*ARCHLine.XP® 2024*

# *ARCHITECTURAL*

# *TUTORIAL*

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# Contents

**Introduction** 7
**What is ARCHLine.XP** ..... 7
**How to use this tutorial?** ..... 7
**1. Workshop: Editing the Floor Plan, Processing DWG** 11
**1.1. Let's Get Started!** ..... 11
**1.2. User Interface, Basic Navigation, and Selection** ..... 12
1.2.1. User Interface ..... 12
1.2.2. Navigating with the Mouse ..... 14
1.2.3. Selection ..... 14
**1.3. Working with External Files** ..... 16
1.3.1. Importing the Floor Plan as a DWG Drawing ..... 17
1.3.2. Setting Up Levels ..... 19
**1.4. Walls** ..... 20
1.4.1. Setting Wall Properties ..... 21
1.4.2. Drawing Exterior Walls ..... 21
1.4.3. Drawing Partition Walls ..... 22
1.4.4. Using Filters ..... 24
1.4.5. Displaying Line Thickness on the Screen ..... 26
**1.5. Openings: Doors and Windows** ..... 26
1.5.1. Variants ..... 26
1.5.2. Placing doors ..... 28
1.5.3. Windows ..... 32
1.5.4. Creating a Corner Window ..... 34
**1.6. Slabs and Ramps** ..... 36
1.6.1. Slab tool – Creating floors ..... 36
1.6.2. Slab Tool – Creating a Terrace ..... 37
1.6.3. Creating a Ramp ..... 39
**1.7. Layered Walls** ..... 42
**1.8. Creating stairs** ..... 46
1.8.1. Placing the stair ..... 46
1.8.2. Modifying the Placed Stair's Properties ..... 46
**2. Workshop: Multi storey building, working on second floor** 53
**2.1. Creating the first floor** ..... 53
2.1.1. Level management ..... 53
2.1.2. Copying the ground floor to the first floor ..... 53
2.1.3. Removing unnecessary elements from the floor plan ..... 55
2.1.4. Restoration of the thermal insulation layer ..... 55
**2.2. Stairs** ..... 58
2.2.1. Opening of the slab above the stairs ..... 58
2.2.2. Symbolic representation of a staircase on the first level ..... 59
**2.3. Partition walls** ..... 62
2.3.1. Wall drawing ..... 62
2.3.2. Partition walls on the first floor ..... 63
**2.4. Openings: doors, windows** ..... 64
2.4.1. Doors on the first floor ..... 64
2.4.2. Modifying doors ..... 66
2.4.3. Windows on the first floor ..... 68

**2.5. Slab tool ... 69**
2.5.1. Creating a balcony ... 69
2.5.2. Creating a flat roof ... 70
**2.6. Railing ... 71**
2.6.1. Railing editing with style ... 71
2.6.2. Creating a railing with the column tool ... 73
**2.7. Creation of the closing slab ... 75**
**3. Workshop: Roof Structure and Firewall Editing 81**
**3.1. Roof ... 81**
3.1.1. Roof Design ... 81
3.1.2. Changing the Roof Contour ... 83
3.1.3. Designing a Firewall with the Push and Pull Tool ... 84
3.1.4. Creating a Gutter ... 87
**3.2. Placing Solar Panels ... 89**
**3.3. Columns ... 91**
3.3.1. Placing Structural Columns ... 91
**4. Workshop: Documentation - Sections, Elevations and Callout 99**
**4.1. Meaning of Sections and Elevations ... 99**
**4.2. Sections ... 99**
4.2.1. Hatching Patterns in Sections ... 103
**4.3. Elevation Views ... 104**
4.3.1. Image Representation Mode ... 104
4.3.2. Vector Representation Mode ... 107
4.3.3. Creating Technical Shadows ... 108
4.3.4. Creating Sun Shadows ... 108
**4.4. Callouts ... 109**
**5. Workshop: Dimensioning, Detailing, Schedules and Project Phases 117**
**5.1. Properties of Dimensioning ... 117**
**5.2. Walls dimensioning ... 119**
**5.3. Dimensioning of Openings ... 125**
**5.4. Room and Area ... 129**
5.4.1. Room and area properties ... 129
5.4.2. Room and area: Automatic placement tool ... 131
5.4.3. Room by walls tool ... 133
5.4.4. „Room by polygon” - tool ... 134
**5.5. Color Schemes ... 135**
**5.6. Elevation on floor plan ... 137**
**5.7. Symbols ... 138**
**5.8. Placing text ... 140**
5.8.1. Text with pointer ... 141
5.8.2. Serial dimensioning ... 141
5.8.3. Numbering ... 146
5.8.4. Inclination Angle of the Ramp ... 147
**5.9. Tags ... 147**
**5.10. Schedules ... 150**
**5.11. Quantity take-off ... 152**
**5.12. Managing phases ... 153**
**6. Workshop: Plan sheets, stamps, publishing multi-page PDFs and DWG/IFC export 157**
**6.1. Printing to PDF ... 157**
**6.2. Creating Plot Layout ... 158**

**6.3. Creating Additional Plan Sheets ... 165**
**6.4. Print Queue ... 169**
**6.5. Exporting DWG/IFC Files ... 171**
**7. Workshop: Creating in-place mass model, reference to other projects 177**
**7.1. Preparation ... 177**
**7.2. Creating a Mass Model ... 178**
**7.3. Urban Planning and Importing Neighboring Buildings ... 182**
**7.4. Creating the Terrace in the Garden ... 186**
**7.5. Creating the Pool area ... 188**
**7.6. Adding Water using the Slab Tool ... 190**
**7.7. Placing objects ... 192**
**8. Workshop: Rendering: Creating a photo-realistic visual design 199**
**8.1. Default settings ... 199**
8.1.1. Perspectives ... 199
8.1.2. Layers ... 200
**8.2. Render settings ... 200**
8.2.1. Render time ... 200
8.2.2. Sun settings, shadows ... 202
8.2.3. Main settings ... 203
8.2.4. Create the first rendered image ... 207
**8.3. Render styles ... 208**
8.3.1. Use render styles ... 209
8.3.2. Display of accessories ... 214
**8.4. Render effects ... 217**
**8.5. Rendering details ... 218**
**8.6. Render list ... 218**
**8.7. Rendering guide ... 221**

# Introduction

## What is ARCHLine.XP

**ARCHLine.XP is a large-scale 3D BIM software for architecture, rendering, site design, interior design and decoration projects.**

ARCHLine.XP is an architectural design software equipped with a fully integrated Open BIM interface, providing the tools to create coordinated and computable building models. Every component, such as floor plans, sections, and elevations are in one comprehensive model. Your BIM projects are fully coordinated and they don't require any manual updates to keep them synchronized.

### *Architectural design*

The program provides the capability to create multi-story buildings. Drawing single or multi-layered, even sloping walls in both 2D and 3D is made easy with the flexible Wall command. Doors and windows are parametric, allowing for size changes to automatically rebuild and update the wall based on parameters. Stair and railing edits are guided by rules, providing flexible design options. Modifying the ceiling profile enables the creation of unique ceiling structures, such as barrel vaults and cross vaults. When it comes to roof shapes, you can choose from a long list of types (gable roof, hip roof, mansard roof, curved, etc.).

### *Furnishing of Spaces*

For furnishing spaces, ARCHLine.XP offers shading, curtain design, lighting, flooring, baseboards, decorative moldings, suspended ceilings, switches, outlets, and parametric kitchen design tools. 3D Warehouse models can be imported and placed within the ARCHLine.XP project, enhancing your design options and allowing you to create detailed and realistic interior layouts.

### *Documentation*

Using the Plan Sheet, creating technical documentation becomes a straightforward task. This documentation can include floor plans, wall and perspective views, detailed drawings, and rendered images in various scales. With ARCHLine.XP, building the 3D model is easy, and you can create approval-, construction-, and visual plans efficiently.

### *Visualization*

With a single click, the model can be transferred to the ARCHLine.XP LIVE visualization software, where it can be easily transformed into immersive, high-quality interactive walkthroughs, videos, and images. The simulation of people, plants, and water provides an experience as if you were taking your clients by the hand and walking them through their future home, starting from the street, passing through the garden, circling around the gently rippling pool, through the living room, and all the way to the bathroom in the gentle breeze.

## How to use this tutorial?

In this tutorial, we will walk you through the process of designing a residential building step by step.
This educational material serves as a guide to help you become proficient by working through a typical architectural example. During the workshops, we will explore how to create lists, elevations, sections, and other detailed drawings and how to place them on plan sheets. By the end of the lectures, you will be able to independently create a complete set of design documentation.

The course consists of 8 workshops:

1. Floor Plan Editing Based on DWG on the Ground Floor: Walls, Openings, Ceilings, Ramps, Stairs
2. Managing Levels: Creating Upper Floor Levels and Structural Connections
3. Roof Editing: Editing Roof Structures and Firewalls
4. Documentation: Sections, Elevations, and Detail Drawings
5. Dimensioning, Annotations, Lists, and Design Phases
6. Printing: Plan Sheets, Stamps, Multi-page PDF Publishing, and DWG / IFC Export
7. Environmental Rendering, Referencing Other Projects, Objects
8. Creating Photorealistic Renderings

It is recommended to start by downloading and installing the Architectural Course Workshop Installer, which contains the projects and CAD files used throughout the course. As you progress through each workshop, it's a good practice to watch the instructional videos associated with the lessons. Then, based on the provided instructions, create the design in the ARCHLine.XP 2024 software.

During the course, we will be creating the floor plan, 3D models, documentation, and photorealistic image for the following building.

# Workshop 1: Editing the Floor Plan

**Architectural tutorial**

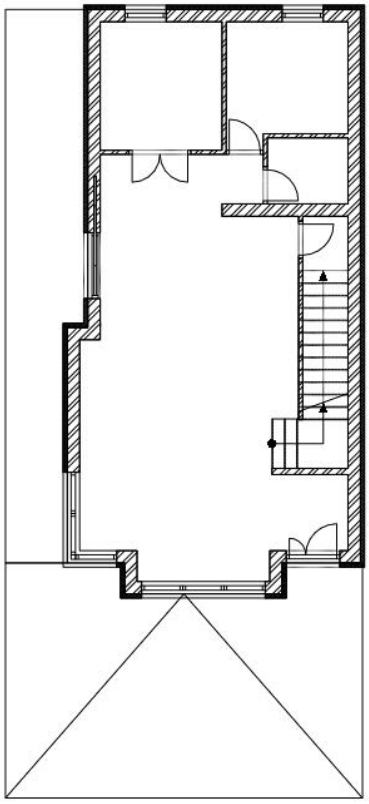
# 1. Workshop: Editing the Floor Plan, Processing DWG

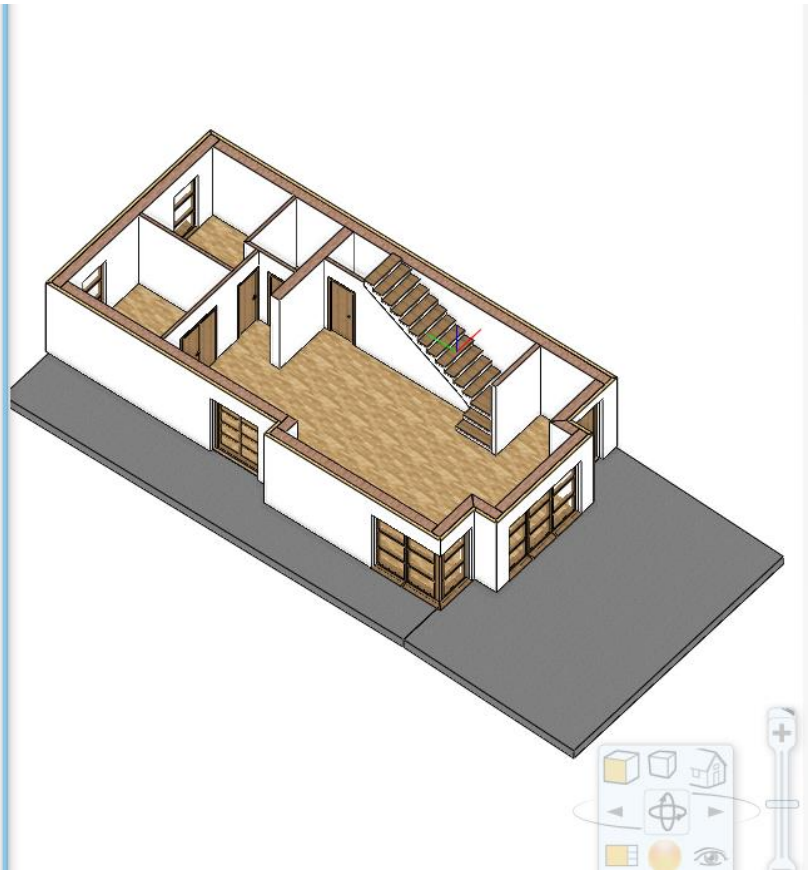
## 1.1. Let's Get Started!

First, watch the Editing the Floor Plan, Processing DWG tutorial video:

If you haven't already, download and install the Architectural Course Workshop Installer, which contains the projects and DWG files used during the course.

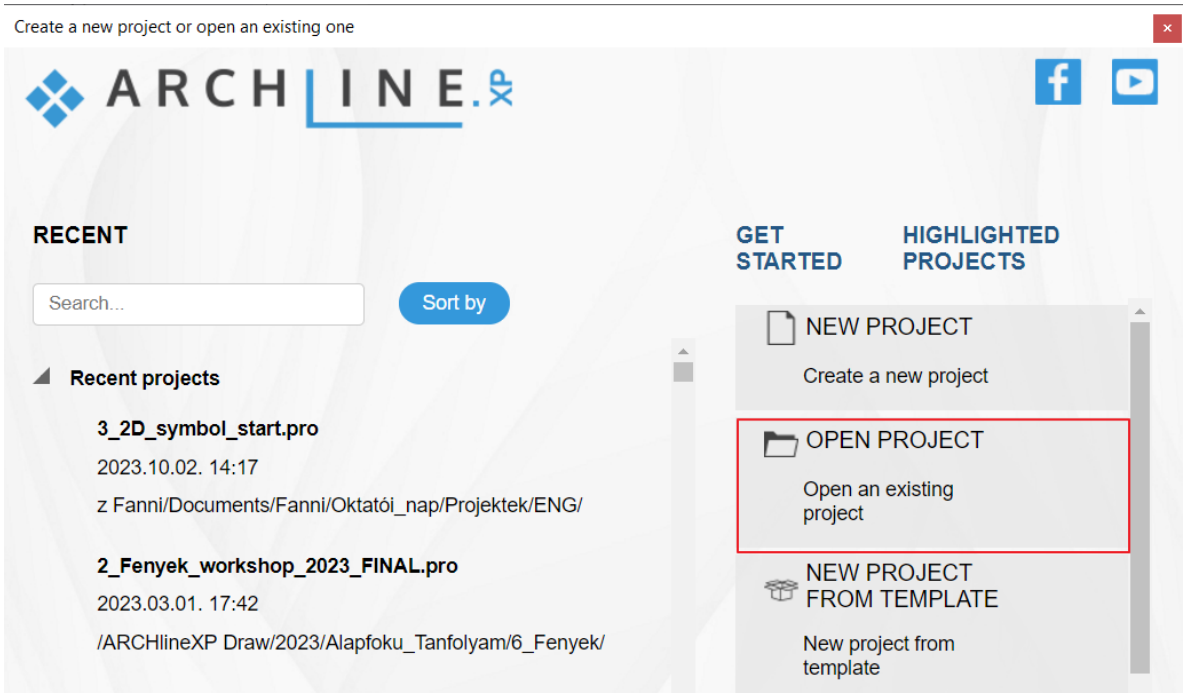
In this workshop, we will create the following floor plan and model using an imported CAD drawing. We will transform the CAD lines into 3D architectural elements. It's also possible to start from scratch and, for example, draw walls directly in an empty project.





