.

Multi-Surface Brush Type

Option	Description
Size	Input or use the slider to specify the radius of the brush, indicated by the green circle around the cursor.
Transition	Input or use the slider to specify the radius of a transitional zone area between the existing surface and the modified surface, as indicated by the outer circle around the green circle.
Select Surface	When this button is clicked, it will activate the surface eyedropper which will automatically configure Surface A , Surface B , and Mix settings to match a selected location on the terrain.
Surface A	Select one of the 38 preconfigured surfaces to be applied by the brush.
Mix	Set which of the two selected surfaces will be favored when the two are blended and applied. Procedurally-placed models associated with some surfaces (e.g., Evergreen Needleleaf Forest) will only appear if the associated surface is favored by this parameter.
Surface B	Select one of the 38 preconfigured surfaces to be applied by the brush.

3. Use the **Surface Brush** on the terrain surface to apply the specified surface type.
- Click **LMB** once to apply a single surface edit based on the selected surface type and its options.
 - Hold **LMB** and move the cursor to apply the specified surface type across a wider area.

Bohemia Interactive Simulations recommends the following best practices for using the **Surface Brush** tool:

1. Use the **Single Surface** type to preserve existing surfaces while adding variety to them.
2. Use the **Multi-Surface** type to completely overwrite existing surfaces.
3. Use the **Select Surface** tool to discern what surfaces are being used in an area.
4. Favor the surface with the desired procedural model content when using the **Multi-Surface** type's **Mix** option.

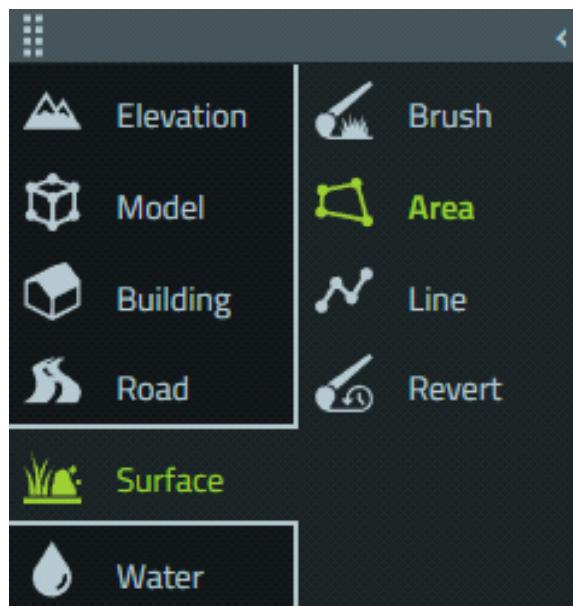
8.2 Surface Area Editing

The **Surface Area** tool allows you to make surface changes in a selected area.

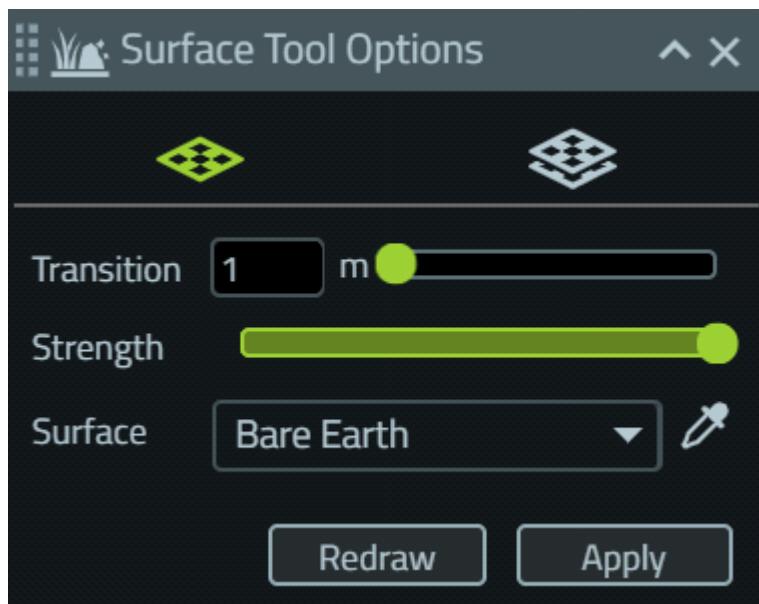
NOTE

The **Surface Area** tool also supports the same **Curve** mode as the **Road** tool and move operations as road vectors. For more information see [Adding Curves \(on page 135\)](#) and [Moving Vectors \(on page 124\)](#) respectively.

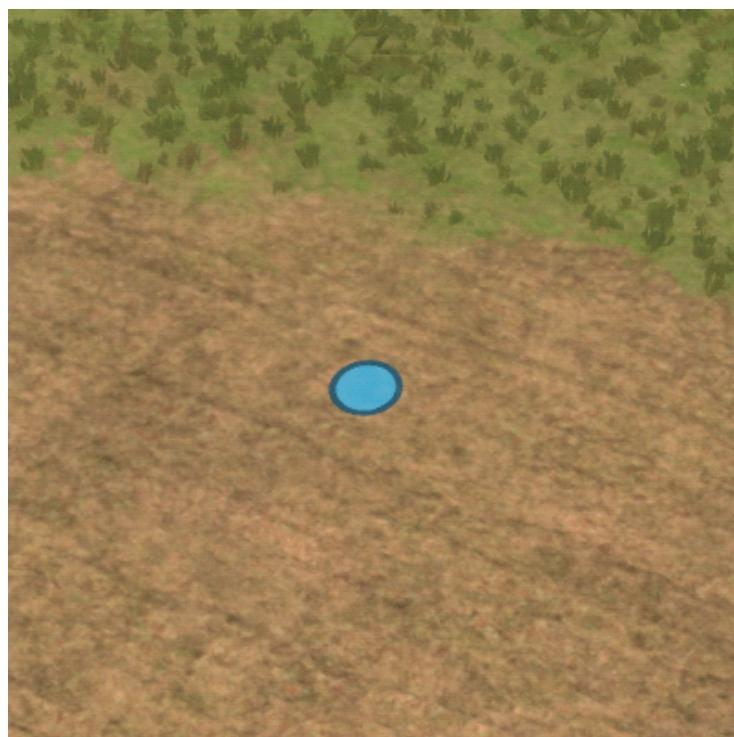
To begin surface area edits, select the **Surface** mode in the toolbar and click the **Surface Area** icon, or right-click and select the **Surface > Area** from the **Quick Access Toolbar**.



The **Surface Tool Options** panel will open, displaying the **Surface Area** controls.



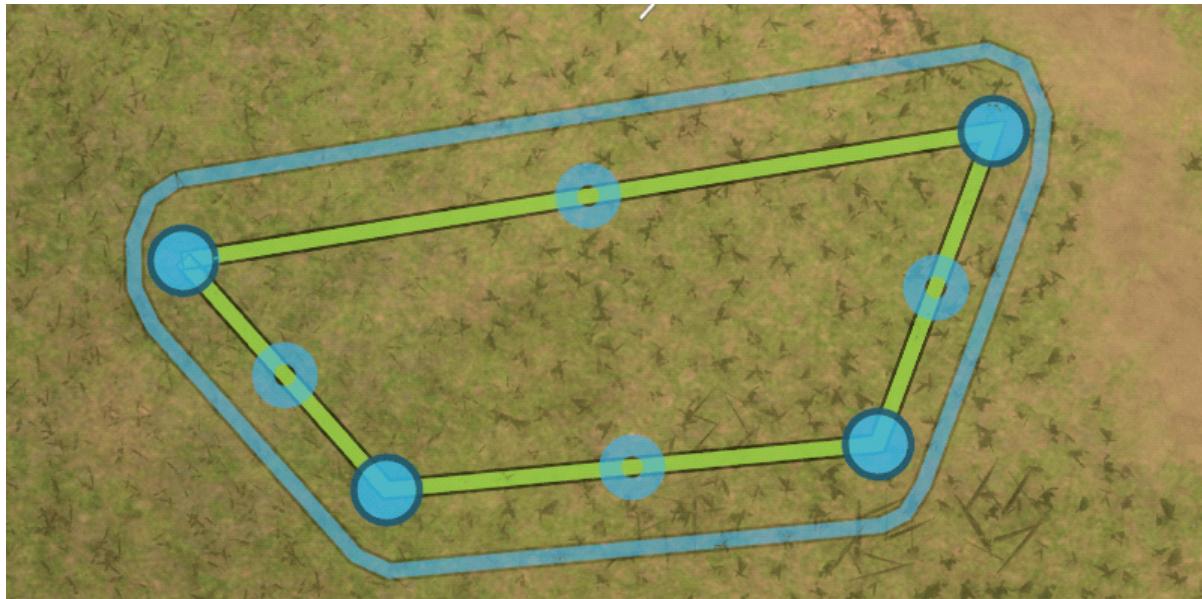
Use the **Surface Tool Options** panel to control the **Surface Area** type and draw on the terrain to apply the surface type to an area.



