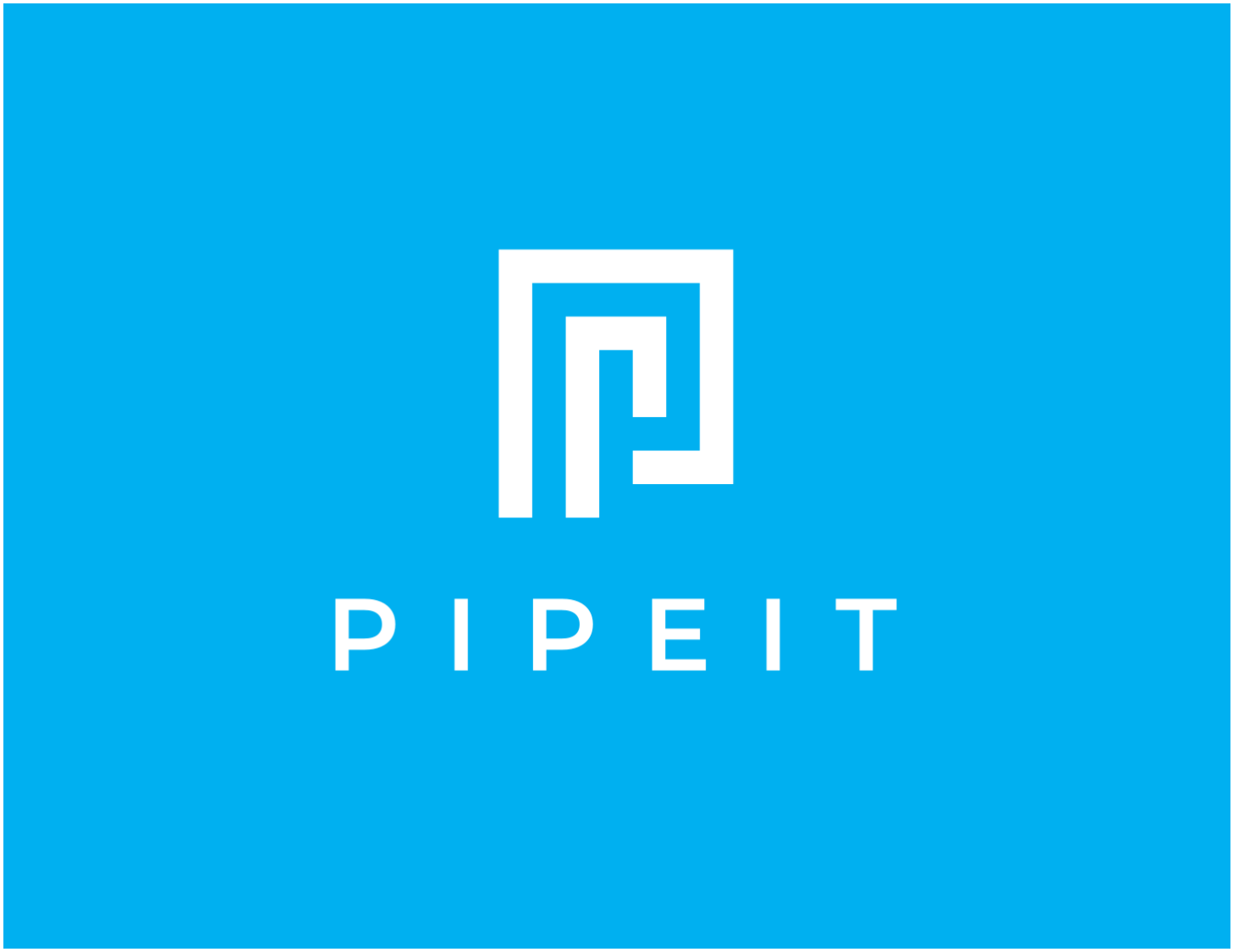

Plumbing-Copilot For Revit

Release notes for version 2022-2024

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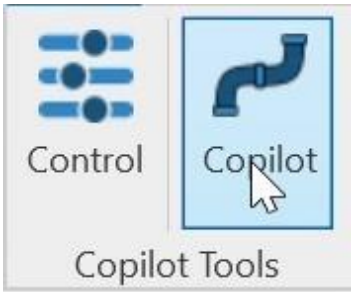
Copilot button

How to use it?

The "CoPilot" button serves as the initial step in the route generation process. Upon clicking the button, the user will be prompted to choose the starting element. Following this selection, the user will then be prompted to choose the ending element.

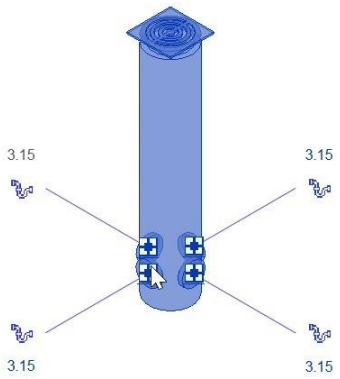
To cancel the operation, simply press the "Esc" button on your keyboard.

If the route generation process has already begun, click on the "CoPilot" button to cancel it.



Where to click?

Users can click on any location within the element. CoPilot will automatically identify the relevant connector to select based on the options configured in the control panel. The significance of the click location only comes into play when multiple connectors on the same element share the same system type. In such instances, CoPilot will prioritize the connector closest to where the user clicked.