***Launching ARCHLine.XP***

Once ARCHLine.XP is launched, the startup screen appears. Here, you can choose how you'd like to begin your work. First, let's load the existing project to become familiar with the user interface.




- Launch ARCHLine.XP®.
- Click on **Open Project** button, and choose the following project:
- ...\Documents\ARCHLine.XP Draw\2024\Architectural_Course\lesson_1\Elata_Nova_lesson_1_FINAL.pro

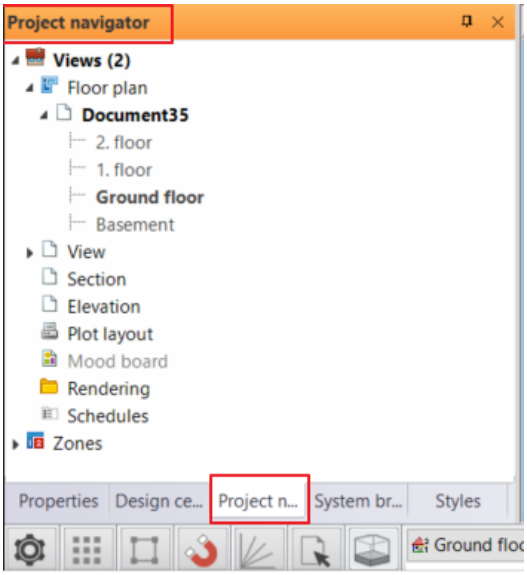
# 1.2. User Interface, Basic Navigation, and Selection

Navigation is straightforward and clear in ARCHLine.XP, especially if you have experience with 2D or 3D design software. First, let's briefly review how to manage and navigate through the drawing content on the ARCHLine.XP user interface.

## 1.2.1. User Interface

### *Project navigator*

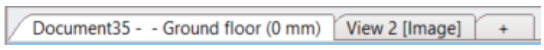
The various windows with different content (2D drawings, 3D views, Sections, Elevations, Plan Sheets, etc.) can be found in the Project Navigator.



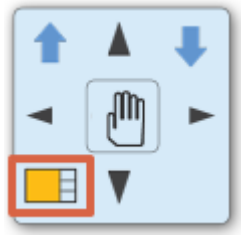

### *Managing Content Layout*

There are several options for switching between windows.

By clicking on the drawing selector tabs, you can maximize the required window.

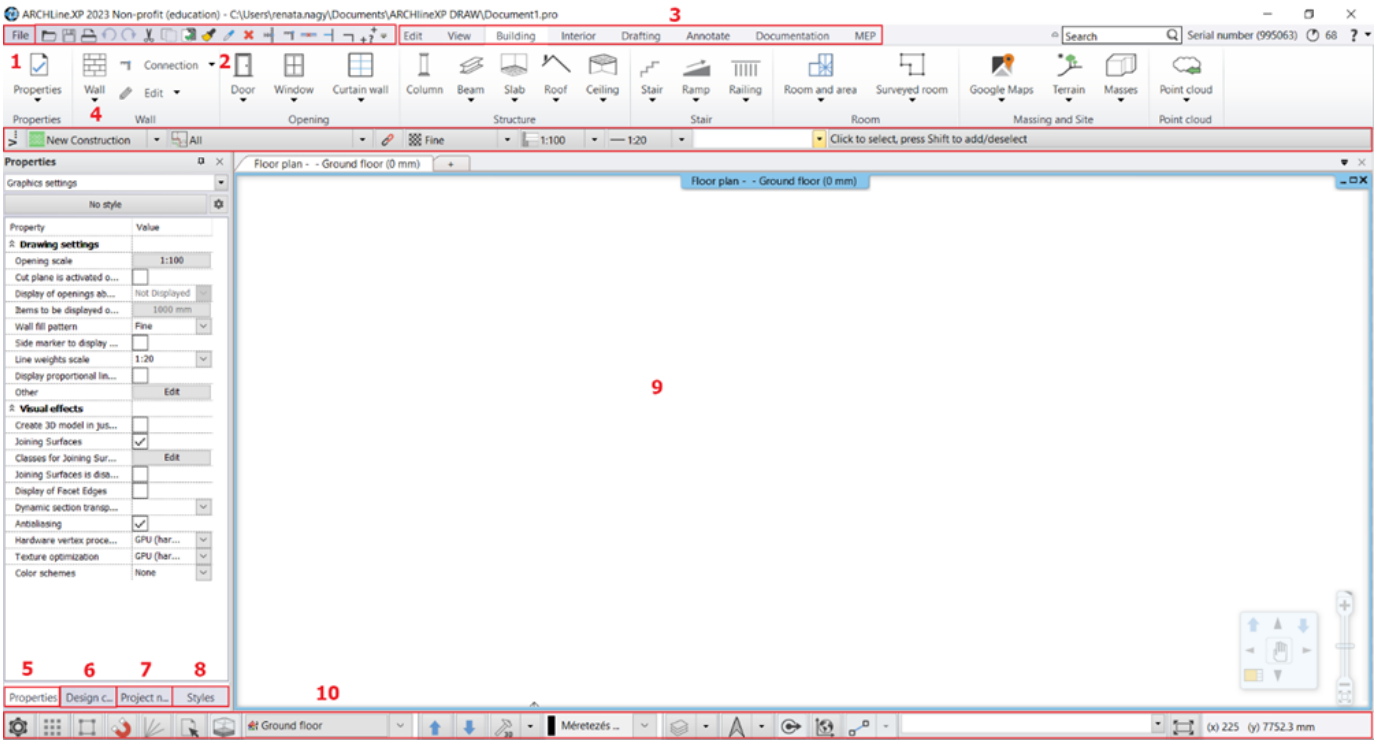



Click on the window you want to zoom in on, then press the **Magnify view** button on the Navigation bar. This way, you can always zoom in on the currently active drawing content.



Let's review its user interface and its main components so that you can more easily associate the terms used in the tutorial descriptions with the corresponding areas of the user interface in the future.

The ARCHLine.XP® interface has the following main parts: File menu (1), Quick Access Toolbar (2), Ribbon bar (3), View Control bar (4), Properties (5), Design Center (6), Project Navigator (7), Styles (8), Drawing area (9), Coordinate bar (Status bar) (10).




### *Selection List*

When you click on an element, the selection list becomes visible. This means that at this click point, multiple elements can be selected. You can navigate between the elements using the right and left arrows. To switch between elements, you can also use the TAB key on the keyboard, or the pop-up selection list that appears when you click on the downward-pointing arrowhead.

### *Resetting the User Interface to Factory Default Settings*

To ensure that we are working with the default user interface settings of the software, which this tutorial is based on, click on the **Menu Bar / View / User Interface / Reset User Interface to factory default** command.

These are the most basic aspects of the user interface and navigation tools. We will become familiar with additional features and commands of the user interface, their placement, and usage as we progress through the tutorial.

### *How to correct mistakes during work?*

Let's take a moment to review how to correct accidental errors during your work.

It's a natural human trait to make mistakes occasionally while following tutorials or working on our own projects.
**If this happens, feel free to try the following tips:**

- If you select the wrong tool, you can exit by pressing the **ESC** key and then choose the correct one.
- If you've made an incorrect modification or created the wrong element, use the **UNDO** button.
- If you accidentally delete something, press the **UNDO** button.
- If you accidentally open a dialog or enter incorrect data, choose the **CANCEL** button at the bottom of the dialog.

## 1.2.2. Navigating with the Mouse

### *Zooming*

You can zoom in or out on the 2D content or 3D view by **scrolling the mouse wheel up or down**.

### *Moving*

**Hold down the middle mouse button and move the mouse simultaneously.** This allows you to pan the current content in the desired direction. Release the mouse to finish the moving.

### *Rotating*

To rotate the model, **hold down the middle mouse button and the SHIFT key while moving the mouse**. To finish, simply release the mouse wheel and the SHIFT key.

### *Orbiting*

If you already have a perspective view (we'll cover this topic later), **press the right mouse button and move it** in the desired direction to orbit around the model.

## 1.2.3. Selection

### *Selecting an Element*

To select an element, simply **click on it**, and it will be highlighted. You will also see the properties of the selected element on the left side. To deselect, press the ESC key or click on another element.

### *Selecting Multiple Elements*

To select multiple elements, you can do the following:

- **To add another element to the selection, hold down the CTRL key while clicking on the new element,**
  or
- Click and drag the mouse on the drawing to create a **selection rectangle**. Click again to select all elements within the selection rectangle. If you draw the selection rectangle from left to right, any element fully enclosed by the rectangle will be selected. However, if you draw the rectangle from right to left, any element fully enclosed and even partially overlapping with the rectangle will be selected.

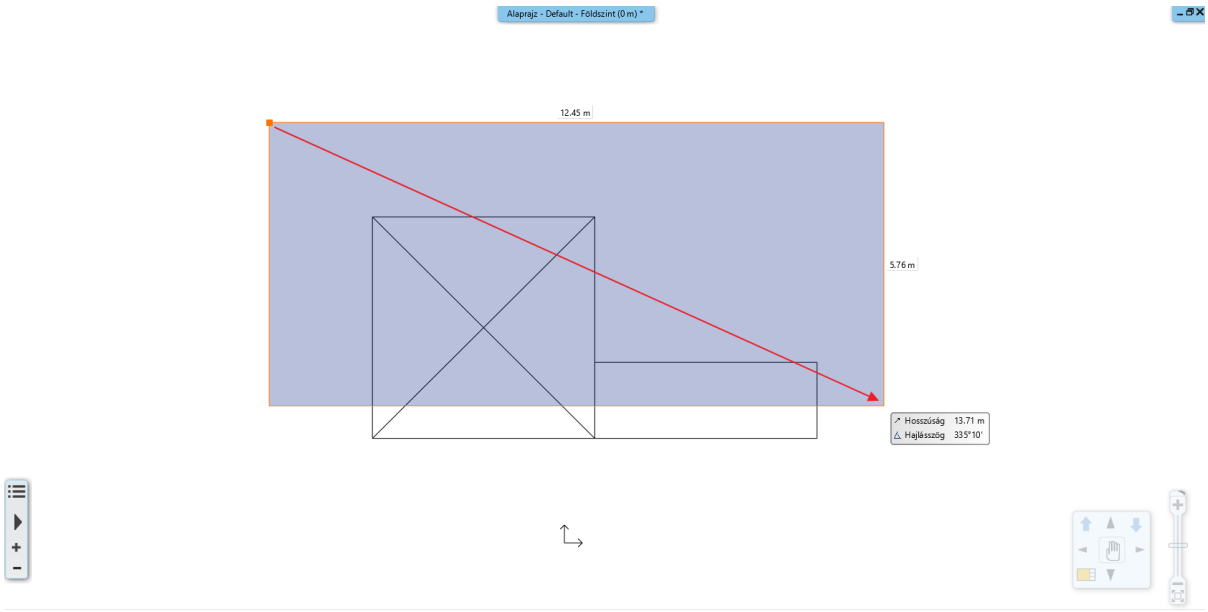
### *Selection with a Rectangle*

You can also choose to make a combined selection using a rectangle.

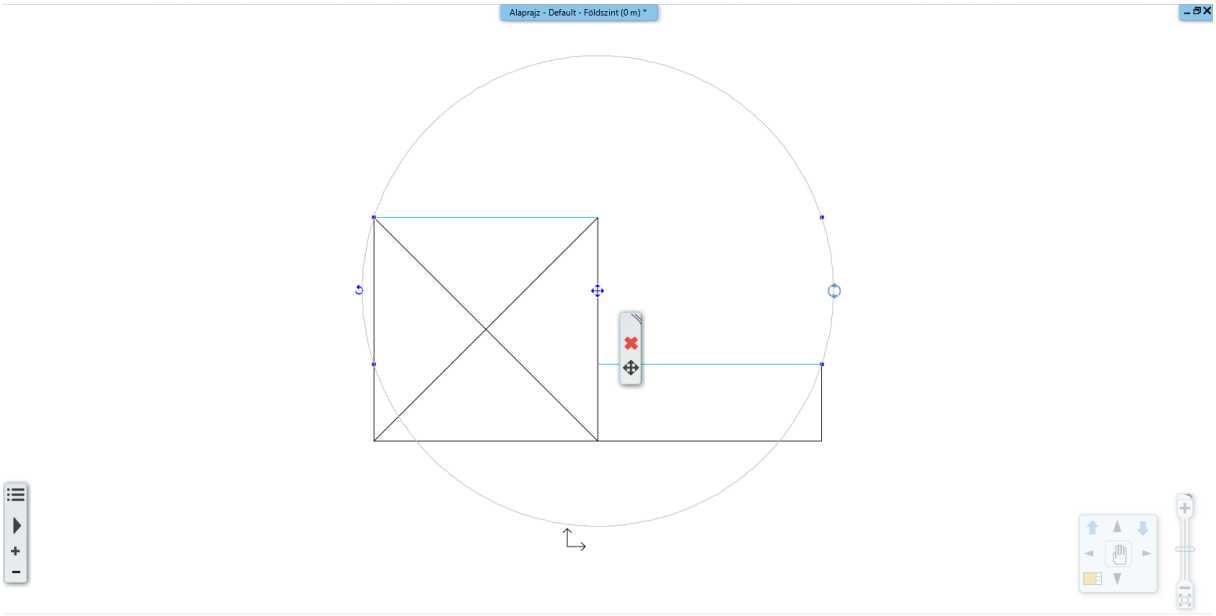
To make a selection with a rectangle, click in an empty area of the drawing, then click on the drawing again after moving the mouse, defining a rectangular area. There are two ways to distinguish the selection with a rectangle:

### *Rectangle Selection: Left to Right*

- Draw some lines as you normally would.
- If you are currently in an editing command, exit it by pressing the ESC key.
- Move the mouse to the upper-left corner of the drawing area, click in an empty part of the drawing area once.
- Move the mouse to the right and downward so that the transparent rectangle partially covers the lines; there should be some lines extending beyond the blue selection box. Click once again.