The first vertex of a **Surface Area** drawing will be displayed under your cursor.

Follow these steps:

1. Select an area to edit by clicking around the terrain surface to draw an area one vertex at a time. You should see the representation of the area, outlined in **green**, after you have begun placing vertices. Place at least three vertices to create a valid area.



2. Press **Enter** or right-click on the terrain and select **Complete** to finish drawing the area.
3. Click and hold **LMB** while hovering over the area to move it.
4. Click and hold **LMB** on the filled vertices to adjust their placement, editing the area.
5. Click **LMB** on one of the hollow vertices between the filled vertices to add a vertex to the drawn area.
6. Use the **Surface Tool Options** or right-click over the terrain to select the **Surface Area** effect.



Type Icon	Type	Description
	Single Surface	This edit type allows you to select and apply a single surface. The applied surface can be mixed with the existing surface where it is applied.
	Multi-Surface	This edit type allows you to mix two selected surfaces and combine them into a new multi-surface. The combined multi-surface will overwrite the existing surface where it is applied.

7. Use the **Surface Tool Options** to control the selected **Surface Area** effect.

Single Surface Area Type

Option	Description
Transition	Input or use the slider to specify the radius of a transitional zone area between the existing surface and the modified surface, as indicated by the outer circle around the green circle.
Strength	Use the slider to change the amount that the selected surface will be mixed in with the existing surface where applied. When the Strength option is set to full, the selected surface will completely cover the existing terrain surface.
Surface	Select one of the 38 preconfigured surfaces to be applied by the brush.
Select Surface	When this button is clicked, it will activate the surface eyedropper which will automatically configure the Surface setting to match a selected location on the terrain.
Redraw Area	Click this button to delete the selected area or to begin drawing a new polygon. Only one area can be drawn or modified at a time.
Apply	Click this button to apply the current effect to the selected area.

Multi-Surface Area Type

Option	Description
Transition	Input or use the slider to specify the radius of a transitional zone area between the existing surface and the modified surface, as indicated by the outer circle around the green circle.
Select Surface	When this button is clicked, it will activate the surface eyedropper which will automatically configure Surface A , Surface B , and Mix settings to match a selected location on the terrain.
Surface A	Select one of the 38 preconfigured surfaces to be applied by the brush.
Mix	Set which of the two selected surfaces will be favored when the two are blended and applied. Procedurally-placed models associated with some surfaces (e.g., Evergreen Needleleaf Forest) will only appear if the associated surface is favored by this parameter.
Surface B	Select one of the 38 preconfigured surfaces to be applied by the brush.
Redraw Area	Click this button to delete the selected area or to begin drawing a new polygon. Only one area can be drawn or modified at a time.
Apply	Click this button to apply the current effect to the selected area.

8. Press the **Delete** key or right-click on the terrain and select **Redraw Area** to draw a new polygon.

Bohemia Interactive Simulations recommends the following best practices for using the **Surface Area** tool:

1. Use this tool when a uniform surface is needed across a large area.
2. Make iterative applications to the same area until you achieve the desired result.
3. Use the **Single Surface** type to preserve existing surfaces while adding variety to them.
4. Use the **Multi-Surface** type to completely overwrite existing surfaces.
5. Use the **Select Surface** tool to discern what surfaces are being used in an area.
6. Favor the surface with the desired procedural model content when using the **Multi-Surface** type's **Mix** option.

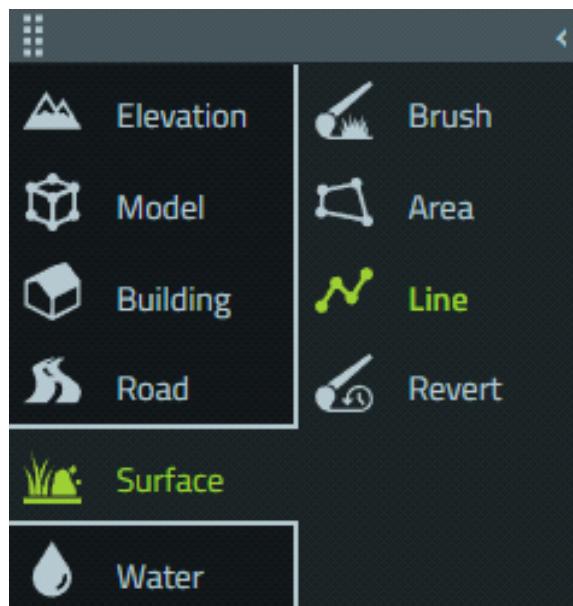
8.3 Surface Line Editing

The **Surface Line** tool allows you to make surface changes along a selected linear area.

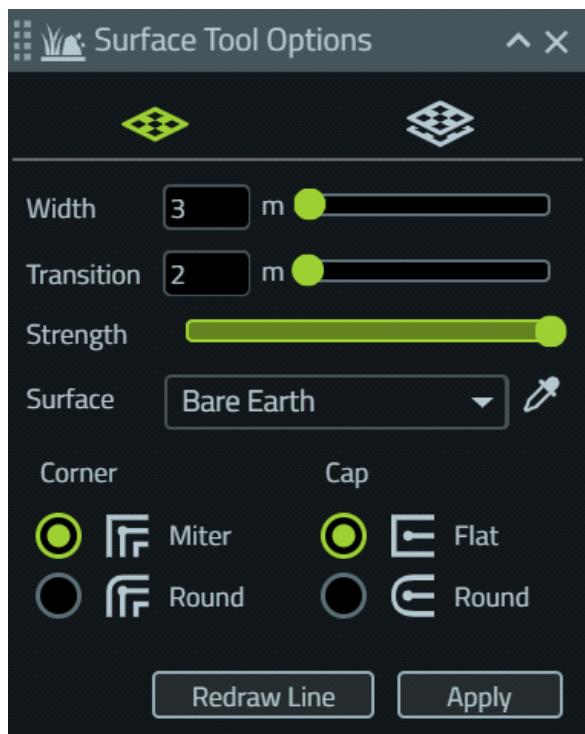
i **NOTE**

The **Surface Line** tool also supports the same **Curve** mode as the **Road** tool and move operations as road vectors. For more information see [Adding Curves \(on page 135\)](#) and [Moving Vectors \(on page 124\)](#) respectively.

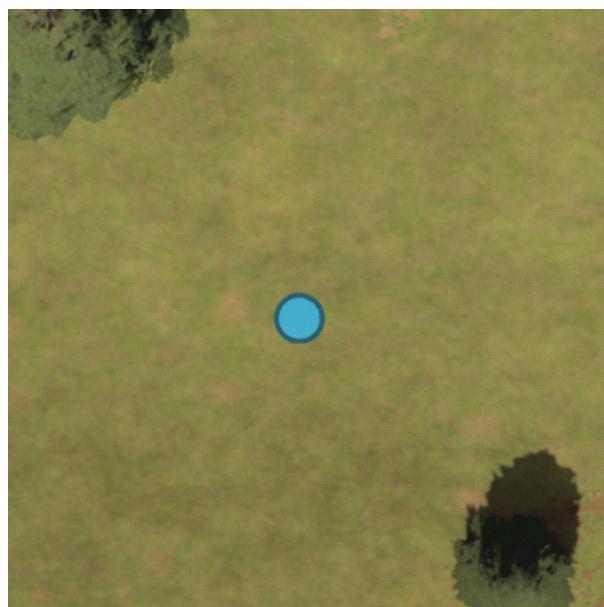
To begin doing surface line edits, select the **Surface** mode in the toolbar and click the **Surface Line** icon, or right-click and select the **Surface > Line** from the **Quick Access Toolbar**.



The **Surface Tool Options** panel will open, displaying the **Surface Line** controls.