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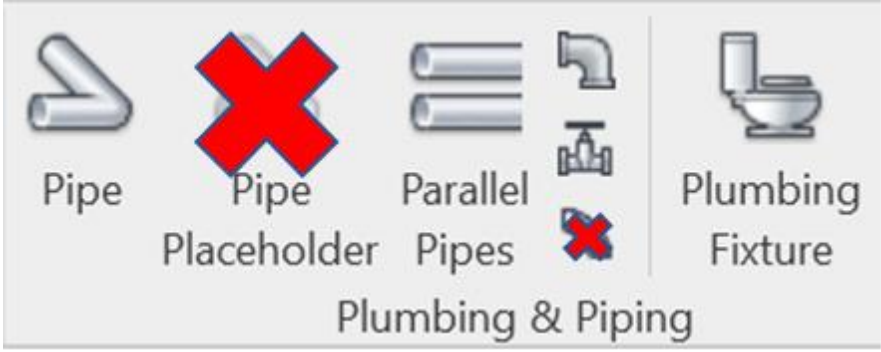
Supported elements

Users have the option to choose the following elements as the start or end element:

- Any pipe types
- Any pipe fitting or Accessory (except for flex pipe)
- Any plumbing fixture



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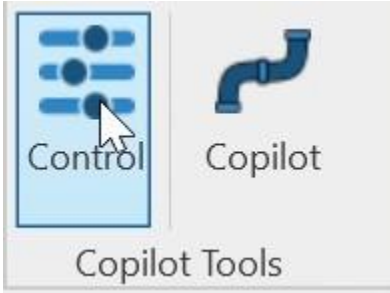
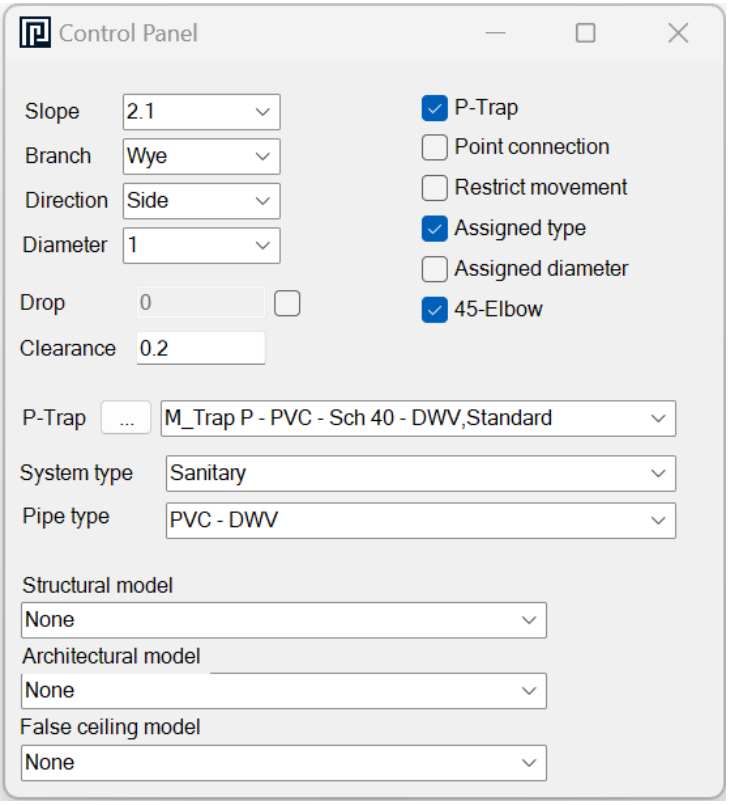
Control button



By clicking the "Control" button, the control panel, as shown below, will be presented. This panel serves as the interface to configure the options required for route generation. The control panel operates as a modeless dialog, allowing users the flexibility to keep it open while performing tasks or to close it once the configuration is complete.



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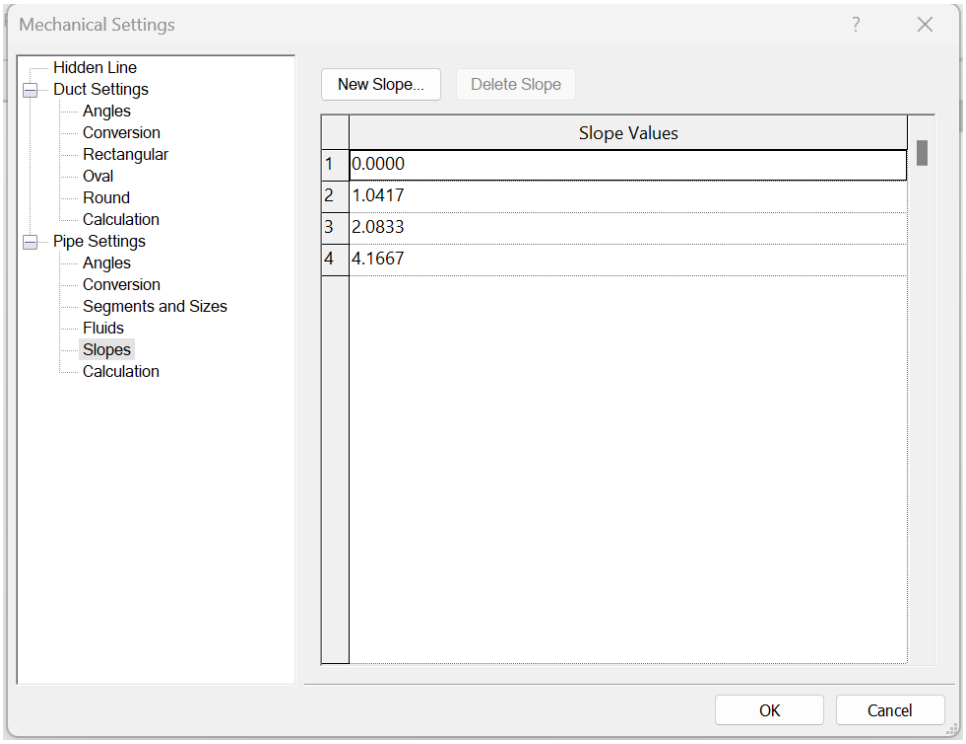
Slope