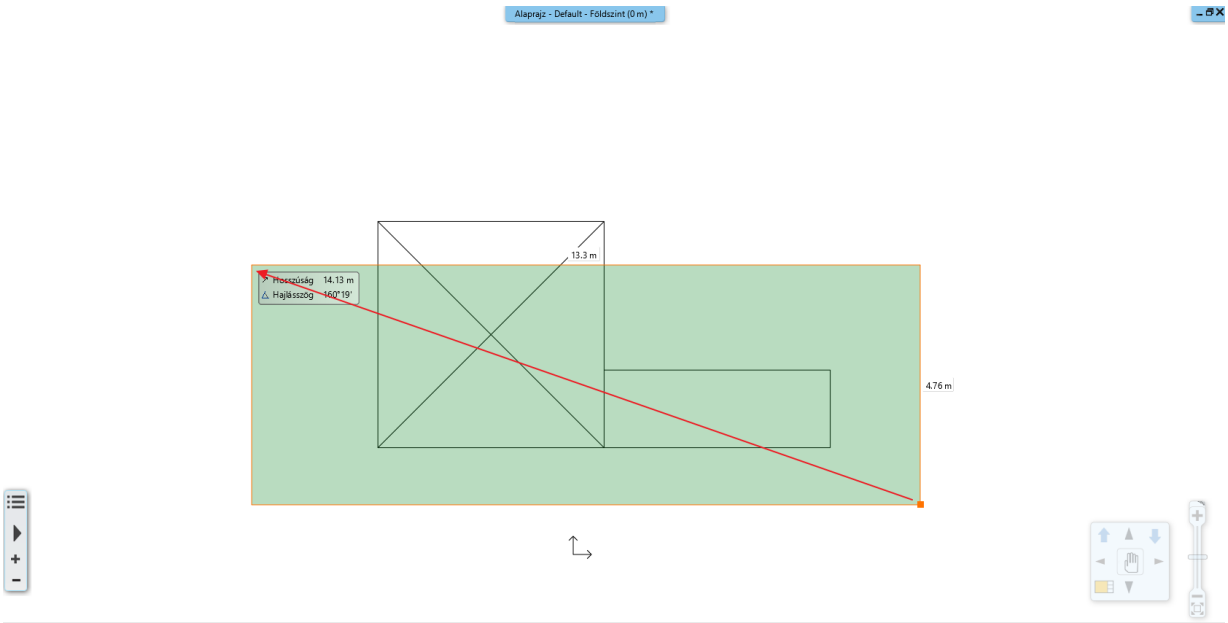
*Selection with a Rectangle: Left to Right – intentionally skipping the lower part of the drawing.*



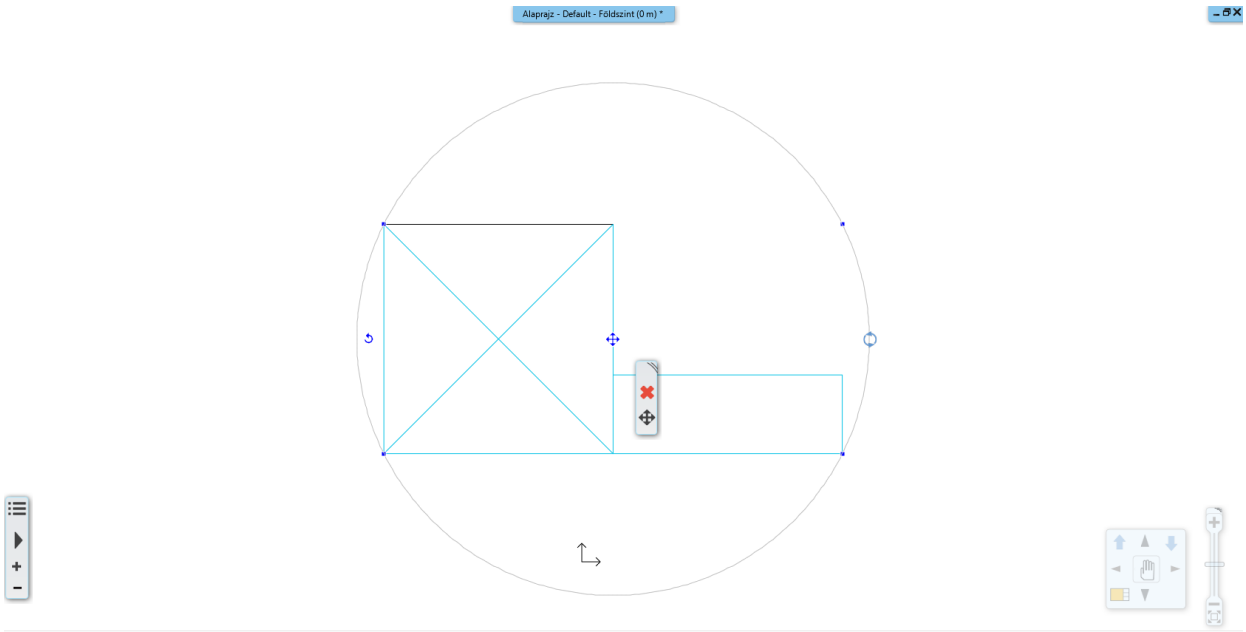

**The result: only the lines that were completely within the selection rectangle were selected.**

### *Rectangle Selection: Right to Left*

- Press the ESC key to deselect if necessary.
- Move the mouse to the lower-right corner of the drawing area in an empty part of the drawing area and click once.
- Move the mouse to the left and upward so that the continuously appearing green rectangle partially covers the lines; there should be some lines extending beyond the green selection box. Click again.




*Selection: Right to Left. intentionally skipping the upper part of the drawing.*




**The program selects any drawing elements that are either entirely within the selection rectangle or intersect its boundary.**

### *Comparison:*

**Rectangle Selection: Left to Right:**

- Draw the selection rectangle from left to right.
- The selection rectangle is colored BLUE.

The program selects only the drawing elements that are entirely within the selection rectangle.

**Rectangle Selection: Right to Left:**

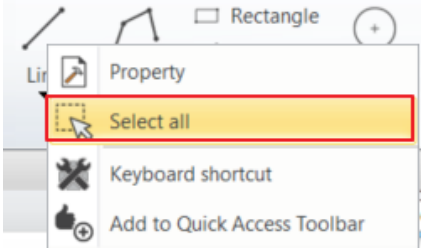
- Draw the selection rectangle from right to left.
- The selection rectangle is colored GREEN.

The program selects any drawing elements that are within the window or intersect the boundary of the selection rectangle.

The practical benefit of these two methods is that it's much easier and faster to select an entire room's furniture, for example, by drawing a selection rectangle with the first method, encompassing the furniture. If some walls overlap this area, it's not a problem because you know that the program won't select them.

In the case where you want to select every drawing element, even those that may extend beyond the visible drawing area, you can use the second method. To achieve successful selection, it's sufficient to partially see the elements you want to select.

### *Selection Based on Element Type*



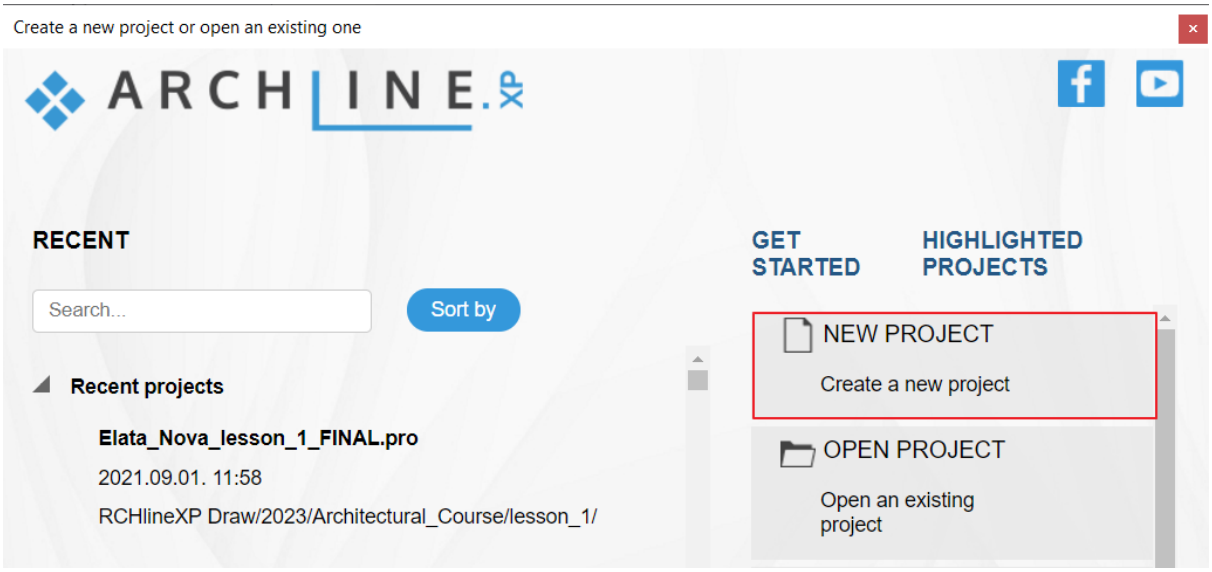

Elements of the same type can be selected with a single click using the following method:

- On the Menu bar, right-click the desired element type, and click on the **Select All** command. All elements of that type will be selected.

## 1.3. Working with External Files

After the overview, let's open a new project in which we will work.

- Click on the File menu - New project command.
- Exit the previous project without saving and choose New Project from the dialog.




When using the ARCHLine.XP program, you can import CAD files in DWG or DXF file formats. Before importing a file that contains the floor plan, it's important to know which formats are supported:

- Images in JPG or PNG formats
- Raster PDFs
- Vector PDFs
- DWG drawings
- IFC models

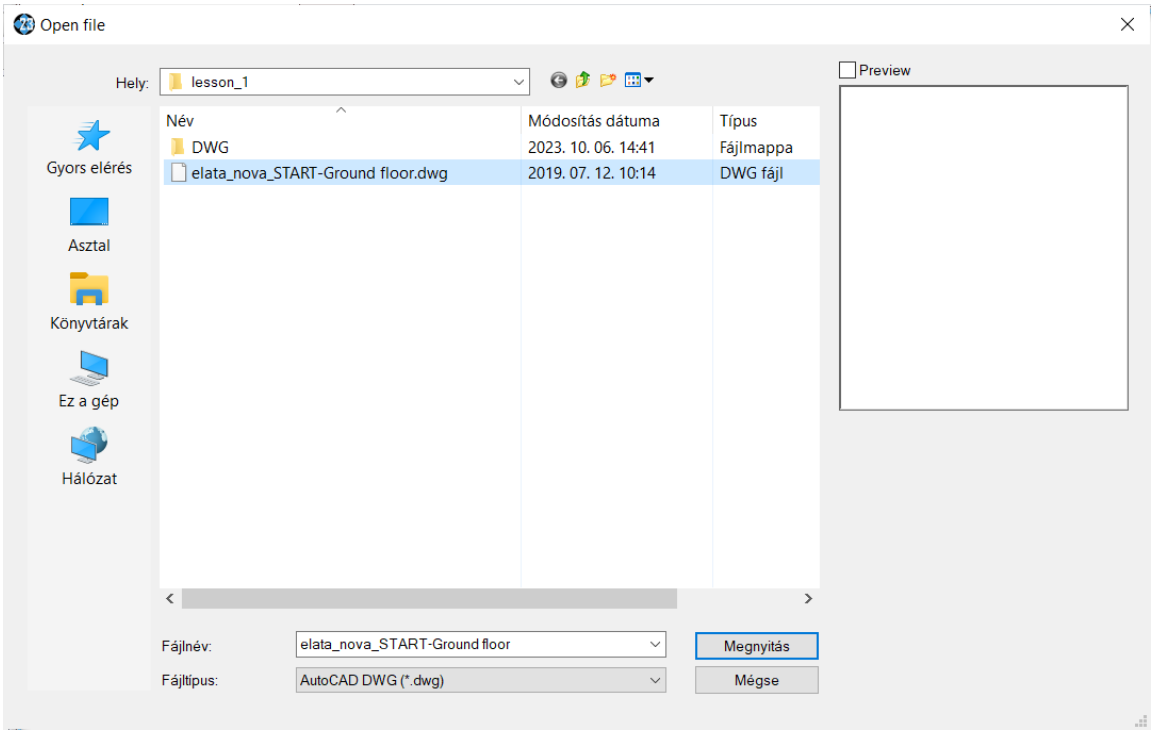
Importing a DWG drawing means importing geometry, which results in a precise drawing with units of measurement. This can include points, lines, polylines, arcs, circles, ellipses, hatches, dimensions, and raster images.

## 1.3.1. Importing the Floor Plan as a DWG Drawing

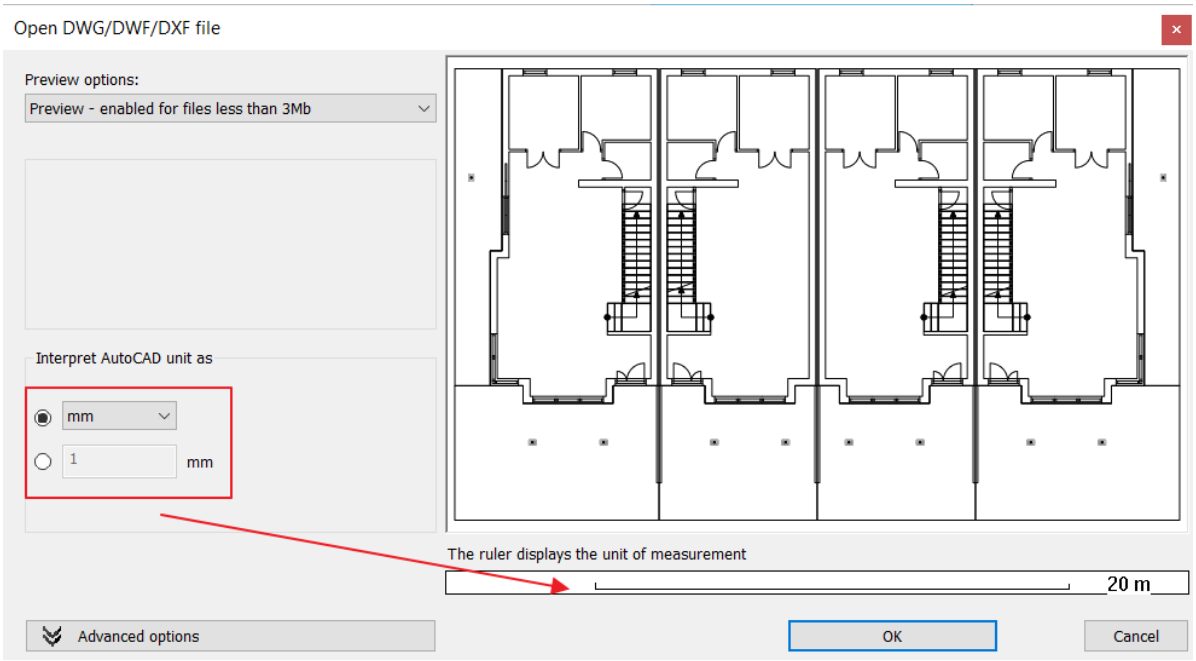
The Link feature connects IFC, RVT, DWG, and PDF files to the project. Linking is the best solution for displaying external content, primarily for coordination purposes. When you open the IFC, RVT, DWG, or PDF file, it automatically updates in the project and can be manually refreshed at any time.