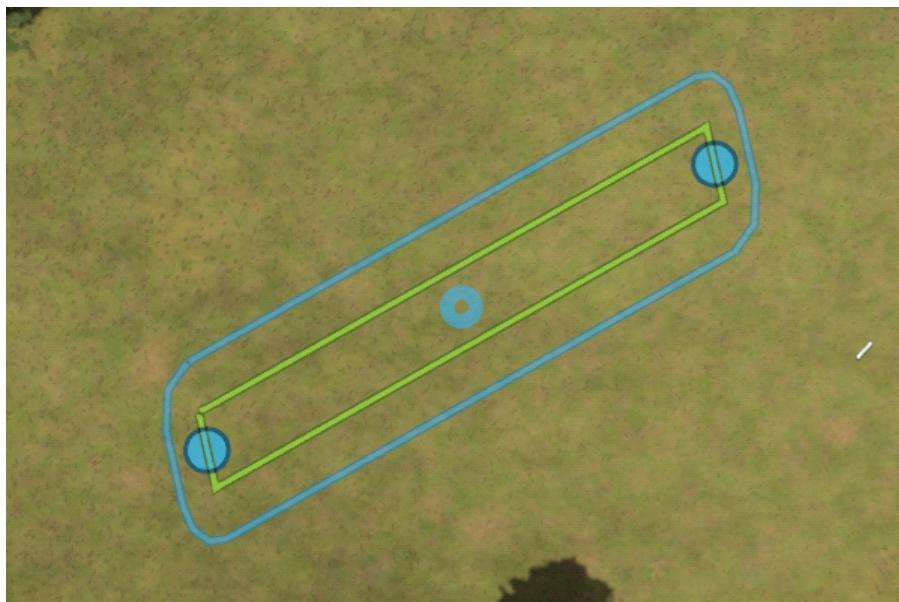
Use **Surface Tool Options** panel to control the **Surface Line** type and draw a line on the terrain to apply the type to a linear area.



The first vertex of a **Surface Line** drawing will be displayed under your cursor.

Follow these steps:

1. Select a linear area to edit by clicking around the terrain surface to draw a line one vertex at a time. You will see a representation of the linear area, outlined in **green**, after you have begun placing vertices. Place at least two vertices to draw a valid line.



2. Press **Enter** or right-click on the terrain and select **Complete** to finish drawing the line.
3. Click and hold **LMB** while hovering over the line to move it.
4. Click and hold **LMB** on the filled vertices to adjust their placement, editing the line.
5. Click **LMB** on one of the hollow vertices between the filled vertices to add a vertex to the drawn line.
6. Use the **Surface Tool Options** or right-click over the terrain to select the **Surface Area** effect.



Type Icon	Type	Description
	Single Surface	This edit type allows you to select and apply a single surface. The applied surface can be mixed with the existing surface where it is applied.
	Multi-Surface	This edit type allows you to mix two selected surfaces and combine them into a new multi-surface. The combined multi-surface will overwrite the existing surface where it is applied.

7. Use the **Surface Tool Options** to control the selected **Surface Line** effect.

Single Surface Line Type

Option	Description
Width	Input or use the slider to specify the thickness of the drawn line, indicated by the green outline.
Transition	Input or use the slider to specify the radius of a transitional zone area between the existing surface and the modified surface, as indicated by the outer circle around the green circle.
Strength	Use the slider to change the amount that the selected surface will be mixed in with the existing surface where applied. When the Strength option is set to full, the selected surface will completely cover the existing terrain surface.
Surface	Select one of the 38 preconfigured surfaces to be applied by the brush.
Select Surface	When this button is clicked, it will activate the surface eyedropper which will automatically configure the Surface setting to match a selected location on the terrain.
Corner	Select whether the corners of the drawn line will be mitered or rounded.
Cap	Select whether the ends of the drawn line will be flat or round.
Redraw Area	Click this button to delete the selected area or to begin drawing a new polygon. Only one area can be drawn or modified at a time.
Apply	Click this button to apply the current effect to the selected area.

Multi-Surface Line Type

Option	Description
Width	Input or use the slider to specify the thickness of the drawn line, indicated by the green outline.
Transition	Input or use the slider to specify the radius of a transitional zone area between the existing surface and the modified surface, as indicated by the outer circle around the green circle.
Select Surface	When this button is clicked, it will activate the surface eyedropper which will automatically configure Surface A , Surface B , and Mix settings to match a selected location on the terrain.
Surface A	Select one of the 38 preconfigured surfaces to be applied by the brush.

Option	Description
Mix	Set which of the two selected surfaces will be favored when the two are blended and applied. Procedurally-placed models associated with some surfaces (e.g., Evergreen Needleleaf Forest) will only appear if the associated surface is favored by this parameter.
Surface B	Select one of the 38 preconfigured surfaces to be applied by the brush.
Cap	Select whether the ends of the drawn line will be flat or round.
Apply	Click this button to apply the current effect to the selected area.
Redraw Area	Click this button to delete the selected area or to begin drawing a new polygon. Only one area can be drawn or modified at a time.
Corner	Select whether the corners of the drawn line will be mitered or rounded.

8. Press the **Delete** key or right-click on the terrain and select **Redraw Area** to draw a new polygon.

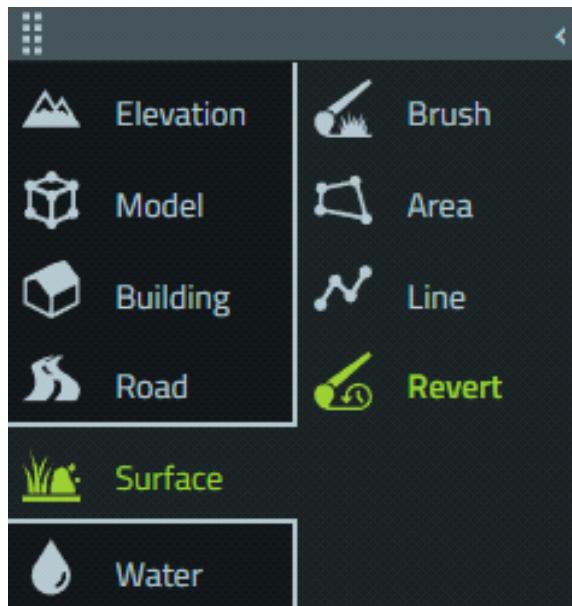
Bohemia Interactive Simulations recommends the following best practices for using the **Surface Line** tool:

1. Use this tool to make linear surface features, such as hedgerows.
2. Make iterative applications to the same area until you achieve the desired result.
3. Use the **Single Surface** type to preserve existing surfaces while adding variety to them.
4. Use the **Multi-Surface** type to completely overwrite existing surfaces.
5. Use the **Select Surface** tool to discern what surfaces are being used in an area.
6. Favor the surface with the desired procedural model content when using the **Multi-Surface** type's **Mix** option.

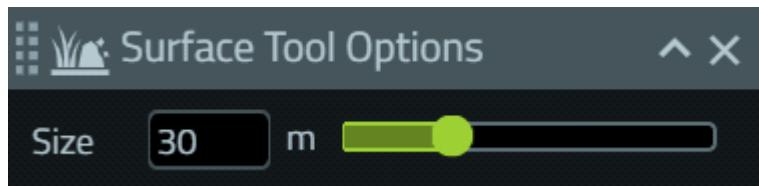
8.4 Reverting Surface Edits

The **Surface Revert Brush** tool allows you revert surface changes previously made to the terrain (**Ctrl + Z** can also be used to revert edits made in the same edit session), restoring the underlying data.

To begin reverting surface edits, select the **Surface** mode in the toolbar and click the **Surface Revert Brush** icon, or right-click and select the **Surface > Revert** from the **Quick Access Toolbar**.



The **Surface Tool Options** panel will open, displaying the **Surface Revert Brush** controls.



Use the **Surface Tool Options** panel to control the size of the **Surface Revert Brush** and apply the brush to the terrain to revert previous edits.



The **Surface Revert Brush** displays one ring on the surface of the terrain, centered around the cursor.

Follow these steps:

1. Select the size of the brush in the **Surface Tool Options** panel.
2. Use the **Surface Revert Brush** on the terrain where surface edits were previously made to revert the edits.
 - Hold **LMB** and move the cursor to revert surface changes across the terrain.

Bohemia Interactive Simulations recommends the following best practice for using the **Surface Revert Brush** effect:

- Use the brush to revert surface edits when using **Ctrl + Z** is no longer an option for restoring the base surface data.

8.5 Surface Types

Surface tools in VBS Geo can blend and apply 42 different surface types. Surface types are divided into three categories: Natural, Urban, and Other.

8.5.1 Natural Surfaces

There are 25 natural surfaces that will vary in appearance to match the ecosystem in the world where they are applied. These surfaces will change the terrain appearance and may also scatter procedurally generated model content.

Name	Description
Bare Earth	Rocky, sandy appearance. No procedural models.
Barren Area	Dry, unvegetated earth. No procedural models.
Closed Shrublands	Dense shrub area with a low canopy. Densely packed procedural shrub models.
Croplands	Green croplands. Has grassy ground cover.
Deciduous Broadleaf Forest	Forest dominated by deciduous broadleaf trees. Leaf litter present on the ground. Has forest models, including trees, shrubs, and ground cover.
Deciduous Needleleaf Forest	Forest dominated by deciduous needle-leaf trees. Leaf litter present on ground. Has forest models, including trees, shrubs, and ground cover.
Dirt and Weeds	Patchy grass and exposed earth. Has sparse ground cover models.
Evergreen Broadleaf Forest	Forest dominated by evergreen broadleaf trees. Leaf litter present on the ground. Has forest models, including trees, shrubs, and ground cover.
Evergreen Needleleaf Forest	Forest dominated by evergreen needle-leaf trees. Leaf litter present on the ground. Has forest models, including trees, shrubs, and ground cover.
Furrowed Field	Tilled soil with rows of furrows. No procedural models.
Grasslands	Grassy area. Has grass ground cover models.
Mixed Forest	Forest with a mixed assortment of tree types. Has forest models, including trees, shrubs, and ground cover.
Muddy Pasture	Muddy area with patches of grass. Has sparse ground cover models.
Muddy Soil	Bare, muddy ground. No procedural models.