This option enables users to configure the slope of the route. The slopes available in the control panel mirror those found in Revit's pipe setting menu under the Slopes section. Consequently, any additions or deletions of slopes in the pipe setting menu will have a corresponding impact on the "Slope" drop down list within the control panel. **It's important to note that the slopes in the control panel are always displayed as percentages.**

Choosing a slope value of 0 means that the generated pipes will be without any incline. This setting is typically used for domestic water systems.



Restrict movement

This option instructs the software to minimize the movement of the run inside walls and plumbing voids as much as possible. To activate this feature, the "Restrict movment" checkbox must be checked. **It's important to note that using this option may, at times, impact the generated run, leading to a suboptimal outcome. Utilizing this option in scenarios with crowded walls or plumbing voids may result in prematurely terminating the current run generation before its completion, due to the restrictions imposed on movement.**

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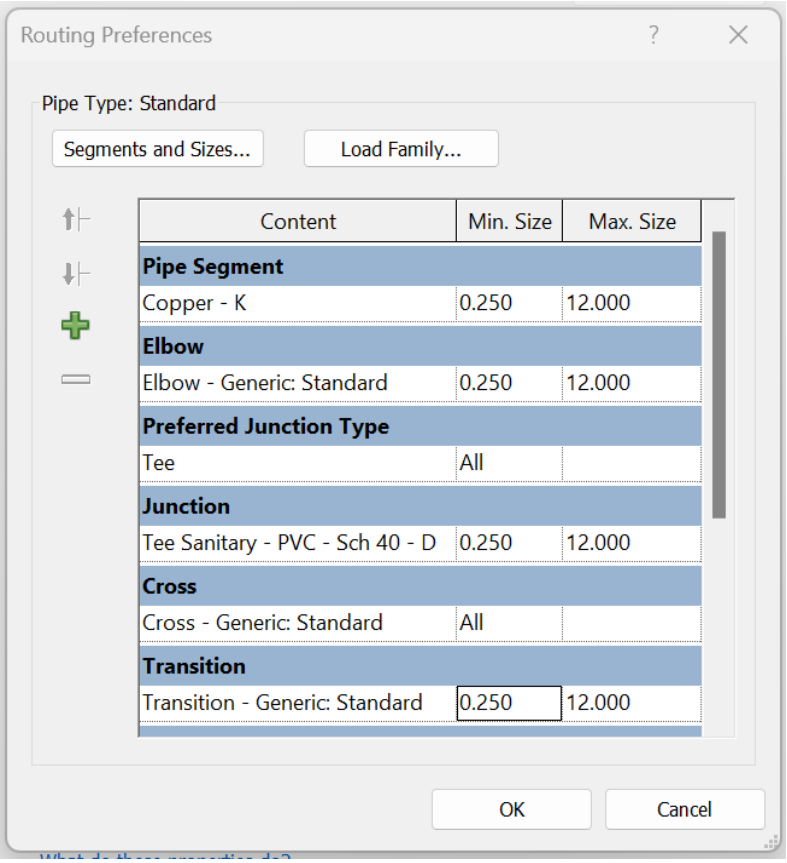
Branch type

This option enables users to select from two junction types for branching off /into a pipe. The family assigned in the pipe type routing preference will be used in route generation.

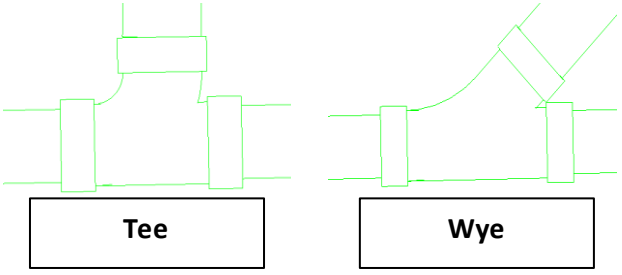


Tee junction

- The tee junction is compatible with both sloped and non-sloped pipes.
- Support Convertible and non-convertible Tee families.

Wye junction

- The Wye junction only works with sloped pipes.
- Support Convertible Wye families only.