Let's open the floor plan. Choose **File / Link / Link CAD** command.

- Locate the following file: *…\Documents\ARCHlineXP Draw\2024\Architectural_Course\lesson_7***elata_nova_START-Ground floor.dwg**



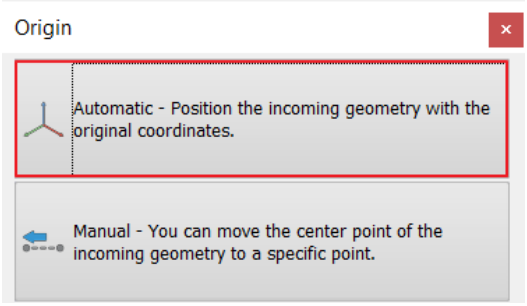
- Click on the **Open** button. This will open the following window:



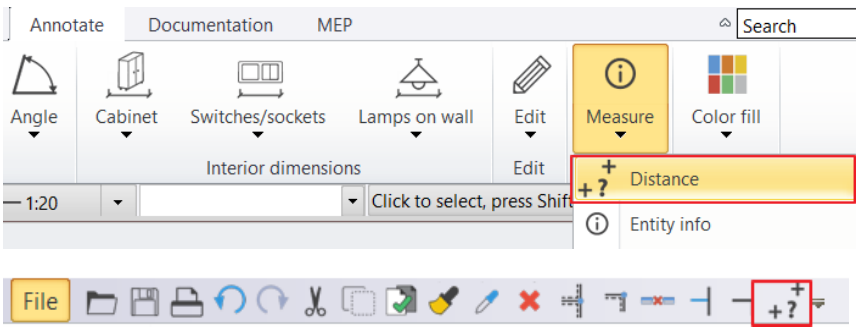

- The program automatically recognizes the unit of measurement, but you can choose a different one from the selection list if needed. Selecting the correct unit of measurement ensures that the imported drawing is accurately scaled.

  At the bottom of the dialog box, there is a ruler displaying the current unit of measurement, helping you interpret the imported drawing as either metric or imperial units can be set. Based on the unit of measurement selected from the drop-down list, the program dynamically displays the size. It's a good idea to look for an element whose size you know or can estimate. For example, this could be a 900 mm door or a 300 mm wall thickness. Using the ruler, you can easily deduce which unit of measurement is correct.

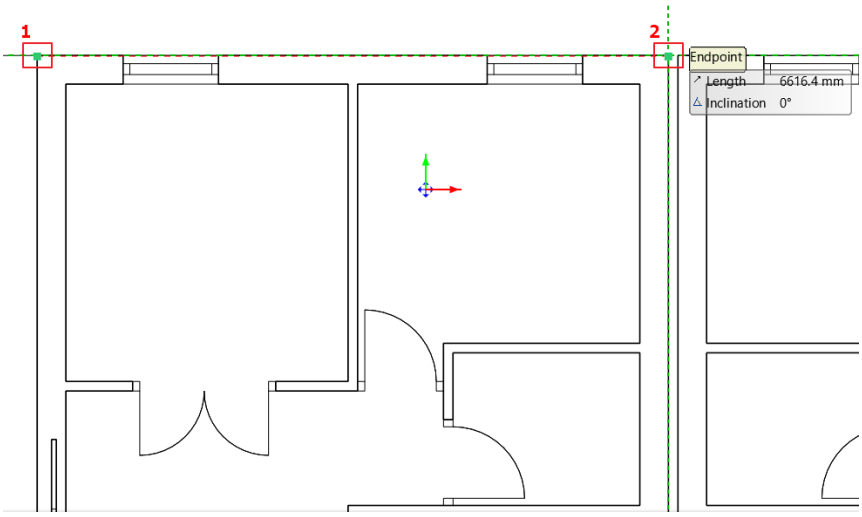
- Import the file by clicking the OK button.
- In the dialog that appears, click on the Automatic option.

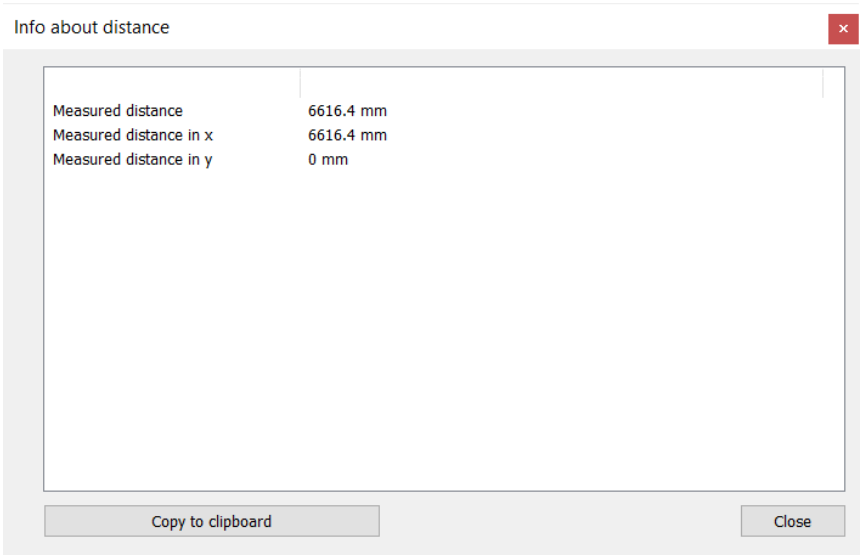



- Let's verify that the imported geometry is the correct size.
- To do this, select the Ribbon / Annotate / Measure / Distance command, or initiate the command from the quick toolbar.




- Measure the width of the floor plan by clicking on two opposite points.



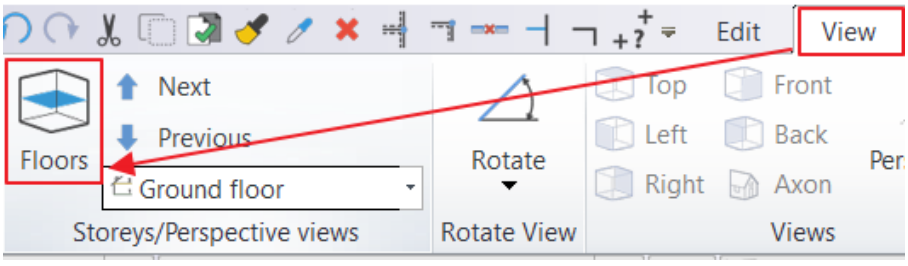




If you selected the incorrect unit of measurement, resulting in incorrect dimensions, you can undo the import and repeat it with the correct unit of measurement, or you can use the Scale command in the Ribbon under **Edit / Move / Scale.**

## 1.3.2. Setting Up Levels

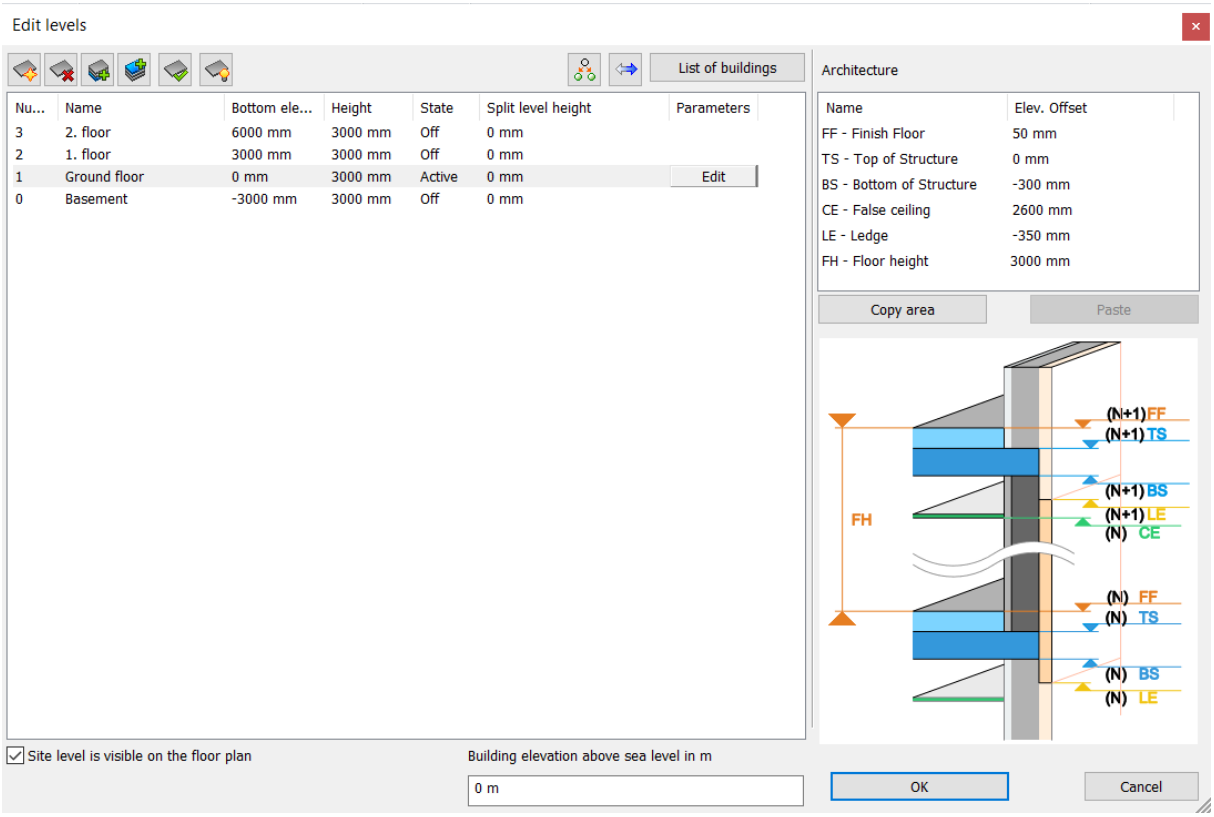
The level dialog determines on which level the new elements will be created.

You can open the Floors dialog from the Ribbon or the Status Bar. It's important to know that every project works with levels.



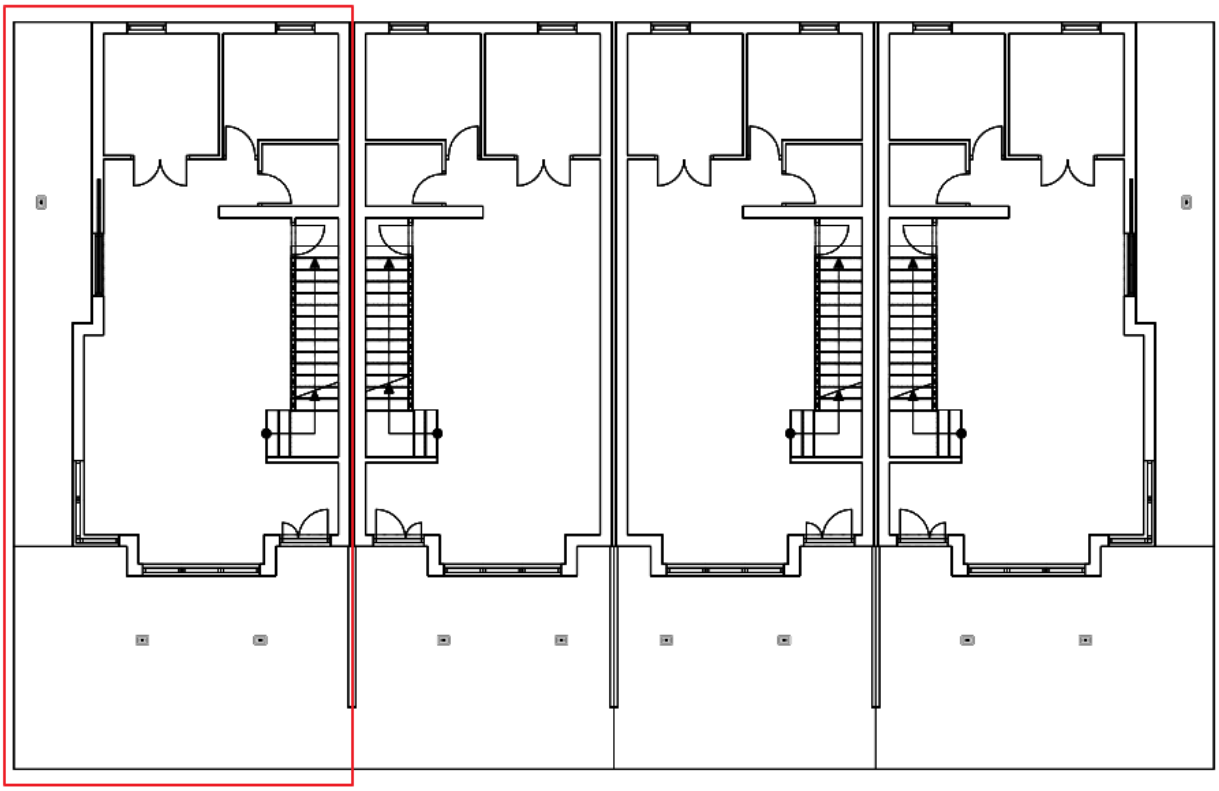

On the status bar:

- Locate the **Floors** on the Status Bar and click on it.
- Make sure that the floor named "**Ground Floor**" is in active state.




- Close the dialog box by clicking the "OK" button.

Let's start drawing the selected building.



## 1.4. Walls

In this section, we will create the ground floor exterior walls, partition walls, and openings. Then, we'll create the floor and ramp based on the imported drawing. ARCHLine.XP generates the 3D BIM model simultaneously as the work progresses on the floor plan.