Name	Description
Open Shrublands	Sparse shrub area with a low canopy. Has sparse shrub and ground cover models.
Packed Soil	Dry, packed earth with no vegetation. No procedural models.
Pasture	Grassy area with assorted wild flowers. Has ground cover models.
Rock	Exposed bedrock. No procedural models.
Sand	Sandy ground. No procedural models.
Savannas	Mostly grassland with very sparse tree models. Has ground cover and sparse tree models.
Tall Grass	Tall grassland. Has ground cover models.
Urban Grass	Short grassy lawn. No procedural models.
Wetlands	Swampy area. Has grass and wetland ground cover.
Wheatfield	Wheat croplands. Has wheat ground cover models.
Woody Savannas	Grassland with scattered groupings of trees. Has grouped ground cover models and groupings of tree models.

8.5.2 Urban Surfaces

There are 14 urban surfaces that will look the same regardless of where they are applied. These surfaces do not scatter procedural model content.

Name	Description
Asphalt	Fresh paved asphalt.
Asphalt Cracked	Old, cracked asphalt.
Cobblestone Irregular	Irregularly-shaped cobblestone.
Cobblestone Medium	Medium, regularly-gridded cobblestone.
Cobblestone Small	Small, regularly-gridded cobblestone.
Gravel	Coarse, loose gravel.
Gray Brick Pavers	Regularly-gridded gray brick pavement.
Jointed Concrete	Concrete pavement with gridded expansion joints.
Mulch	Coarse, woodchip texture.

Name	Description
Red Brick Pavers	Regularly-gridded red brick pavement.
Stone Pavers	Irregular stone pavement
Tile Pavers	Regularly-gridded tile pavement.
Trimmed Grass	Lawn grass.
Urban Area	Generic urban surface.

8.5.3 Others Surfaces

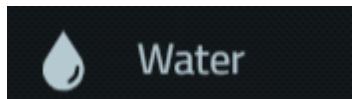
There are 3 other surfaces that are used for a soil and image blending technique. These classes are used in specific terrain insets, such as the Hohenfels inset. Most VBS Geo surface edits should continue to use the surfaces available under the **Natural** and **Urban** categories.

Name	Description
Croplands (Soil)	Green croplands. Has grassy ground cover. Used in soil blending.
Grasslands (Soil)	Grassy area. Has grass ground cover models. Used in soil blending.
Barren Earth (Soil)	Dry, unvegetated earth. No procedural models. Used in soil blending.

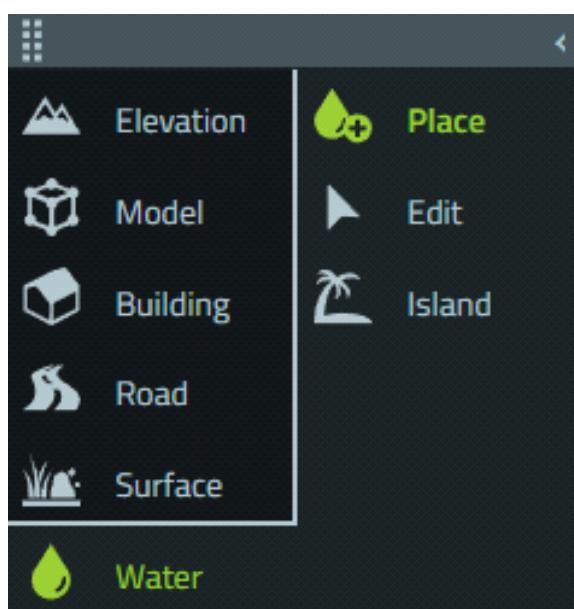
9. Placing and Editing Water

VBS Geo includes a **Water** mode to populate the VBS4 terrain with new water bodies and to edit global inland water data.

- In the **Toolbar**, click the **Water** icon.



The VBS Geo toolbar will display a set of **Water Tools**.



Tool Icon	Tool Type	Description
	Water Place	Place new inland water bodies. For more information, see Water Placing (on the next page) .
	Water Edit	Select and edit existing inland water bodies, their islands, and their properties. For more information, see Water Editing (on page 175) .
	Water Island	Place new islands in existing inland water bodies. For more information, see Placing Islands (on page 179) .

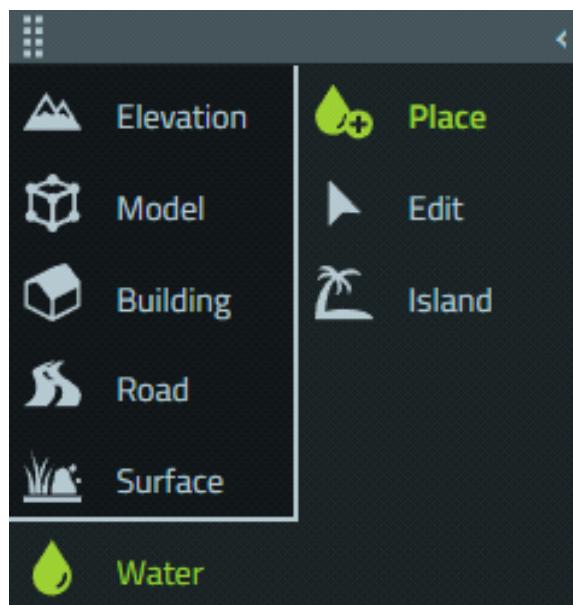
9.1 Water Placing

The **Water Place** tool allows you to place a water body using a simple polygon tool.

To begin placing water bodies, select the **Water** mode in the toolbar and click the **Water Place** icon, or right-click and select the **Water > Place** option from the **Quick Access Toolbar**.

NOTE

Water is always placed in the **Follow Terrain Grade** mode. Its influence on surrounding elevation can be adjusted using the **Water Edit** tool after the water body has been placed. For more information, see [Water Editing \(on page 175\)](#).

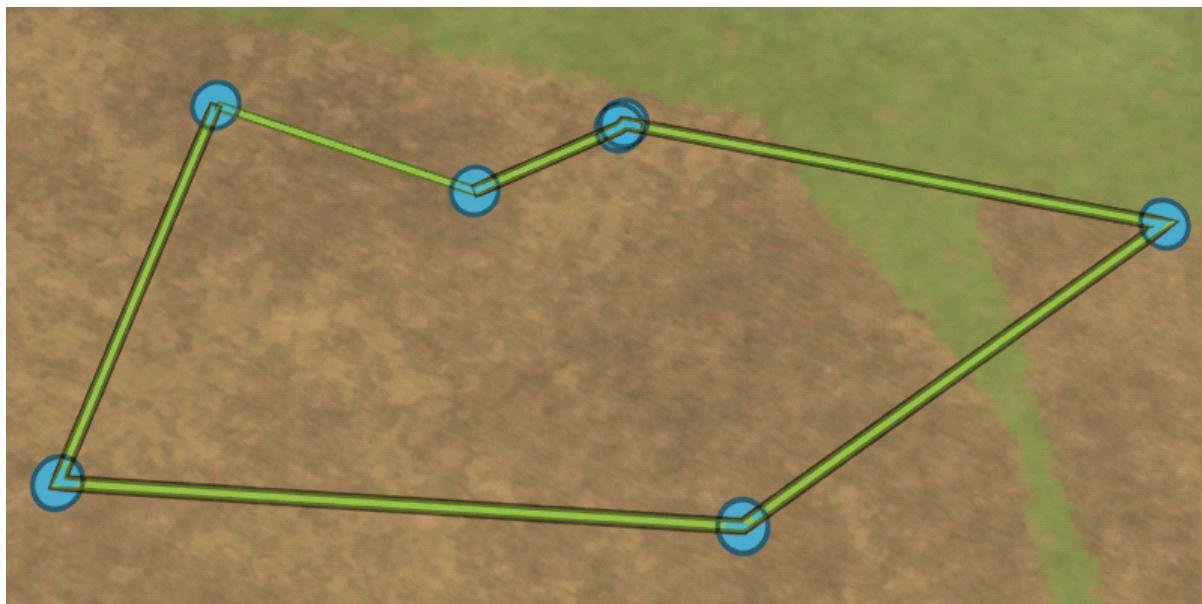


The first vertex of the new water body will be displayed under your cursor.