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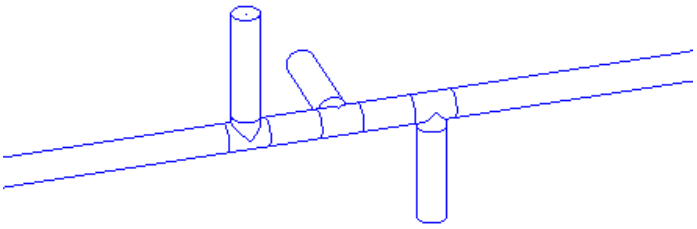
Branch direction

This option enables users to specify the direction for branching off/into a pipe, there are three options

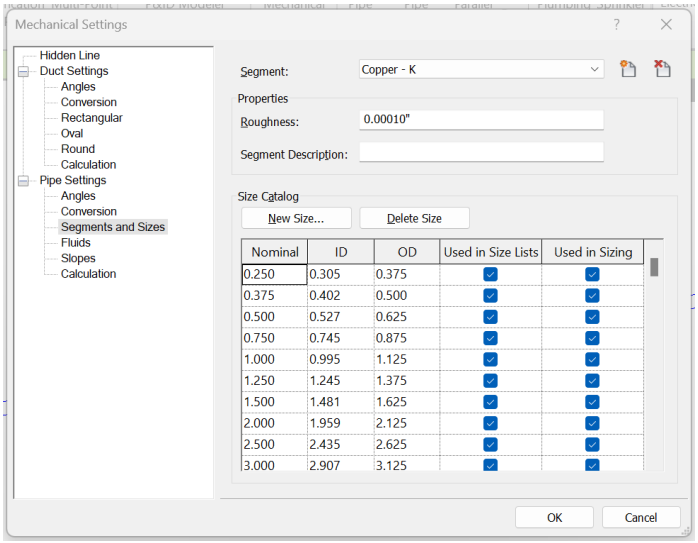
1. Side
2. Up
3. Down

CoPilot will automatically select the optimal point on the end segment for connection, considering the branch type and direction. It also considers the required space for junction and reducer fittings, if necessary, all while minimizing both the route length and the use of elbows.



Diameter

This option allows users to define the diameter of the route. The diameters presented in the control panel mirror those found in Revit's pipe setting menu under the segments and sizes section. To activate this option, the "Assigned diameter" checkbox must be checked. If left unchecked, the pipe diameter of the start or end element will be used in route generation. **It's important to note that the Diameters in the control panel are displayed in the unit of pipe dimension, which can be modified through Manage -> Project Units -> Piping -> Pipe Dimension.**



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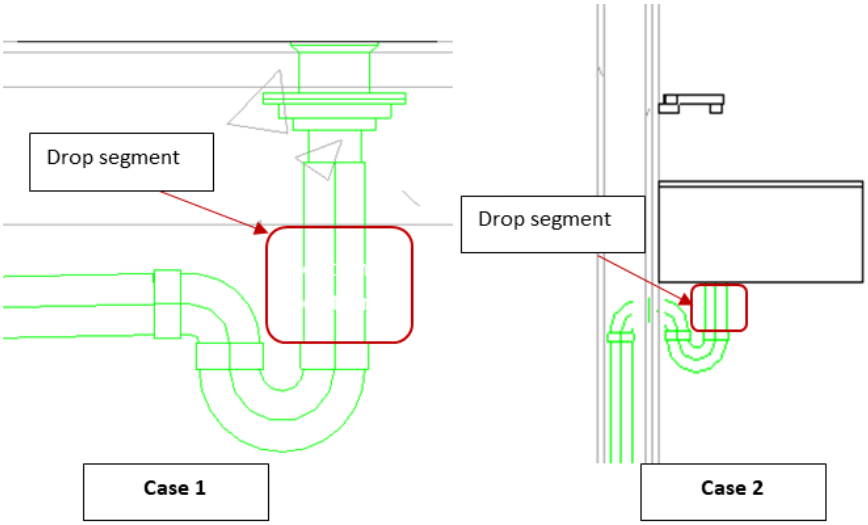
Drop

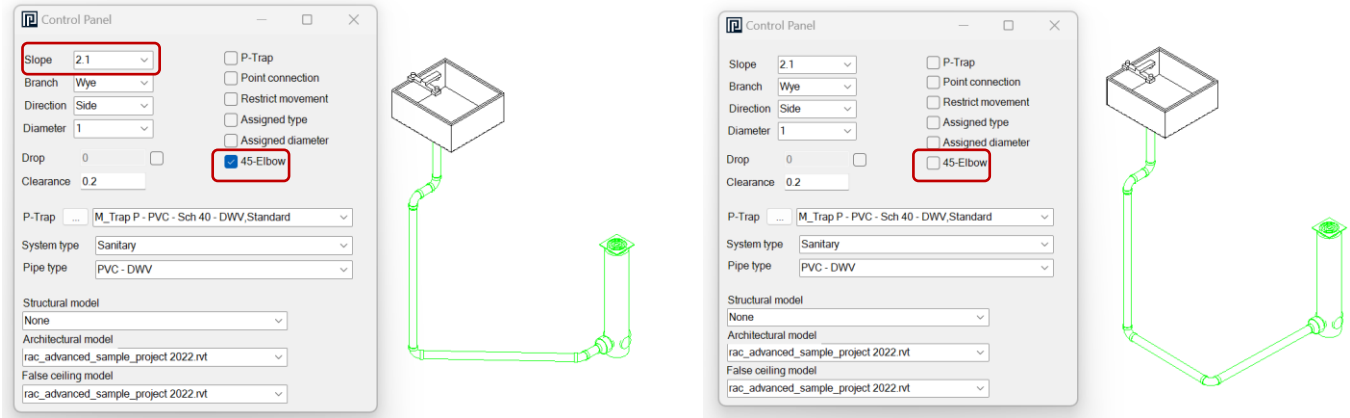
This option allows users to specify the length of the pipe segment immediately following the plumbing fixture and preceding the p-trap (Case 2). To activate this option, the “Drop” checkbox must be checked, if left unchecked, the software will determine the drop length required to optimize both route length and minimize the use of fittings. It's important to note that the measurement of the drop segment length differs in the case of a floor-mounted fixture (Case 1), where the drop segment is measured from the p-trap to the upper floor slab. **It's important to note that the Drop is measured in the unit of length, which can be modified through Manage -> Project Units -> Common-> length.**