## 1.4.1. Setting Wall Properties

When starting a new project, the program creates default layers. Architectural and drawing elements we create are automatically assigned to the layer specified in the default style for that element type. For example, walls are assigned to the "Wall" layer, slabs to the "Slab" layer, and columns to the "Column" layer.

## 1.4.2. Drawing Exterior Walls

First, let's create the walls on the ground floor.

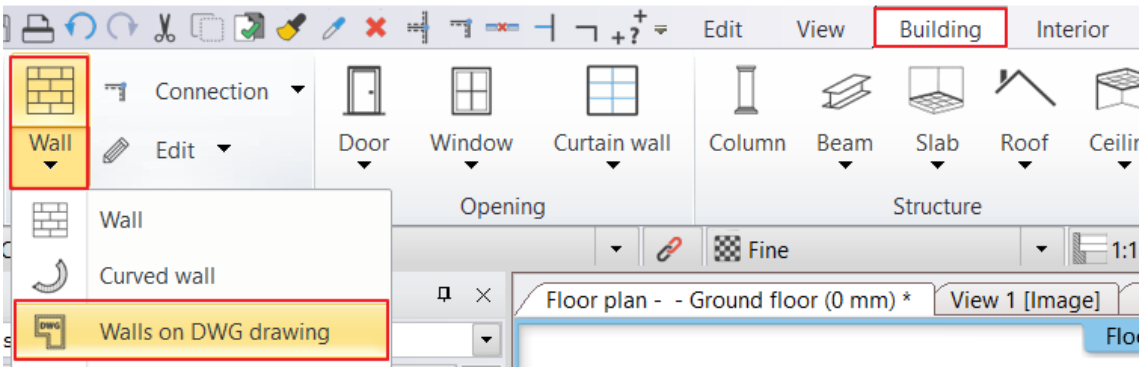
You can create walls in various ways, either completely freely or based on existing drawing content. If starting from scratch, the following tools can be used for wall drawing:

- Straight Wall
- Curved Wall
- Rectangular
- Spline

After initiating the wall command, the properties will display the saved wall styles to choose from. In this case, they may not be needed, as we will be drawing the walls based on the DWG file.

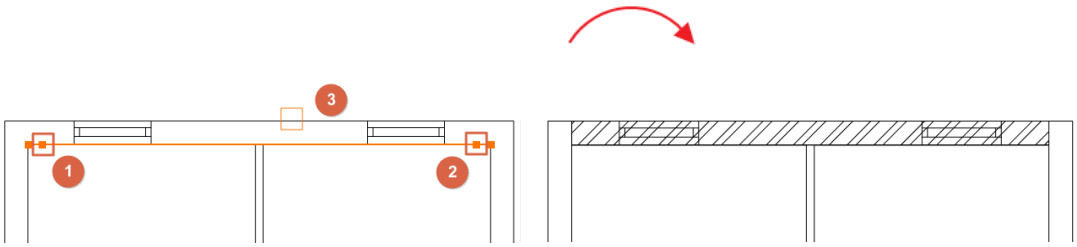
In this case, we will use the DWG file to convert 2D shapes into actual BIM walls. Use the "**Walls on DWG drawing**" command to convert the floor plan CAD lines into 3D conceptual architectural walls.

- Select **Building / Wall / Walls on DWG drawing** tool.



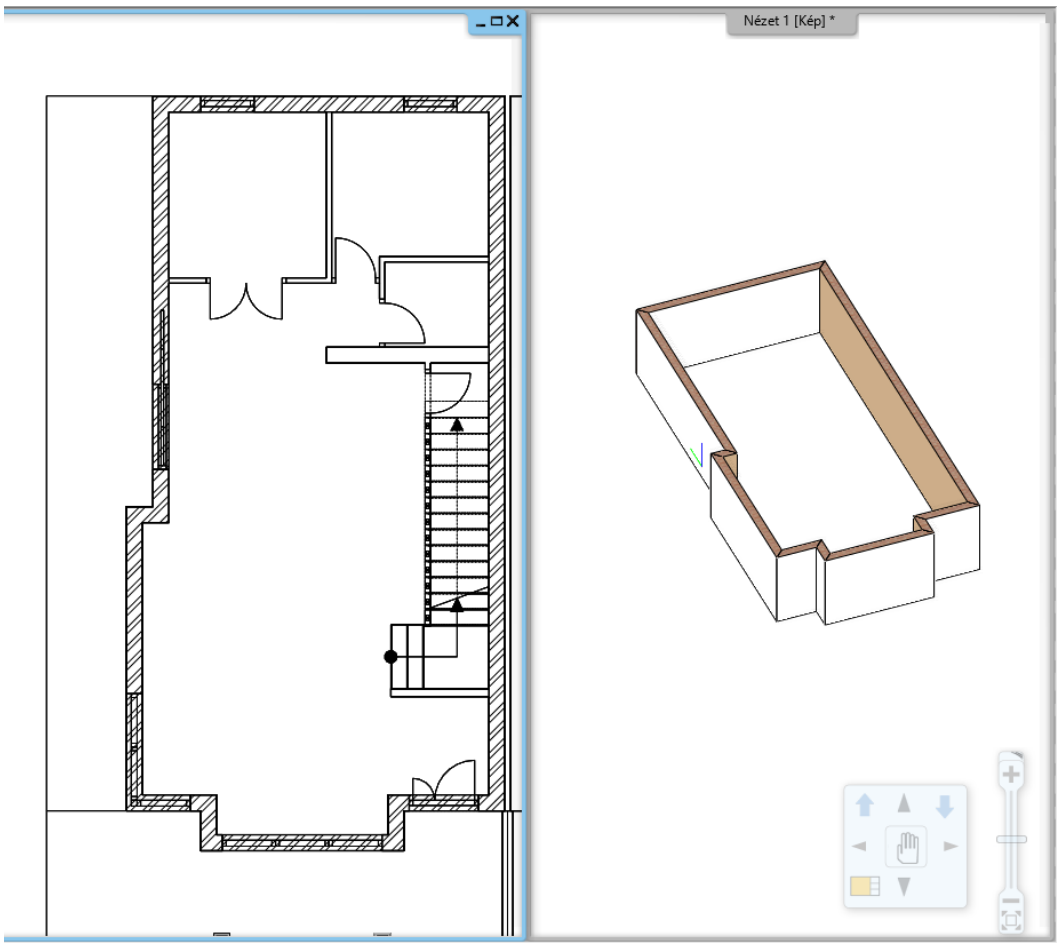

Click near the starting point (1) and the endpoint (2) on the inside of the wall, then move your cursor to the other side of the wall (the wall thickness) (3). The wall will appear in the 3D view.

Note:
It's important that the insertion point is closest to the visible endpoint for both the starting and ending points; otherwise, the new wall may align with unintended features such as window endpoints. For accuracy, consider zooming in on the specific drawing area using the mouse scroll wheel.



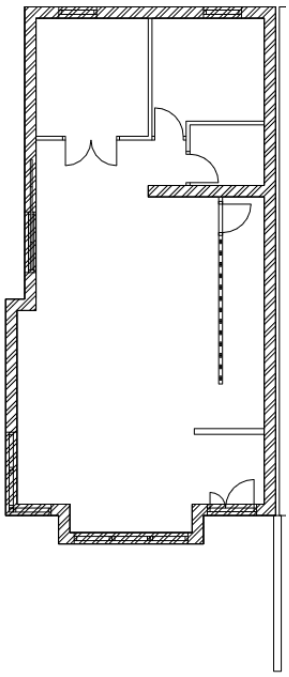

- Draw all the main walls using this method.

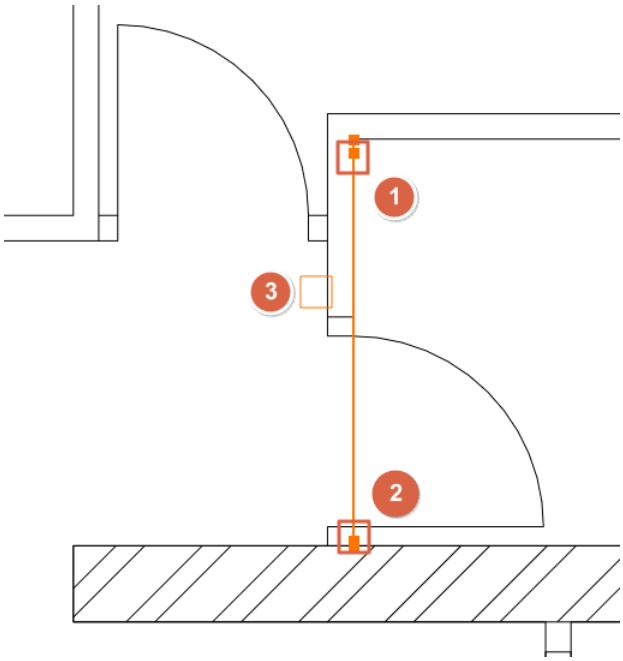
The result:




## 1.4.3. Drawing Partition Walls

- Let's continue with the partition walls.





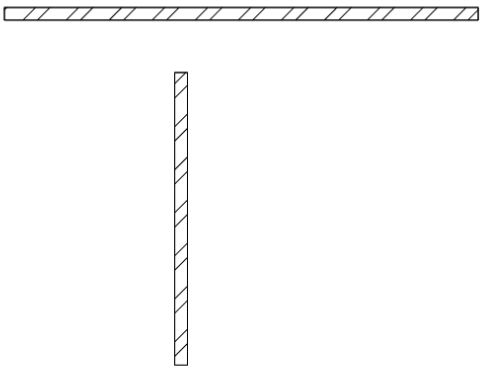

If the wall connections are not correct in the 3D model, you can choose from the L or T connections in the ARCHLine.XP top toolbar.

### *T-Connection*

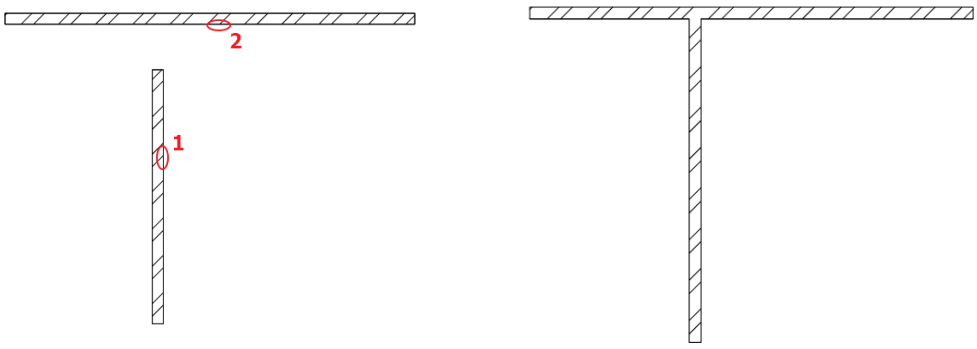
***A T-connection on the first selected element removes unwanted segments or adds missing wall segments to reach the intersection point with the second element. The second selected wall will not be modified.***

Let's take an example where the T-connection adds a missing section of the wall to reach the intersection point with the second wall.

Draw the following walls according to the example below:



- Click on the icon in the toolbar. Click on the wall you want to modify, and then on the second wall.



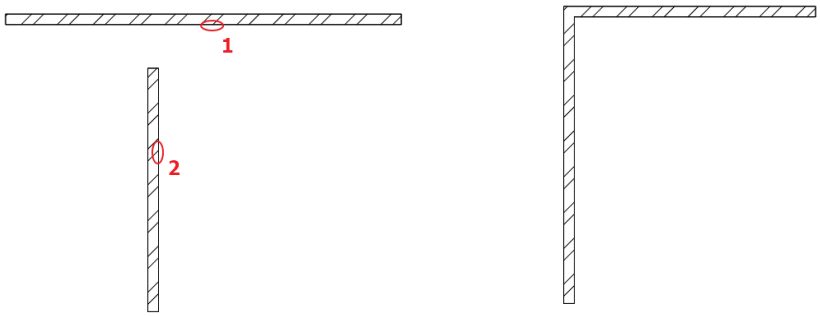

The shorter wall has been extended with the missing wall section.

- Undo these steps by clicking on the icon .

### *L-Connection*

The L-connection aligns elements with each other, shortening or lengthening walls so that the selected points coincide with the endpoints.

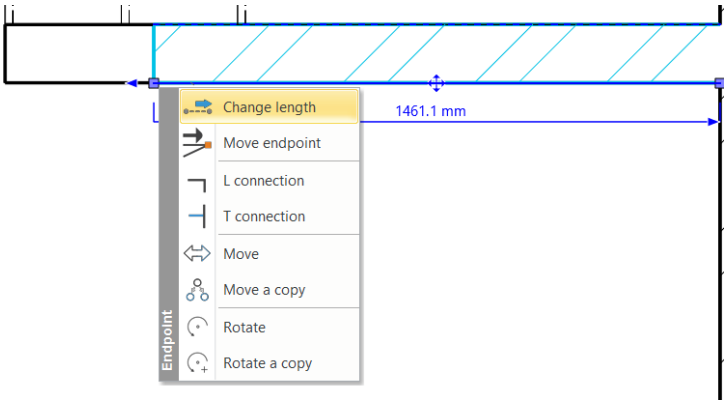
- Click on the icon in the toolbar, then select the first wall with one click and then the second wall with another click.



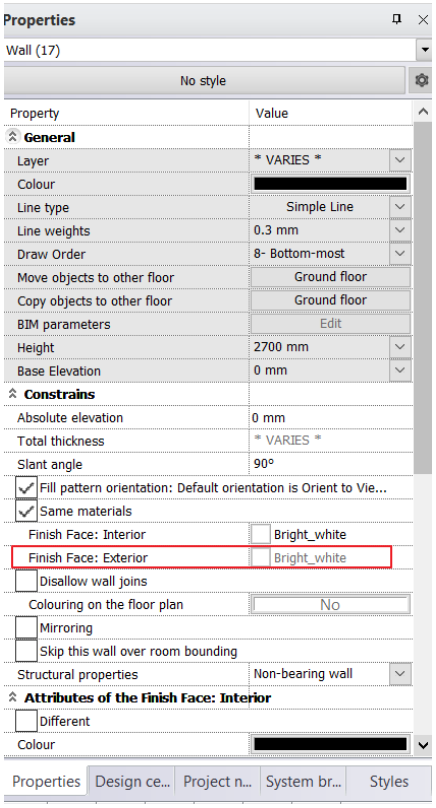

An L-connection has been established between the walls.