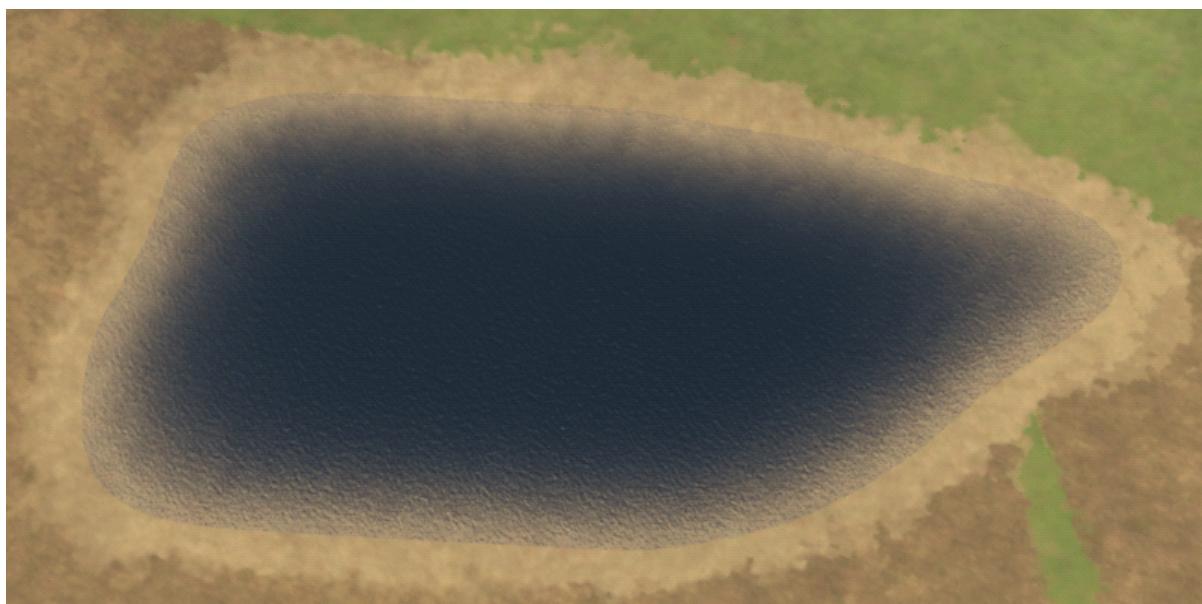


Follow these steps:

1. Click on the terrain surface to draw the water body one vertex at a time. You will see a representation of the water, outlined in **green**, after you have begun placing vertices. Place at least three vertices to draw a valid water body.



2. Press **Enter** or right-click on the terrain and select **Complete Drawing** to finish drawing the water body. You will see the outline filled with a water body and it will be cut into the terrain.



3. Edit the water as necessary.
 - a. Click and hold **LMB** while hovering over the water body to move it.
 - b. Click and hold **LMB** on the filled vertices and move the cursor to adjust their placement.
 - c. Click **LMB** on one of the hollow vertices (between the filled vertices) to add a vertex to the water body.
 - d. Press the **Delete** key while hovering over a filled vertex to delete that vertex.
 - e. Press the **Delete** key to delete the water body.
4. Click away from the drawn water body or press **Enter** to deselect it and to begin drawing a new water body.

i **NOTE**

VBS Geo elevation edits always take precedence over water cutting into the terrain (i.e., If elevation edits were made using VBS Geo in a given area, water will not cut into it and instead the elevation edits “overwrite” the potential elevation cutting done by water).

Bohemia Interactive Simulations recommends the following best practices for using the **Water Place** tool:

1. Water bodies should not overlap if possible. While the engine is able to handle some overlap between polygons, some overlapping polygons might be considered invalid and cause visual artifacts in the terrain.
2. Adjust the water layer first and then make additional changes to the elevation, as water elevation edits are superseded by VBS Geo elevation edits. If existing edits prevent water from cutting into the terrain, use the **Elevation Revert** tool to revert the elevation changes and to allow the water to cut into the terrain.

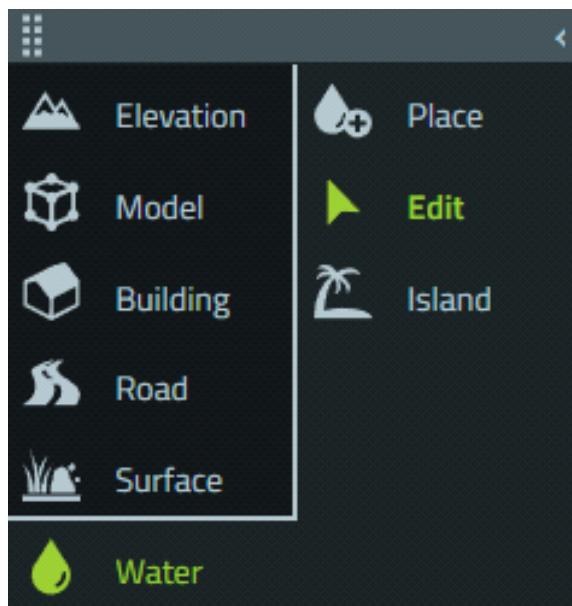
9.2 Water Editing

The **Water Edit** tool can select, edit, and delete placed water bodies and their islands.

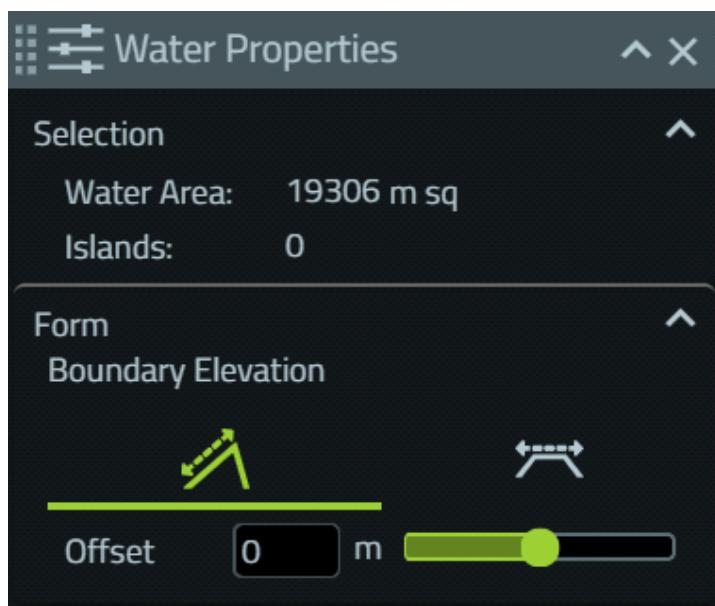
i **NOTE**

The **Water Edit** tool supports the **Curve** mode used by the **Road** tool and the same move operations as road vectors. For more information, see [Adding Curves \(on page 135\)](#) and [Moving Vectors \(on page 124\)](#) respectively.

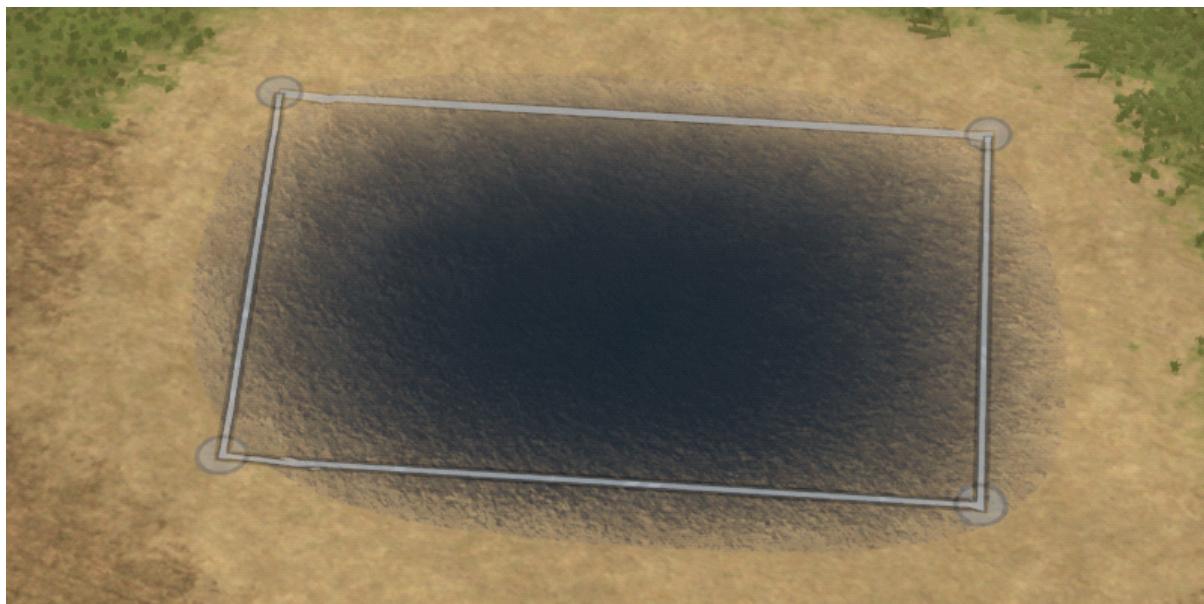
To begin editing placed or existing water bodies, select the **Water** mode in the toolbar and click the **Water Edit** icon, or right-click and select the **Water > Edit** option from the **Quick Access Toolbar**.