45-Elbow

This option instructs the software to exclusively use 45-degree elbows on horizontal runs. To activate this feature, the “45-Elbow” checkbox must be checked. **It’s important to note the following**

- **This feature is only effective with sloped pipes.**
- **Support Convertible Elbows.**



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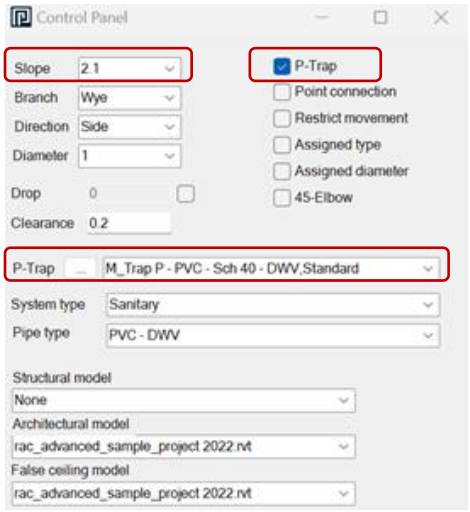
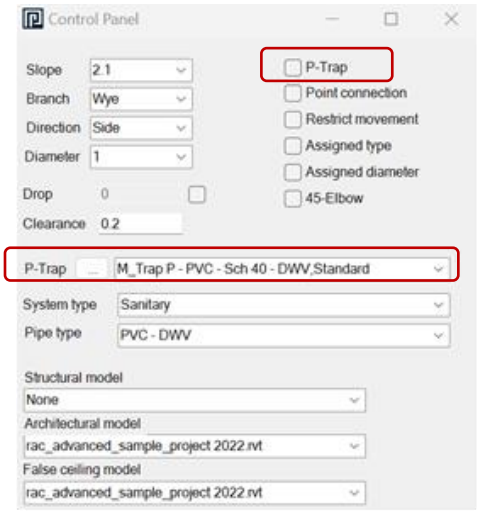
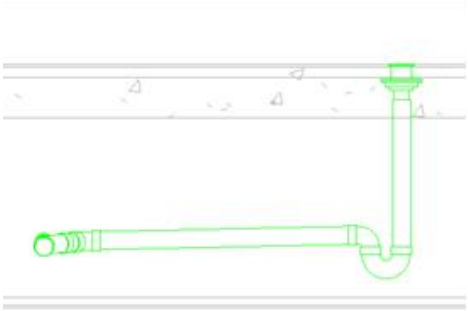
P-Trap

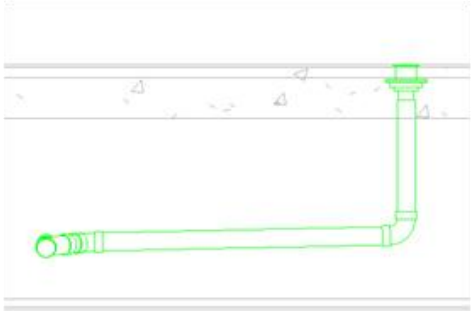
This option allows users to include a p-trap into the generated route. To activate this feature, ensure the "P-Trap" checkbox is checked, and choose the p-trap family from the "P-Trap" dropdown list in the control panel. If the "P-Trap" checkbox is left unchecked or the "P-Trap" dropdown list is assigned the wrong family, the generated route will not include a p-trap. **It's important to note the following:**

- **The p-trap family shall be a resizable family.**
- **The p-trap feature can only be included in routes starting from floor or wall mounted plumbing fixtures.**
- **The p-trap feature only works with sloped pipes.**









Clearance

This option allows users to specify the desired clearance around the elements of the generated route. **It's important to note that the Clearnce is measured in the unit of length, which can be modified through Manage -> Project Units -> Common-> length.**

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Pipe & System type

This option allows users to specify the desired pipe and system type of the generated route. To activate this option, the "Assigned type" checkbox must be checked, if left unchecked, the software will determine the pipe and system type to use in the generated route from either the start or end element. The two tables below illustrate how the determination of pipe and system types for the route is made. **It's important to note that the route generation process will fail to start if either the start or end element is a plumbing fixture, and it doesn't contain a connector with the determined system type.**

Pipe & system types of the start element
Pipe & system types of the end element
Pipe & system types assigned in the CP

Assigned type (checked)

		Start element		
		pipe	Fitting	Plumbing fixture
End element	Pipe			
	Fitting			
	Plumbing fixture			

Assigned type (unchecked)

		Start element		
		pipe	Fitting	Plumbing fixture
End element	Pipe			
	Fitting			
	Plumbing fixture			