### *Wall Length Modification*

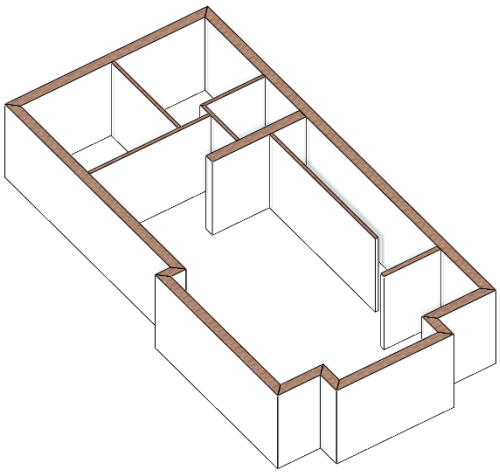
If any of the walls do not reach the endpoint visible in the DWG, you can extend it by clicking on the wall endpoint and choosing the **Change length** command.




- As the final step in wall drawing, select the "*Bright White*" material for the exterior of the walls. Highlight all the walls on the floor plan using the selection rectangle or right-click on the Wall command and choose the "*Select All*" option. Then, in the Properties panel on the left, set the "*Finfish Face: Exterior*" to "*Bright White.*"




At this point, the 3D model should look like the following:

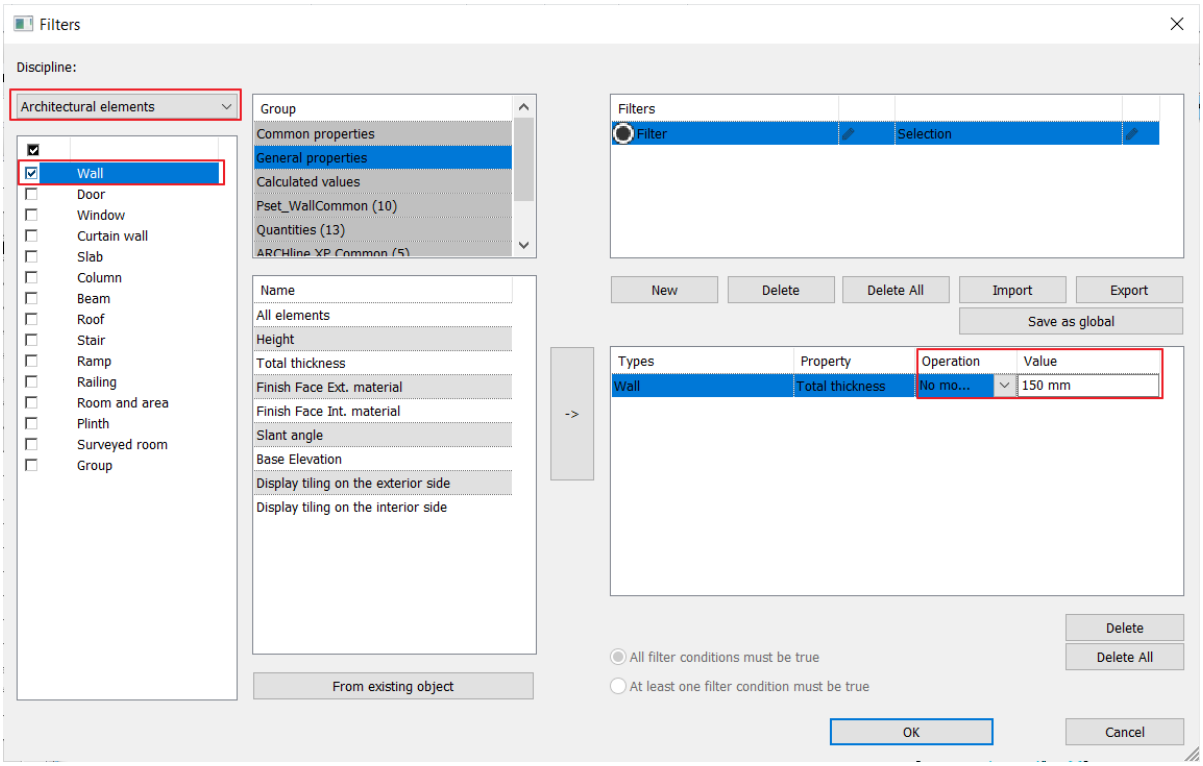


## 1.4.4. Using Filters

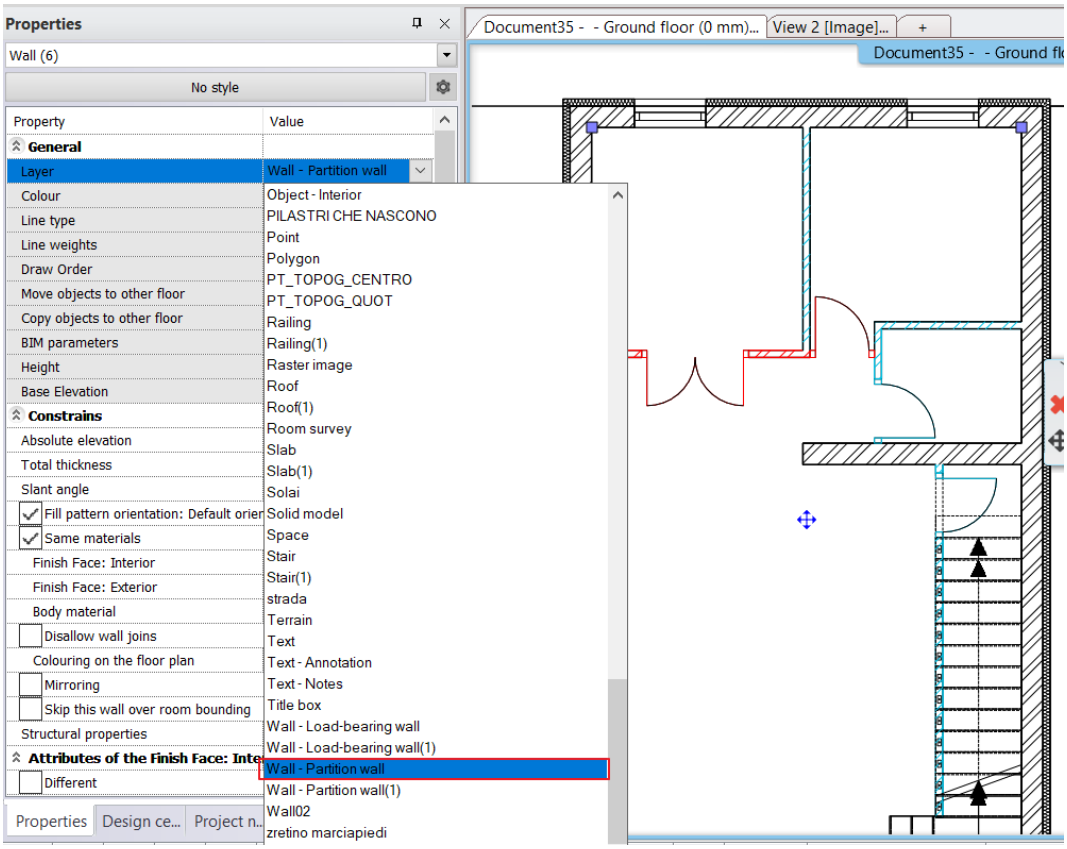
We will move the load-bearing walls and partition walls to separate layers for better project clarity. To do this, we'll use filters.

Select the **Edit menu** / **Select** menu from the Status Bar, then choose the **Filter** command.

- Under disciplines, select Architectural Elements, then choose Wall from the properties. For the operation, set it to select walls with a maximum thickness of 150 mm. After accepting the dialog, the program will select all partition walls.




- In the side menu, properties, change the layer of the partition walls to the **Wall - Partition Wall** layer.

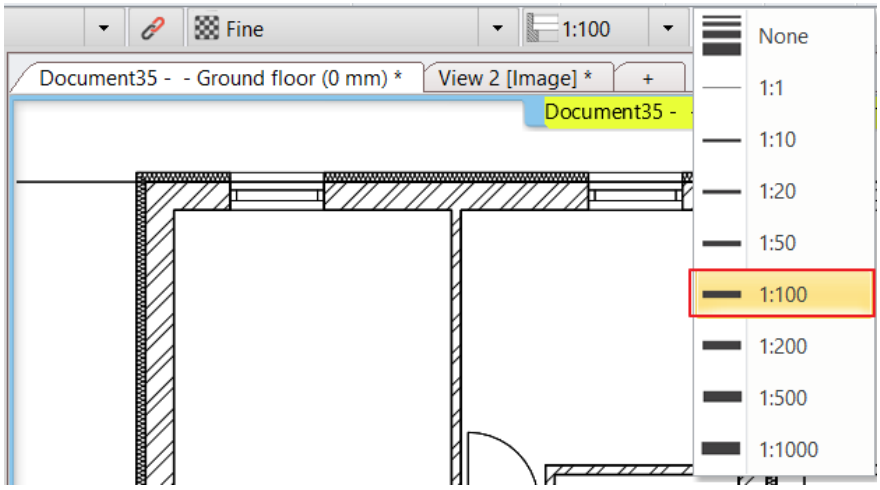


### 1.4.5. Displaying Line Thickness on the Screen

As a side note, let's take a look at how to display line thickness on the screen.

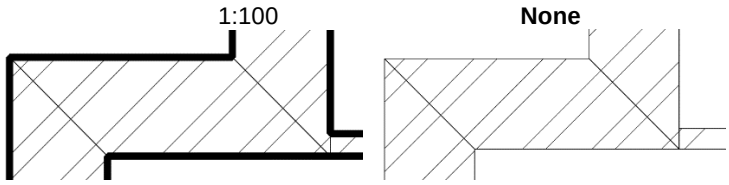
In the **View Control Bar,** by clicking on the **Line Thickness Scale,** you can choose from various line thickness size ratios. Setting the line thickness scale applies to the screen and does not affect printing settings.
For example, if you plan to print the design at a 1:100 scale later and want to see the corresponding line thickness on the screen, select the 1:100 scale.

- Set the line thickness scale to: **1:100**




**„None" Line Thickness**

The "None" line thickness means that the program displays line thickness on the screen with the smallest 1-pixel thickness, which essentially turns off line thickness. This setting is particularly useful for floor plan editing, as it enhances the visibility of endpoints and other special points, making precise editing easier.




## 1.5. Openings: Doors and Windows

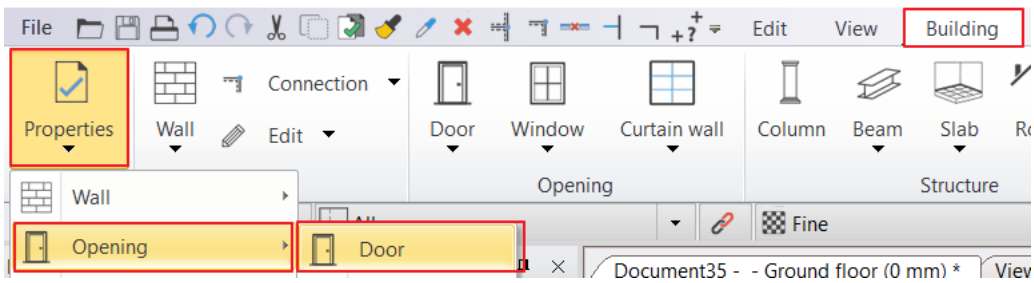
In this section, we will go over the essential information for inserting doors and windows into walls.

The method for creating openings is the same for doors, windows, niches, and recesses. There is a strong connection between walls and openings in the program. The opening (with a few exceptions) is always part of the wall, which means that if you move the wall, the associated openings move with it.

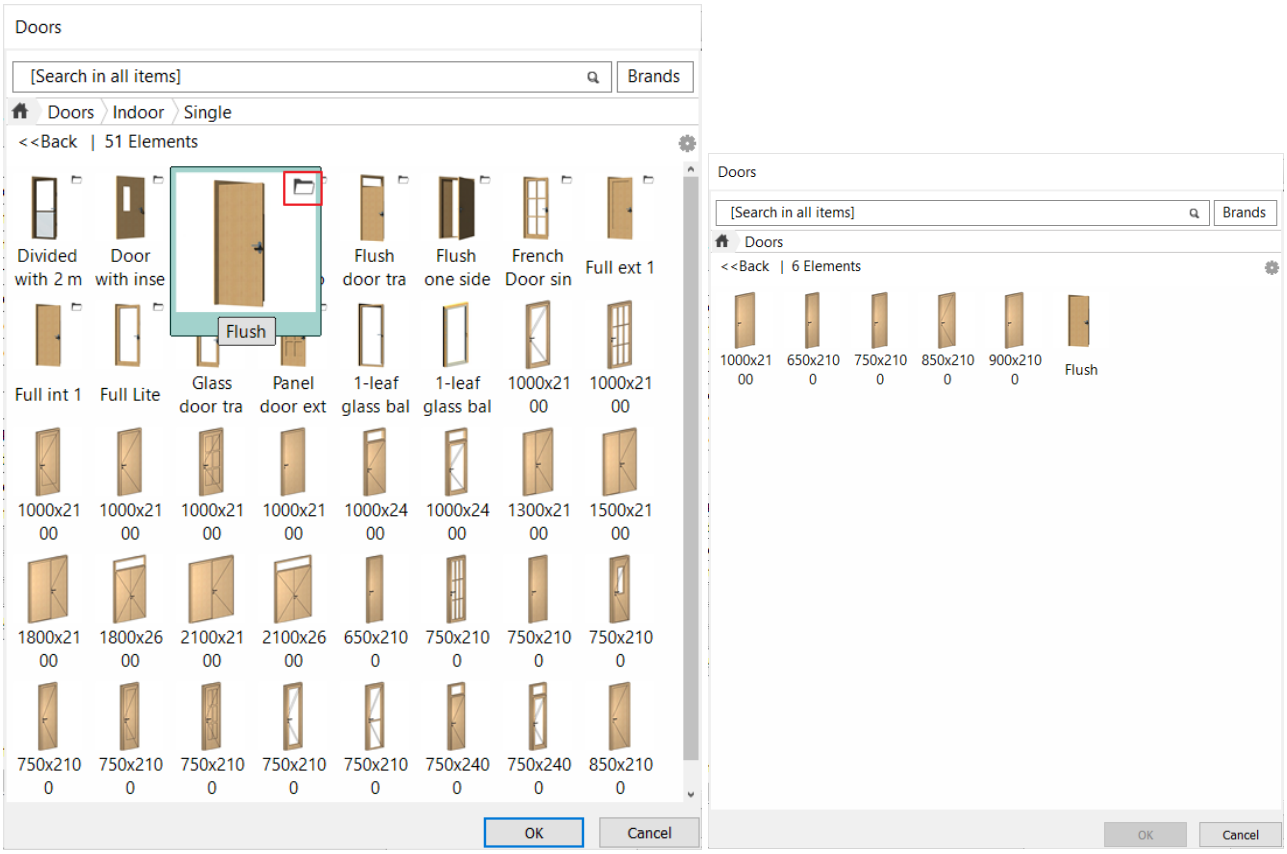
### 1.5.1. Variants

For openings, there is an option to create variants. Variants are elements that differ slightly from similar elements.