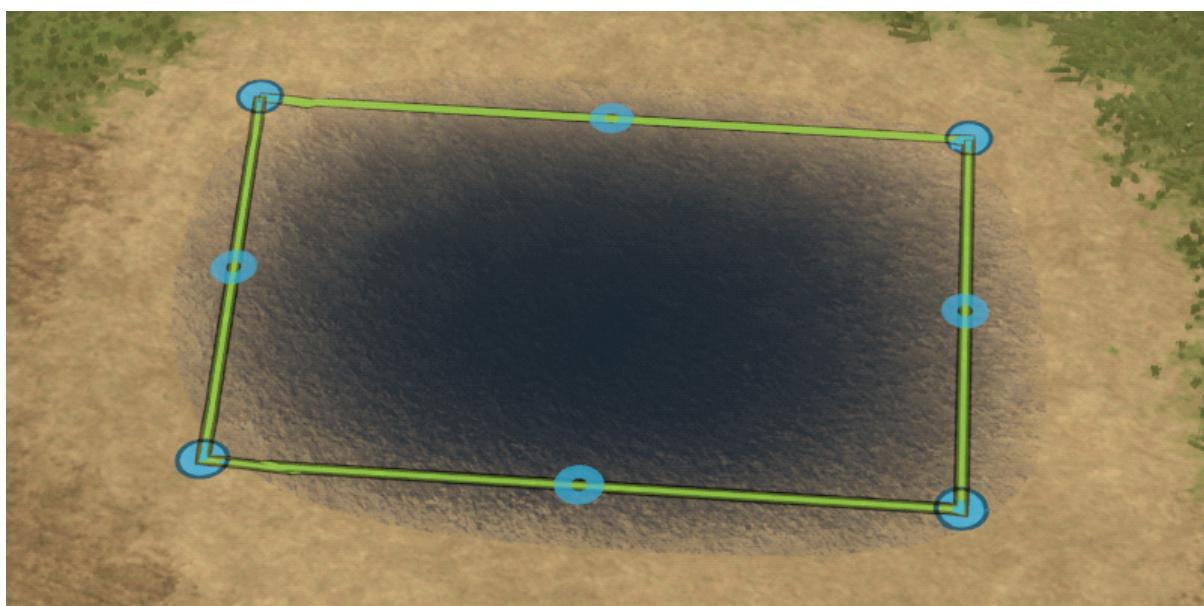
The **Water Properties** will open, displaying options and information about the selected water body and the setting of its **Boundary Elevation** options.



When a placed water body or island is hovered over with the **Water Edit** tool equipped, it will be highlighted in gray.



Select a placed water body or island to edit its outline, change its boundary elevation, or to delete it. When a water body is selected, it will be highlighted in **green**.



Follow these steps:

1. Click on a placed water body in the terrain or an island in the water body to select it. The water body or island is highlighted in gray when hovered and turns **green** when selected.

NOTE

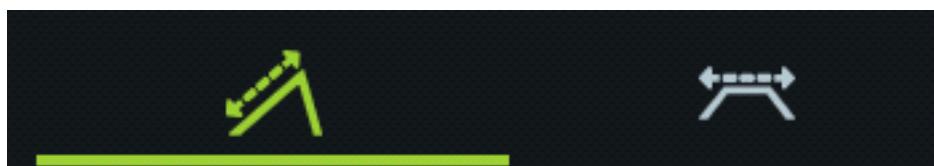
Only one water body or island can be selected at a time.

2. Edit the water body as necessary.
3. Click and hold **LMB** while hovering over the water to move it.

4. Click and hold **LMB** on the filled vertices when the highlight changes to **red** and move the cursor to adjust their placement.
5. Click **LMB** on one of the hollow vertices (between the filled vertices) to add a vertex to a drawn water body or island.
6. Adjust a **Water Properties Boundary Elevation** option to adjust how or if the water cuts into the terrain, or if the water should attempt to follow the terrain with a specified offset.

NOTE

These options only apply to water bodies, not islands.



Effect Icon	Effect	Description
	Follow Terrain Grade	<p>This effect forces the water body to follow the terrain grade beneath it.</p> <ul style="list-style-type: none"> • Offset - Input or use the slider to specify the amount of force to be applied across the water body when following the terrain grade. <p>NOTE Offset does not apply to Flatten.</p>
	Flatten Terrain	<p>When this effect is enabled, water will automatically flatten terrain elevation when placed. Select an option to control the extents of the terrain to be flattened around the placed water body.</p> <ul style="list-style-type: none"> • Minimum - Flattens terrain to the lowest elevation of the water body. • Average - Flattens terrain to the average elevation of the water body. • Maximum - Flattens terrain to the highest elevation of the selected area. • Custom - Flattens the water body to an input elevation above sea level. • Select Elevation - When this button is clicked, it will activate the elevation eyedropper which will automatically configure the elevation value to match a selected location on the terrain.

7. To delete an individual vertex, press **Delete** while hovering over that vertex and the highlight changes to **red**.
8. To delete the entire water body, press the **Delete** key.

NOTE

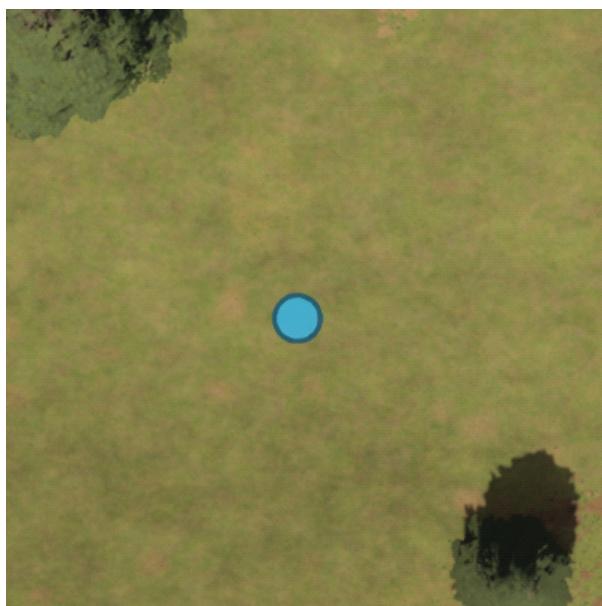
Editing islands works the same as editing water bodies with the exception that islands have no **Boundary Elevation** options like water bodies do. Whenever a water body is moved, deleted, or edited, the islands within the water body are affected as well.

Bohemia Interactive Simulations recommends the following best practices for using the **Water Edit** tool:

1. Water bodies are automatically smooth around the corners and their slope is automatically generated. The **Elevation** tools must be used for any finer tuning.
2. Islands can only be edited within their parent water body due to the dependency between water bodies and their islands.
3. Selecting large inland water bodies from the global water layer can cause significant performance hits due to the massive number of vertices involved as well as the general computational requirements for reconstructing large water body vectors. As a result, it is strongly recommended that these bodies not be selected with the **Water Edit** tool unless absolutely necessary.