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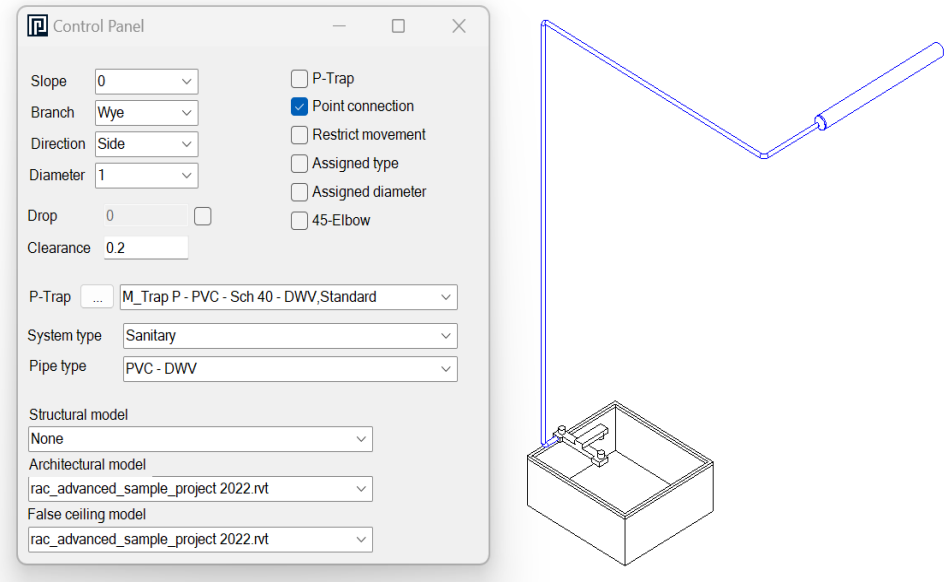
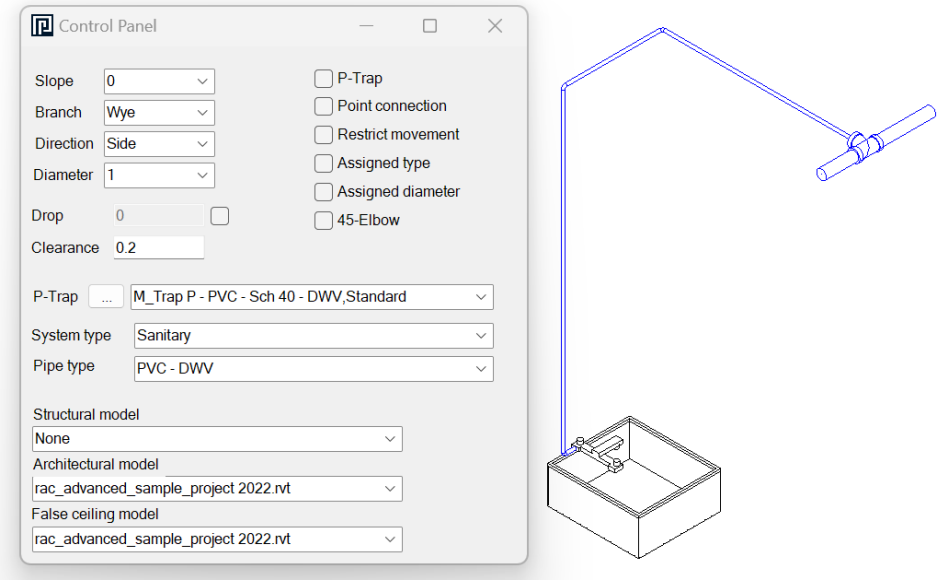
Point connection

This option enables users to connect two elements by their end points. To activate this option, the "Point connection" checkbox must be checked. If left unchecked, the software's default behavior is to connect into the end element if it is a pipe or to a free connector on the element closest to where the user clicked if it is a fitting or a plumbing fixture. **It's important to note that the route generation process will fail to start if either the start or the end element doesn't have a free connector.**





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User messages

Make sure you are working in a valid context.

What is a valid context?

In Plumbing-CoPilot, a valid context refers to the identifiable portions of the building through which the software can route the elements.

Valid contexts

False ceiling void

A false ceiling represents the space within the building enclosed by the false ceiling and the upper floor slab. When the start and end elements are located within the same false ceiling void on the same floor, the software can recognize them and generate a route to connect them. **It's important to note that a ceiling void shall have a level element above it and a level element below it.**

Wall

If the start and end elements are located within the same wall element, the software can recognize them and generate a route to connect them.

Plumbing void

If the start and end elements are located within the same plumbing void, the software can recognize them and generate a route to connect them. It is allowed for plumbing voids to extend across multiple levels.

What is a plumbing void?

It is the concealed space behind a toilet where plumbing connections and pipes, such as the water supply and waste pipe, are installed. This space allows for a discreet and functional toilet installation with access for maintenance and repairs.

Wall/Plumbing Void-False ceiling void

If the first element is in a wall/plumbing void and the other element is in a false ceiling void, the software will recognize this as a valid context.