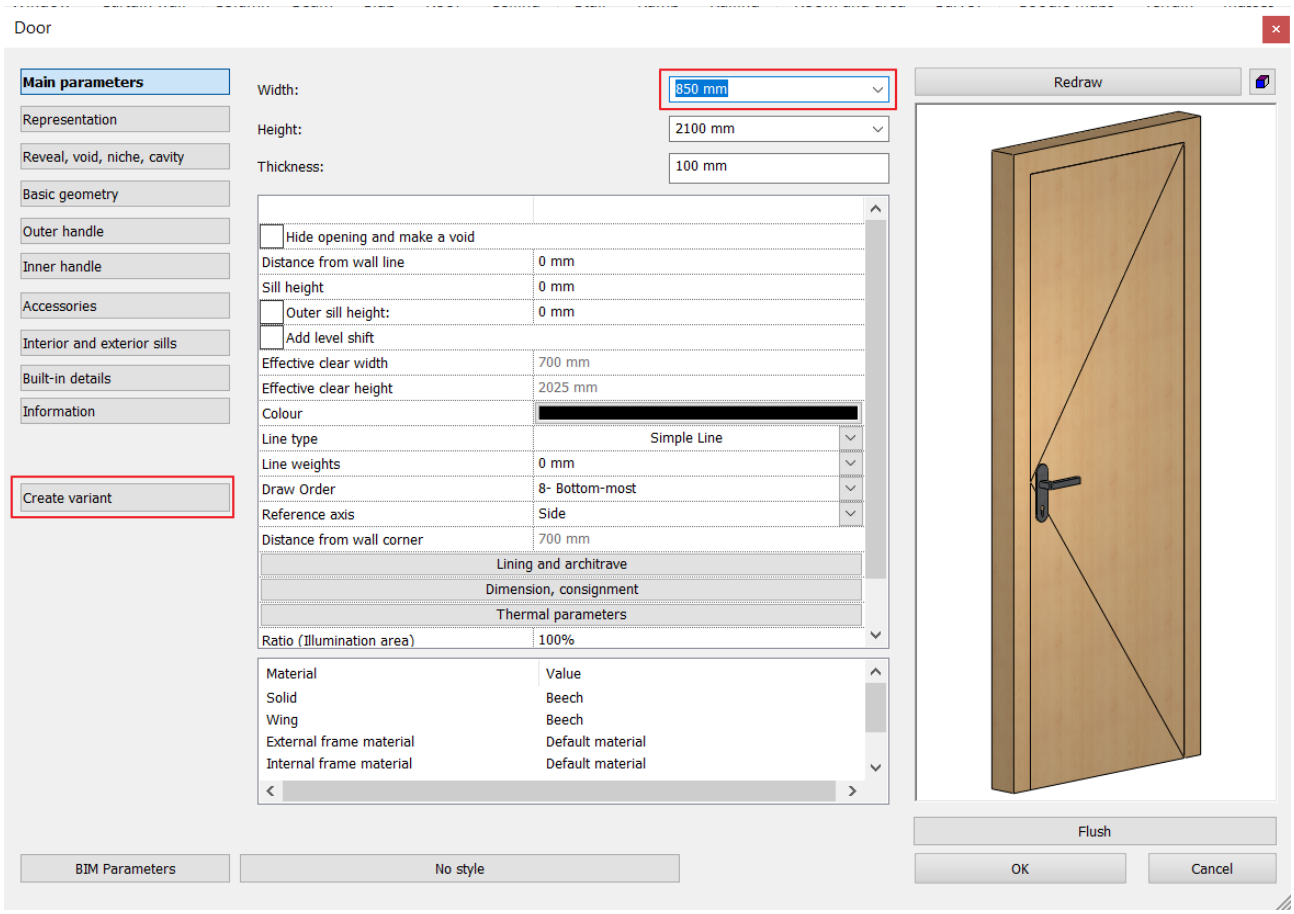
- Select Ribbon / Building / Properties / Opening / Door command or right-click on the Building / Door command, and choose its properties.



In the dialog that appears, click on Flush style. In the door dialog, you can see that there is a folder icon in the upper-right corner of doors with different styles. This indicates that you can choose from multiple variants of doors in that particular style. Clicking on the door will display these variants.




- Go back by clicking the Cancel button and create a custom variant. Change the door width to 850 mm, then click the Create Variant button.

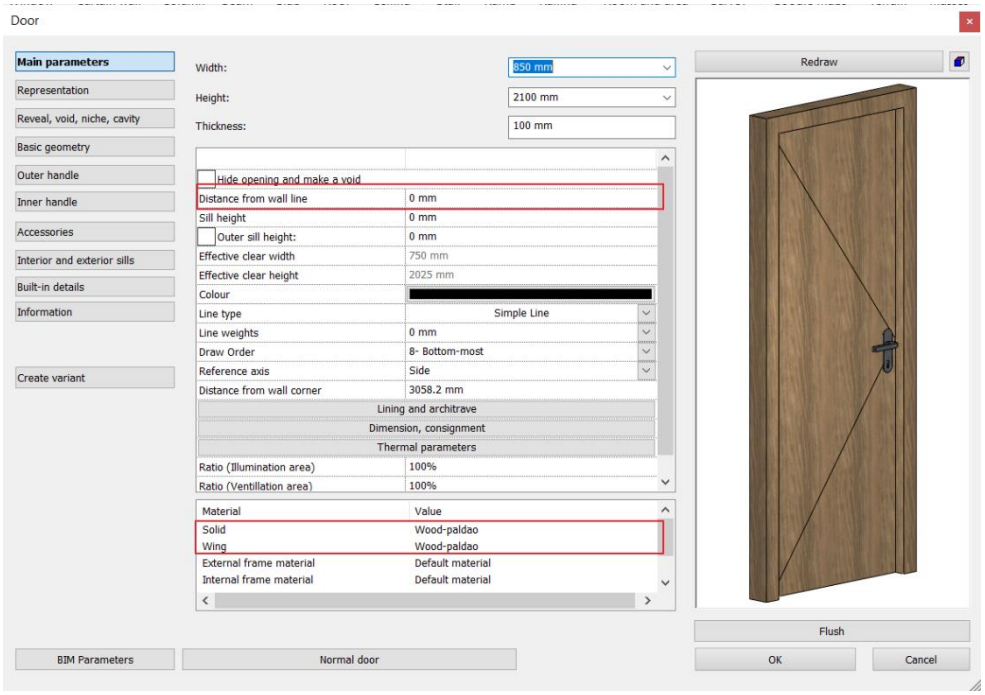



## 1.5.2. Placing doors

Let's place the doors based on the DWG drawing. The width of the doors is determined by the DWG drawing, and each door is 2100 mm high.

You can set the door properties in advance under the Ribbon Properties tab or use predefined door styles that appear on the left after the command is initiated.

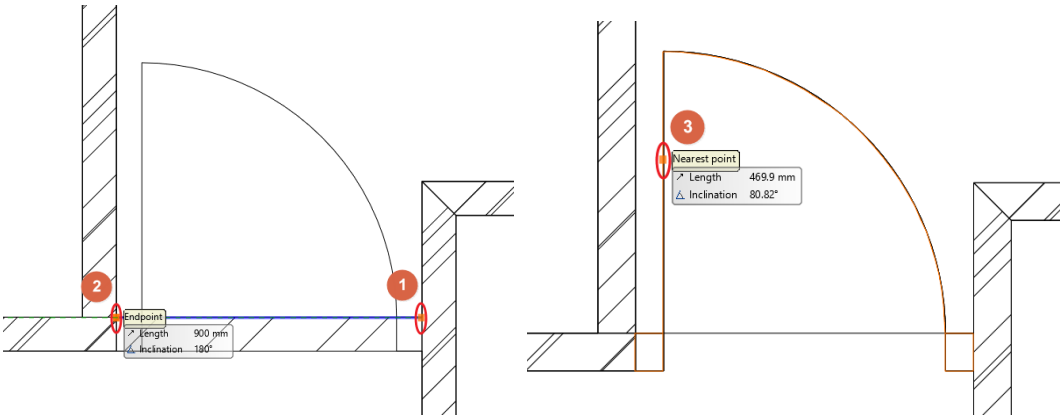
- Modify the **Distance from wall line** to 0 mm since these doors will be inserted into 100 mm partition walls.
- Change the door material. Select the "**Wood-paldao**" material from the material library.




- Close the dialog box by clicking the **OK** button.

  Let's draw the door based on the original content of the DWG drawing.

- Select **Ribbon / Building / Door / Door by Two Points** command.
- Determine the first and second points of the door with consecutive clicks.
- Move the mouse to set the direction of the door opening and then click to fix the orientation.

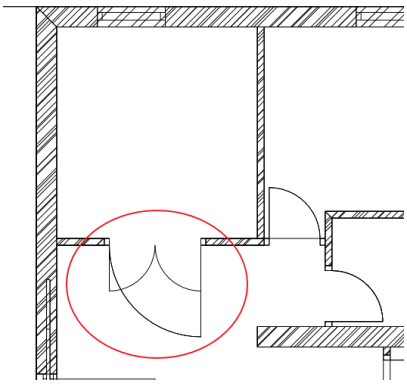



- Use this method to place the remaining doors.

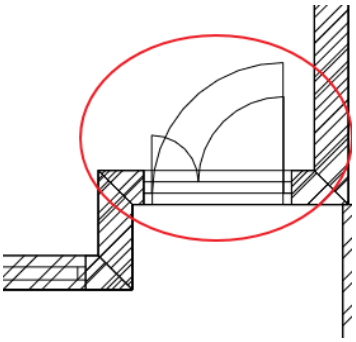
  Now, let's replace the entrance door with another interior double door.

**Double Door**

- To modify a door that was previously placed, select it and choose the pencil icon from the Floating menu to open the door's properties.
- Click on the button below the preview image that indicates the door type to open the library.
- Select the "**Flush Internal Double**" door and click "**OK**."
- The program will ask if you want to keep the previously set dimensions. In this case, choose "Yes" as we are following the dimensions from the DWG drawing.
- Change the door **thickness to 100 mm** and click "**OK**" to close the dialog.



### *Front Door*

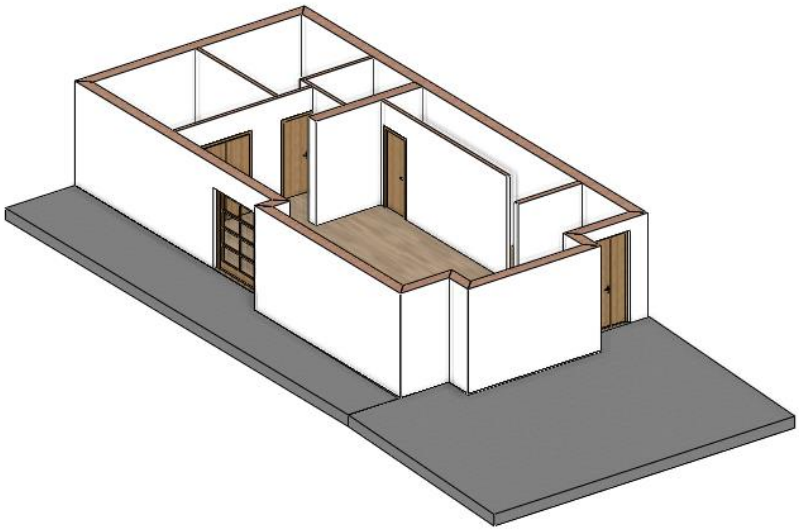


- Select the front door and choose the pencil icon from the Floating menu to edit its properties.
- Click on the button below the preview image that indicates the door type to open the library.
- Choose the "Flush one side fixed" door and click "OK."
- The program will ask if you want to keep the previously set dimensions. In this case, choose "Yes" as we are following the dimensions from the DWG drawing.
- Change the Distance from wall line to 100 mm.

### *Sliding Door*

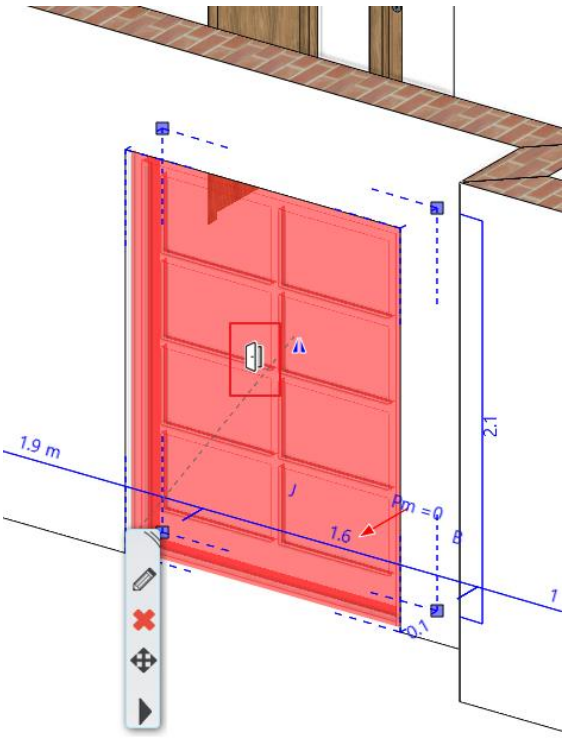
Finally, let's place a sliding door.

- Select the Ribbon / Building / Properties / Opening / Door command.
- Click on the button below the preview image that indicates the door type to open the library.
- Select the "Glass sliding in 1" door and click "OK."
- Modify the Distance from wall line to 100 mm.
- Click "OK" to close the dialog.
- Finally, place the door on the interior surface of the wall using the Ribbon / Building / Door / Door by Two Points command.



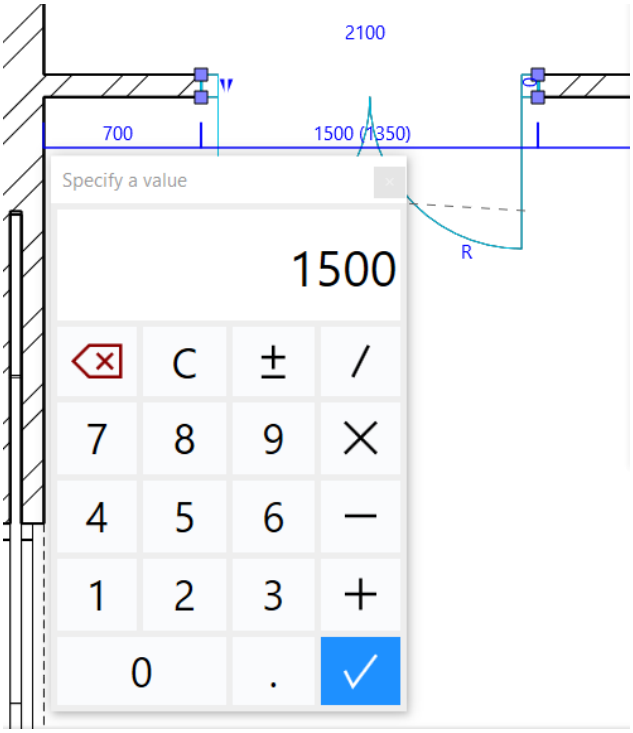
### *Door Opening Animation*

In the 3D view, you have the option to show how doors open. After selecting the door, clicking on the door opening animation icon will display the animation.