9.3 Placing Islands

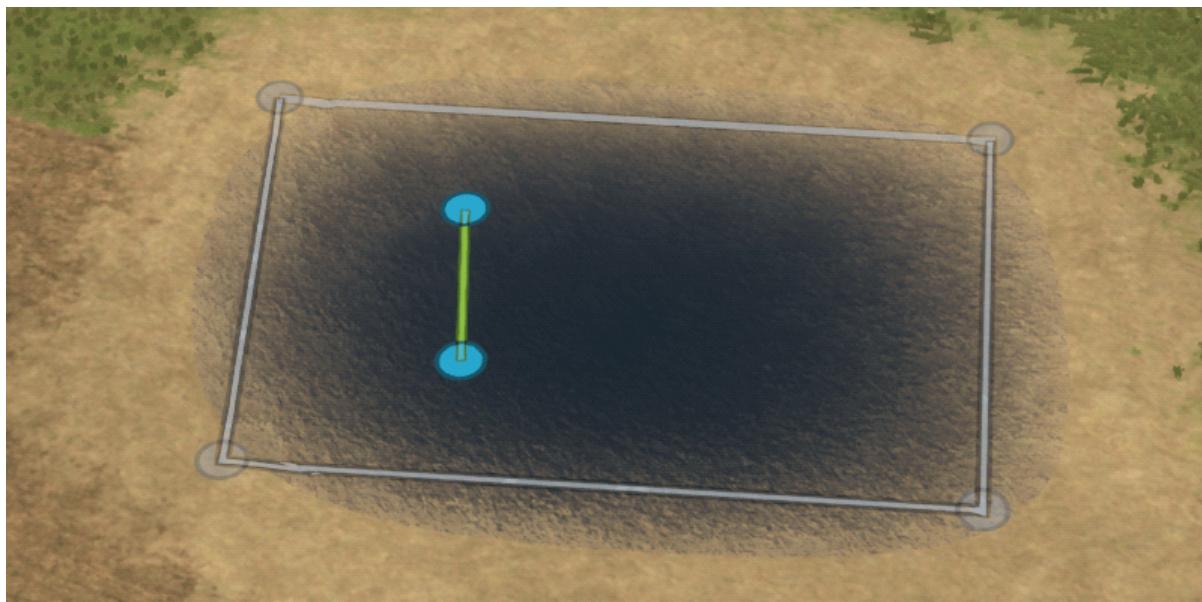
The **Water Island** tool allows you to place an island into a water body using a simple polygon tool. To begin placing the island, select the **Water** mode in the toolbar and click the **Water Island** icon, or right-click and select the **Water > Island** from the **Quick Access Toolbar**.



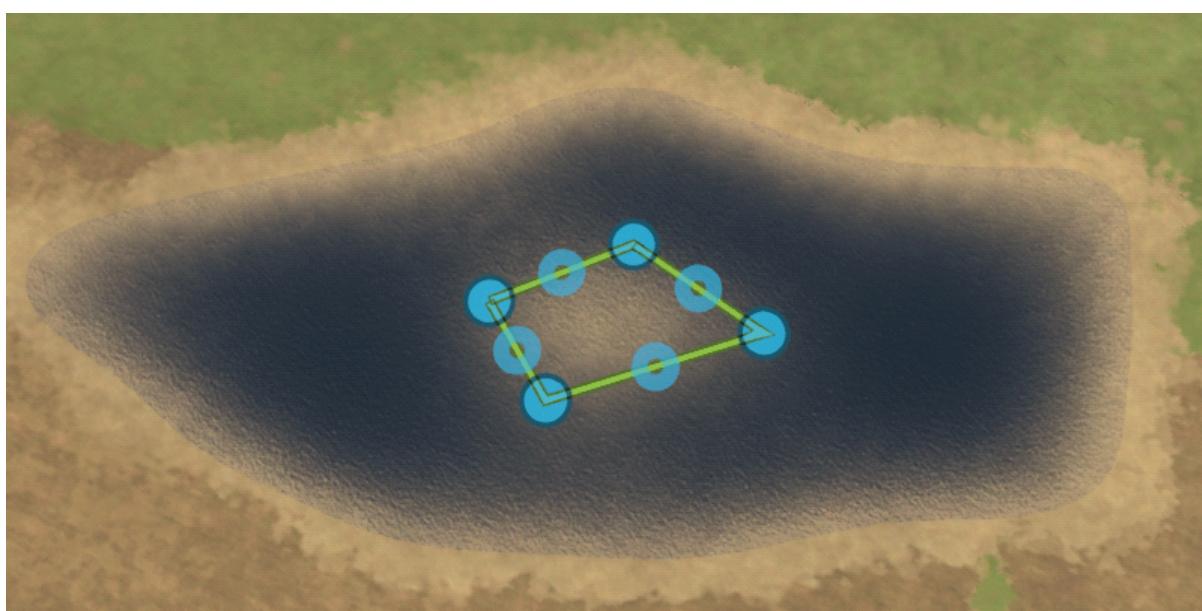
The first vertex of the new island will be displayed under your cursor.

Follow these steps:

1. Click on the water surface to draw the island one vertex at a time. You will see a representation of the island, outlined in **green**, after you have begun placing vertices. Place at least three vertices to draw a valid island. The parent water body will be highlighted in gray.



2. Press **Enter** or right-click on the terrain and select **Complete Drawing** to finish drawing the island. You will see the drawing fill in the parent water body with a terrain mass in the specified area.



3. Edited the island as necessary.
 - a. Click and hold **LMB** while hovering over the island to move it within the parent water body.
 - b. Click and hold **LMB** on the filled vertices and move the cursor to adjust their placement.
 - c. Click **LMB** on one of the hollowed vertices (between filled vertices) to add a vertex to the island.
 - d. Press the **Delete** key while hovering over a filled vertex to delete that vertex.
 - e. Press the **Delete** key to delete the island.
4. Click away from the drawn island or press **Enter** to deselect it and to begin drawing a new island in the same or a different water body.

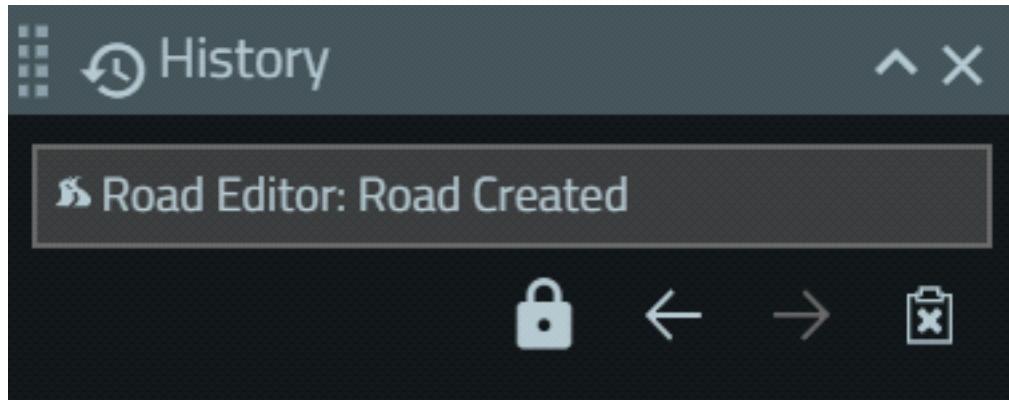
Bohemia Interactive Simulations recommends the following best practices for using the **Water Island** tool:

1. Islands are typically holes in the parent water polygon and will have the elevation of the underlying elevation layer. Use the **Elevation** tools to edit only the elevation of the island without affecting the elevation of the underlying water body.
2. Islands lying close to the edges of their parent water body will merge with the elevation on the water body edge.
3. Due to the automatic slope that is created by the parent water body, islands must have a certain area in order to allow their elevation to rise above the water level. Increase the size of the island vector using the **Water Edit** tool if the island is not appearing within the parent water body.

10. Editing Terrain History

VBS Geo includes a **History** panel for undoing and redoing terrain edits made during an active terrain editing session.

To access the **History** panel, click on the hamburger menu and select **Window > History**. The **History** panel opens, displaying a list of previously performed terrain edits.



The **History** panel displays all terrain edits in a list. The most recent edits appear at the bottom of the list while the oldest actions appear at the top. Clicking any item in the list causes the terrain to revert to its state before that edit was performed. The **History** panel also contains a set of buttons for controlling the history list.

Button Icon	Button	Description
	Scroll Lock	When locked, the scroll bar always snaps to the bottom of the History list.
	Undo	Undoes the most recent action. Undone actions are grayed out in the History list. Pressing Ctrl + Z also undoes the most recent action.
	Redo	Redoes the most recent undo action. Pressing Ctrl + Y also redoes the most recent action. This option is disabled when no actions have been undone.
	Clear	Permanently clears the entire History list. Cleared actions cannot be undone or redone.

Use the **History** to view all edits made to a terrain and to undo or redo terrain edits as necessary.

Follow these steps:

1. To open the **History** panel, click the hamburger menu icon then click **Window > History**.
2. Using the various terrain tools, make edits to the terrain. Each action is added as an individual entry in the **History** list.
3. Click the **Undo** button or press **Ctrl + Z** to undo the most recent action.
4. Click the **Redo** button or press **Ctrl + Y** to redo an undone action.
5. Click an action higher up in the **History** list to undo multiple actions.
6. Click an action lower in the **History** list to redo multiple actions.
7. Click the **Clear** button to remove all items from the **History** list.

NOTE

The **History** list is automatically cleared when a VBS Geo edit session is terminated.