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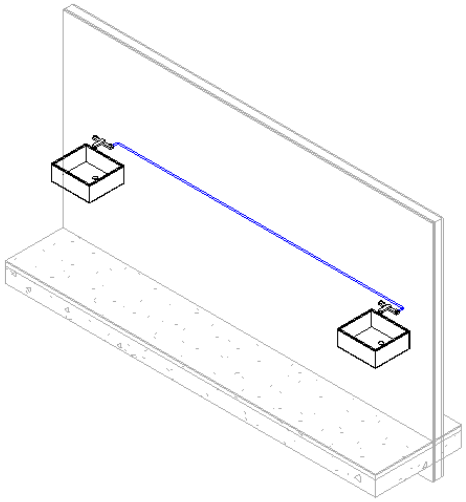
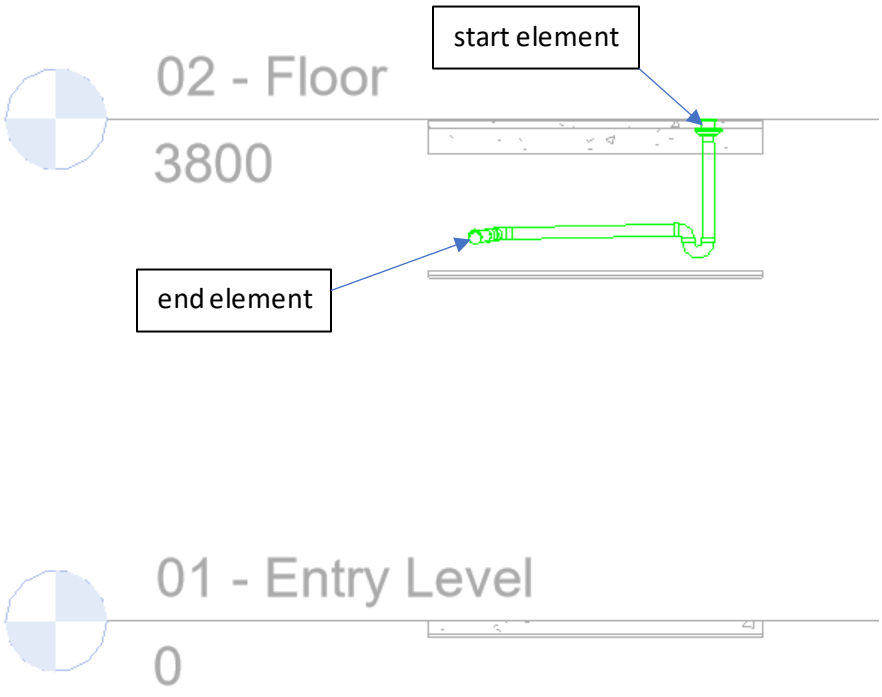
Space

If the start and end elements are in a space and hosted on the same wall, then the connectors of the two elements near the wall can be connected through the wall. However, if the software detected a plumbing void behind the wall, it would be used for connecting the elements.



Space-False ceiling void

If a plumbing fixture or fitting is positioned near or hosted by the lower floor slab, and the other element is located in the false ceiling void of the level directly below it, the software will recognize this as a valid context.



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Space-Wall

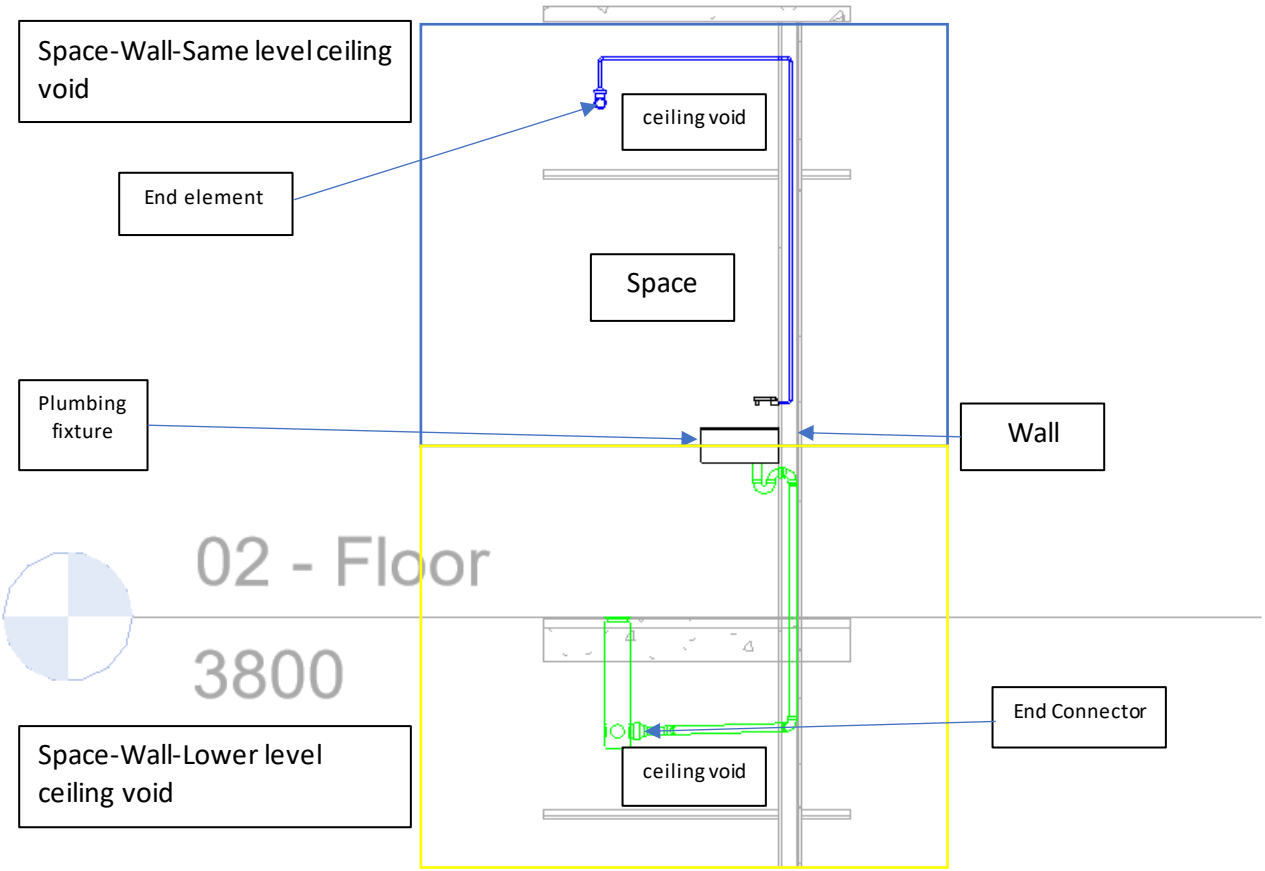
If a plumbing fixture or fitting is close to a wall, and the other element is also within that same wall, it's a valid context for the software. However, it's not considered a valid context if the other element is located in a different wall.