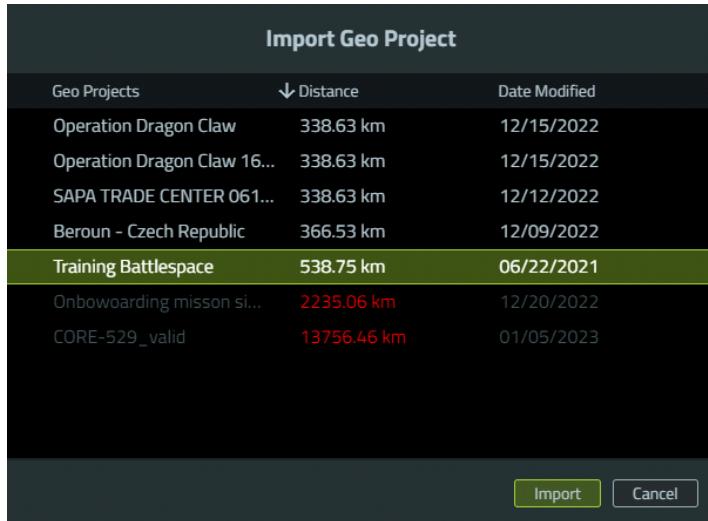
11. Importing VBS Geo Projects

You can import a VBS Geo project from one Battlespace into another to allow you to create different missions or plans without redoing all your terrain changes in the same area.



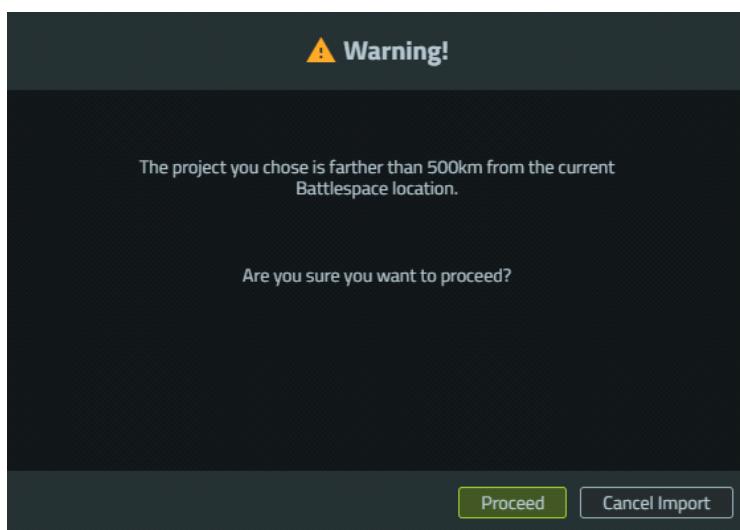
Follow these steps:

1. Select a Battlespace and launch VBS Geo.
2. In the **Main Menu**, select **Import >Import Geo Project**. The **Import Geo Project** dialog will open, listing Battlespaces that contain VBS Geo changes.

**i NOTE**

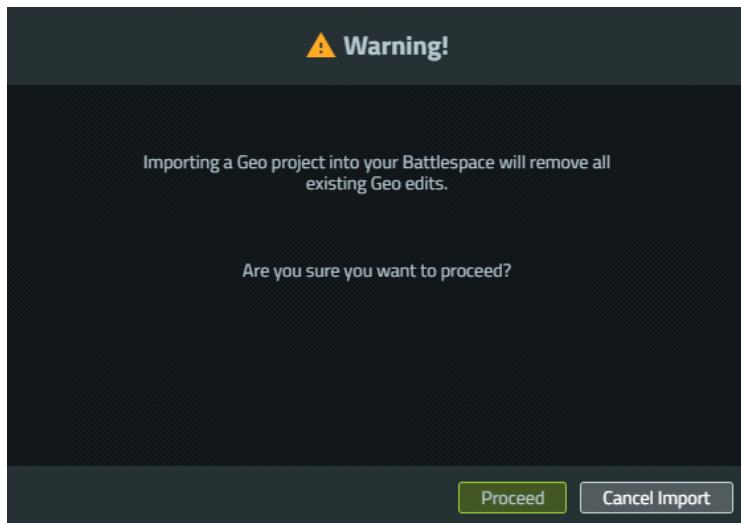
Due to limits in VBS4, Battlespaces with centers further away than 1000 km from the current Battlespace cannot be imported.

3. Select a Battlespace to import and click the **Import** button. Click the **Import** button. If you do not wish to import a VBS Geo project, click **Cancel** to close the **Import Geo Project** dialog.
4. If the Battlespace from which you are importing is located farther than 500 km from the current Battlespace, the following warning dialog appears:



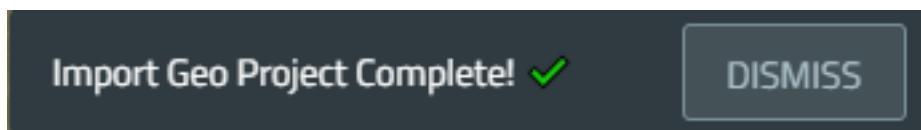
Click **Proceed** to continue the import, or **Cancel Import** to cancel it.

5. If you have previously imported a VBS Geo project from a different Battlespace, the following warning dialog appears, warning you that re-importing another VBS Geo project completely replaces existing data with the data from the imported project:



Click **Proceed** to continue the import, or **Cancel Import** to cancel it.

6. If the import is successful, the following message appears:



7. To save the VBS Geo import changes, click the **Main Menu** in the VBS4 Toolbar, and under **Battlespaces** select one of the following options:
 - **Save** - Saves the changes into the currently open Battlespace.
 - **Save As** - Creates a new Battlespace, or overwrites the existing one, based on the name you enter in the dialog.

12. Known Issues

This release of VBS Geo contains the following known issues:

- [General \(below\)](#)
- [User Interface \(below\)](#)
- [Backdrop Imagery \(below\)](#)
- [Elevation \(below\)](#)
- [Model Placement \(on the next page\)](#)
- [Extruded Buildings \(on the next page\)](#)
- [Roads \(on the next page\)](#)
- [Surface Editing \(on the next page\)](#)
- [Water \(on page 189\)](#)
- [VBS4 Integration \(on page 189\)](#)

12.1 General

- When running multiple VBS4 instances (or a VBS4 and a simulation client) on one PC, there may be an error with failed geopackage loading.

12.2 User Interface

- Toolbar position and dialog layout settings do not persist between VBS Geo sessions.

12.3 Backdrop Imagery

- If the backdrop imagery is enabled or disabled too quickly, it can lead to VBS4 instability.
- Interrupting the upload of a backdrop image to the VBS World Server can cause VBS4 instability.

12.4 Elevation

- Some terrain tearing may occur when applying elevation edits, but this should disappear once the terrain is fully regenerated.
- It is possible for some small or narrow elevation edits in VBS Geo to be partially ignored by collisions and AI.
- Flattening large mountainous terrain may leave behind some elevation noise and “bumpiness”.

12.5 Model Placement

- Model edits made using the **Model Properties** dialog are not recorded in the **History** panel.
- Models sometimes do not snap back to the surface if the terrain elevation beneath the model has been edited. Reselecting the model will cause the correct elevation offset to be applied. This behavior has been improved in VBS Geo 22.2 but can still potentially happen in this release.
- In certain situations, some model properties are not correctly reapplied after undoing or redoing actions, but visually appear when reselecting the objects.
- Model library category filters may return unrelated content.
- Linears presets, which have **Spacings > Disconnected** unset, will not always match the created linear. This is done to align the objects evenly. Setting disconnect can help with this issue but will leave gaps in a linear.
- Some Custom Linear Presets may never load their icons, which will be shown as an infinite spinning icon. The presets are still functional.

12.6 Extruded Buildings

- The **Curve** mode tool is not currently visible when below buildings.
- Crossing building footprint linears during building creation or editing will break the appearance of a building.
- Extruded buildings currently do not work with the **History** dialog.

12.7 Roads

- If roads are added in the offline build without the global data present, loading the Battlespace with such edits when the global road that is present can result in road artifacts due to overlaps.
- To edit the attributes of a Legacy road the texture of the road must be updated via the road dropdown list in the UI.

12.8 Surface Editing

- The **Select Surface** tool can sometimes return empty surface values in pre-constructed insets.

12.9 Water

- Large water areas currently have performance degradation and selection issues due to the drawing of highlights.
- Water editing currently does not work on the Hohenfels terrain inset or other TerraTools insets that have an offline binarized water layer and hence cannot be edited. While the water polygons can be created, the water is never properly cut in.
- Dragging and repositioning water bodies with islands may result in the islands not correctly updating their elevation.

12.10 VBS4 Integration

- When switching to VBS Editor or the Preview mode, it may take some time for models placed in VBS Geo to appear in the terrain.
- Performing an action in the VBS4 UI disables the use of VBS Geo hot keys until the user clicks into the VBS Geo 3D camera view.
- Some mouse clicks are registered even when VBS4 is not in focus, resulting in unintentional terrain modifications.