Space-Plumbing void

If a plumbing fixture or fitting is close to a wall, and the other element is in the plumbing void of the same wall, it's a valid context for the software.

Space-Wall/Plumbing Void-False Ceiling void

If a plumbing fixture or a fitting is positioned near or hosted by a wall and the other element/connector is located in the false ceiling void of the same level or the level directly below it, the software will recognize this as a valid context.



The start and end elements cannot be the same element.

This message indicates that the user has chosen the same element for both the start and end positions. Make sure you select a start element and a different end element.

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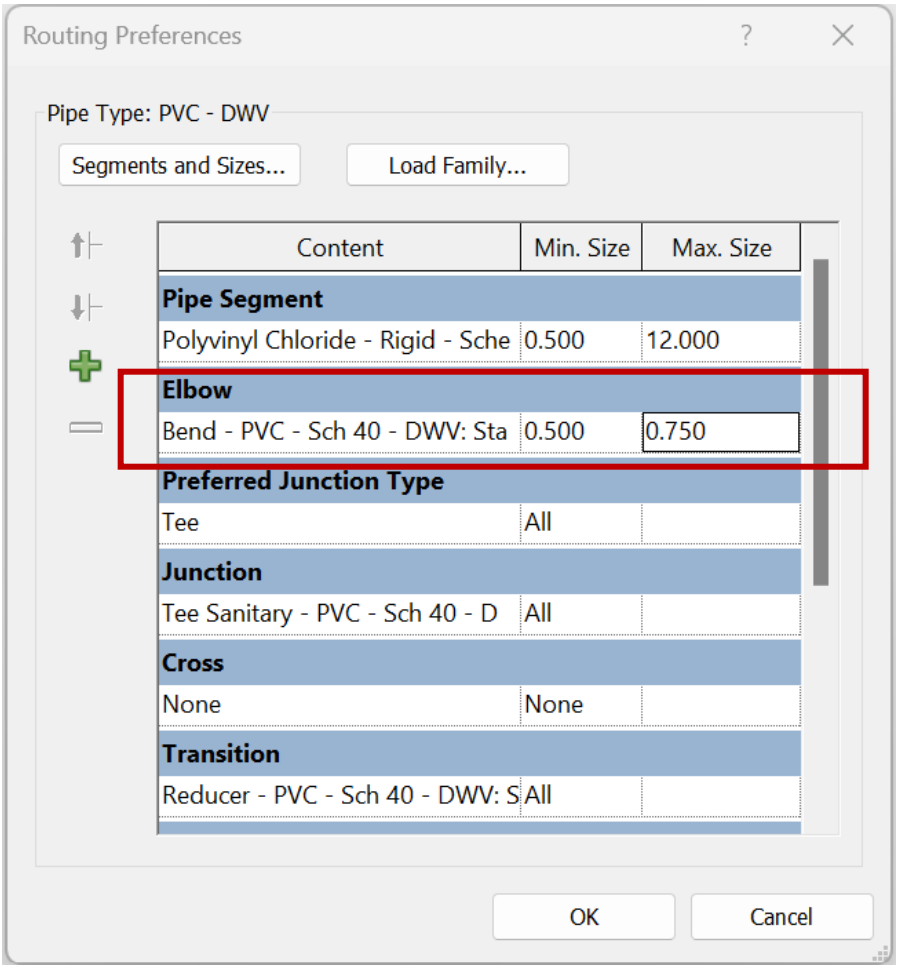
The selected start element does not have a valid system type.

This message indicates that the selected start element does not have a valid system type. It is often associated with a corrupted pipe. To fix this problem, delete the pipe and create it again.

Routing process cannot start.

No 'Elbow' family is assigned...

No 'Elbow' family is assigned for the current pipe type “PVC-DWV” and the used pipe size. This warning message will be displayed if for example the used pipe size is 1 in, and the routing preference manager of the used pipe type is as shown below.



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Routing process was interrupted

This message usually indicates an internal malfunctioning of the routing system. However, If the routing process was interrupted within a wall or plumbing void, ensure there is sufficient space for the pipe to navigate. also Check that the used pipe size is the intended size.

After the routing was interrupted, you can take the following actions:

1- Continue from where the route stopped if possible.
2- Undo the done route and run copilot again.
3- Run it again but with a smaller pipe size.

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