### *Calculator*

The built-in calculator allows you to calculate various formulas directly at the dimension label.

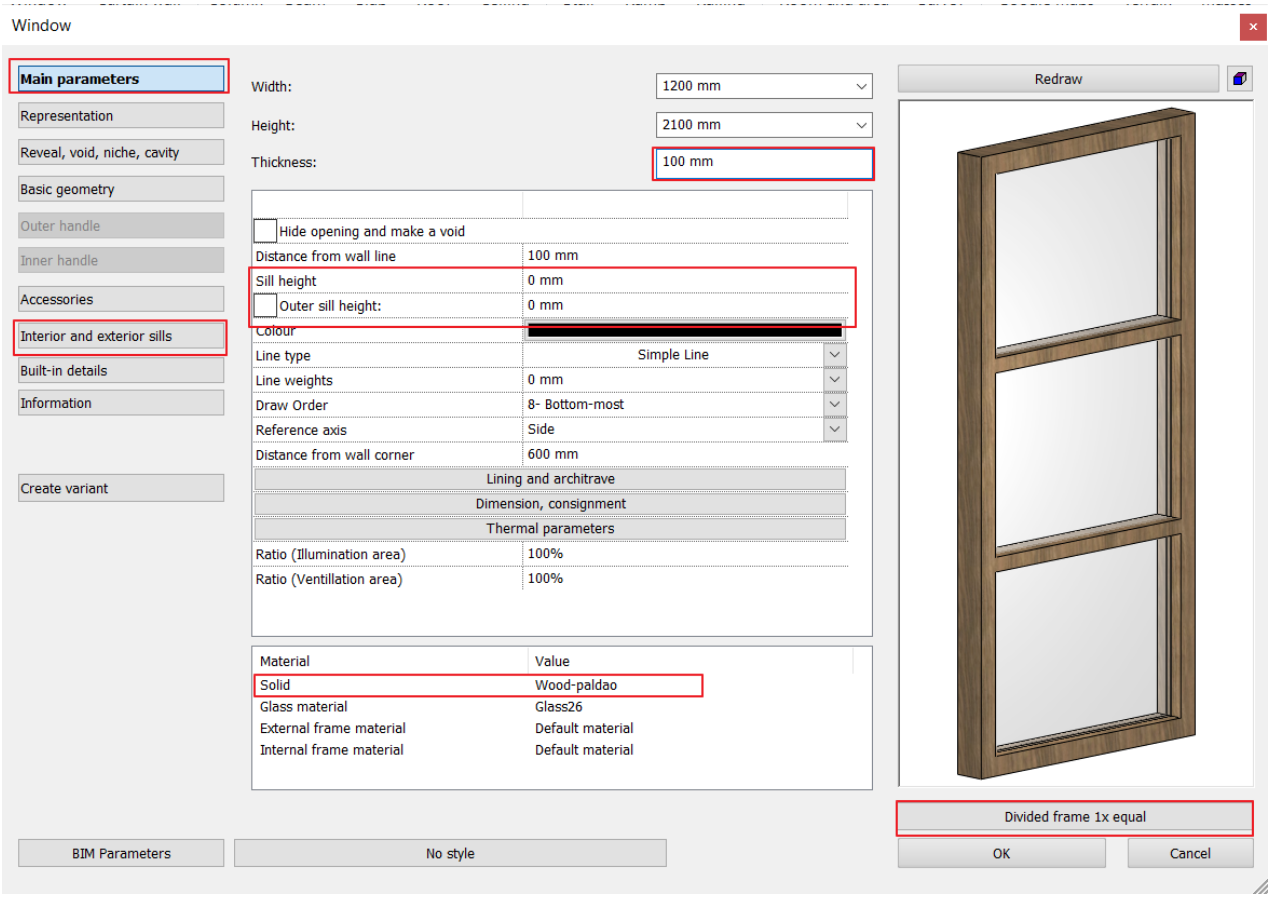



The calculator can be turned on and off in the *Settings / Units and Angles* menu.

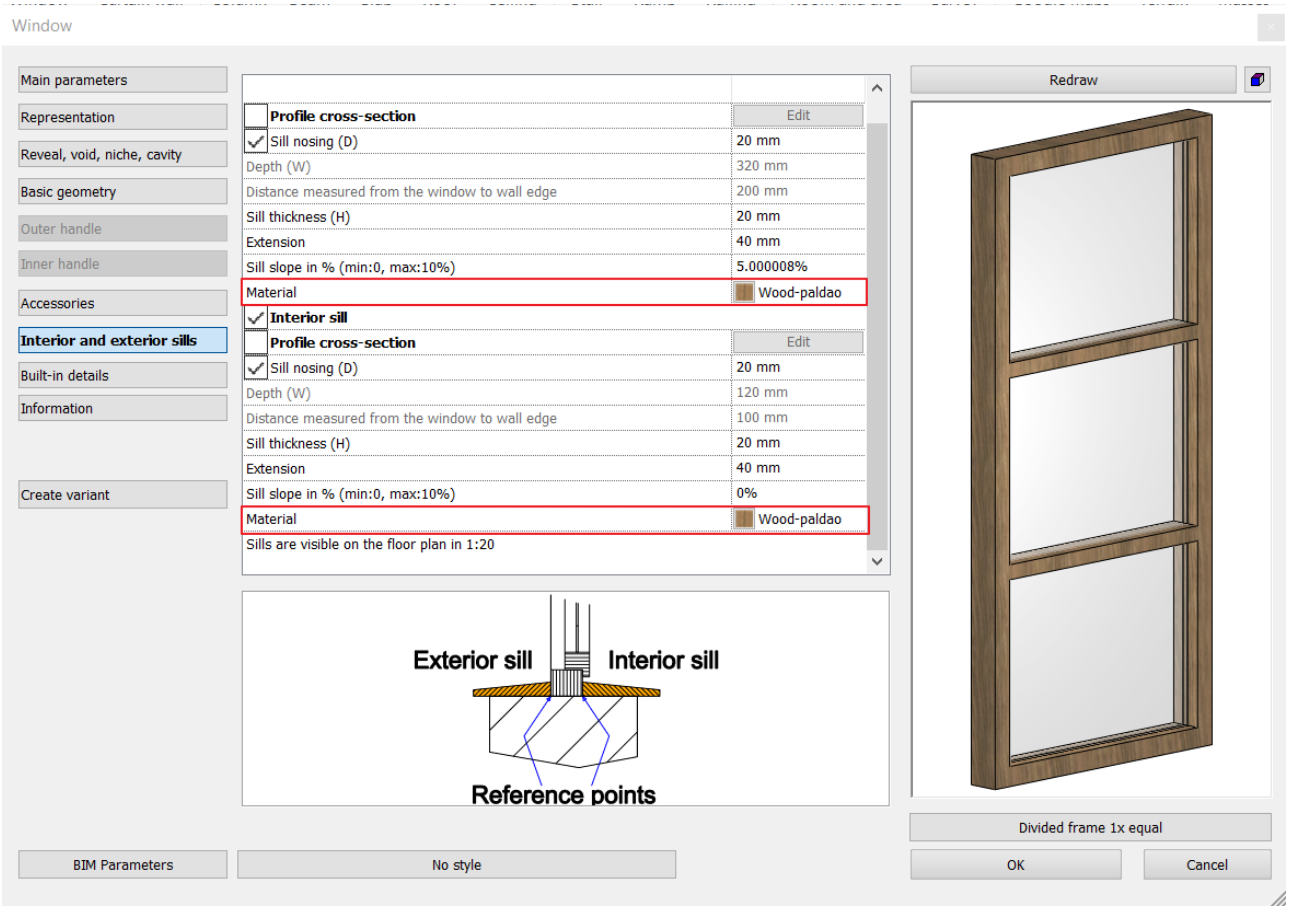
## 1.5.3. Windows

Now let's place the windows.

- Right-click on the Ribbon / Building / Window command and select Properties.
- In the default properties dialog, open the library and choose the window that is horizontally divided into three equal parts: "Divided frame 1x equal".
- Set the thickness to 100 mm, height to 2100 mm, and the sill height to 0 mm.
- Choose the same material for the frame that we used for the doors: "Wood - Paldao."



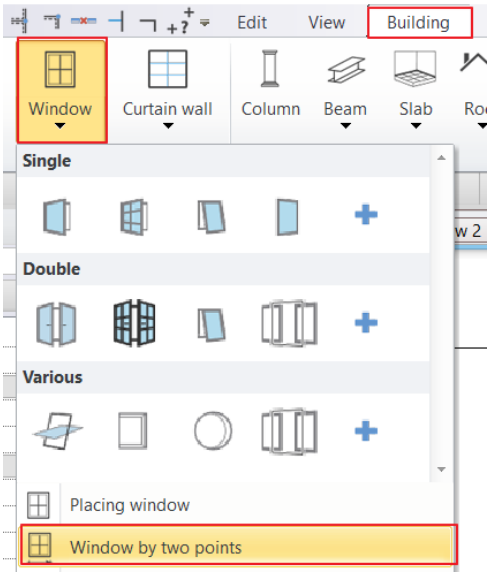

- Finally, set the same material for both the window's exterior and interior sills in the **Interior and Exterior Sills** tab.



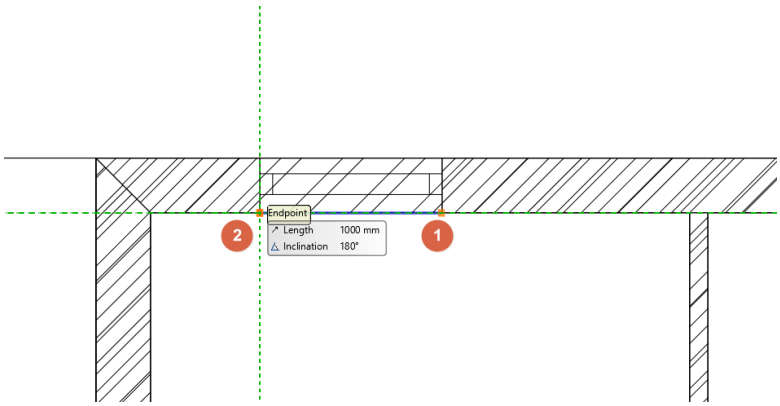

- Close the dialog with the "**OK**" button.

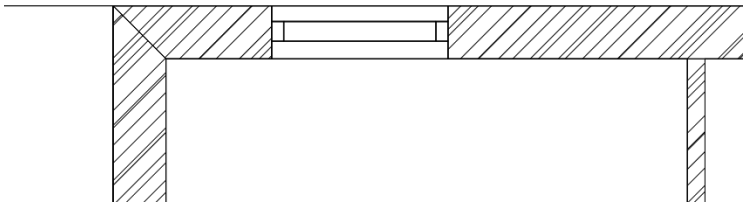
  Now you can draw the windows based on the DWG drawing with the appropriate properties.

- Select the **Ribbon / Building / Window / Window by Two Points** command.




- Select the two corner points of the window by clicking on the interior surface of the wall.

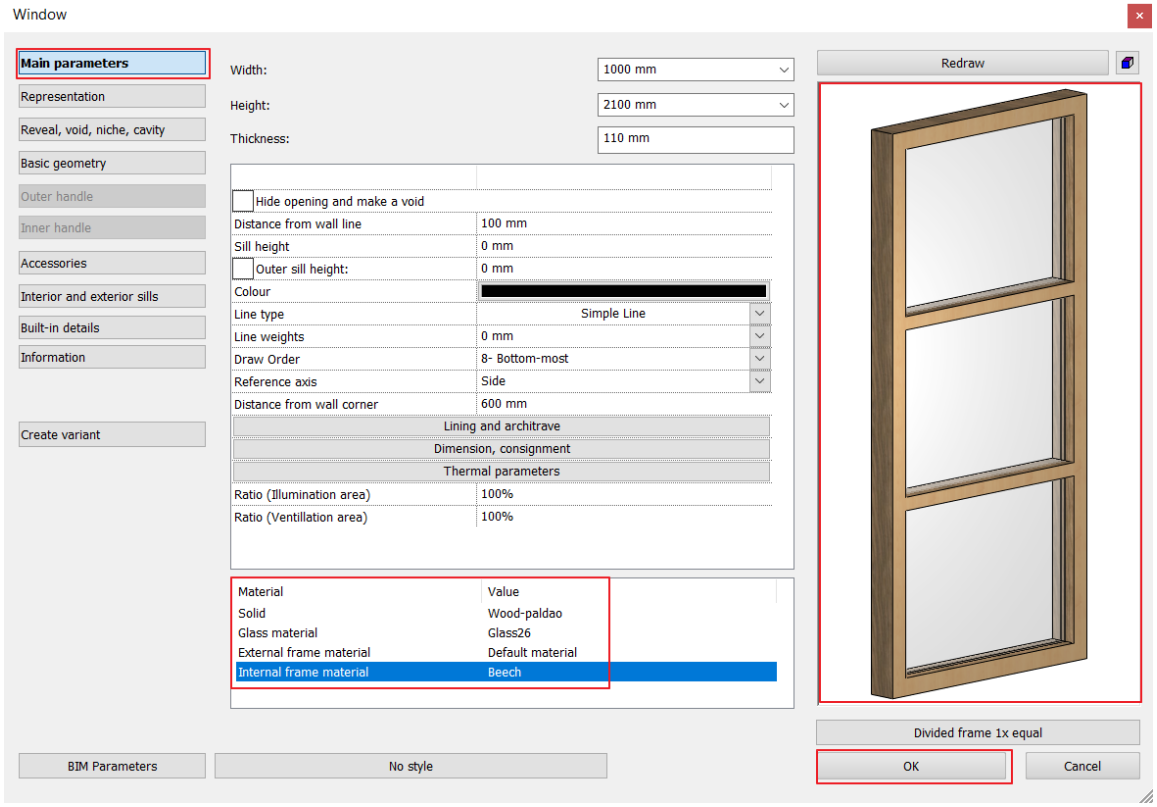


- Place all the other windows using the same method.

***Helpful tip: The interior and exterior materials of the window can be changed independently.***

- Select any window in the house.
- Enter the window settings and set the materials in **Main Parameters / Material**.
- Choose "Beech" for the Internal frame material.
- The change will immediately appear in the window preview.



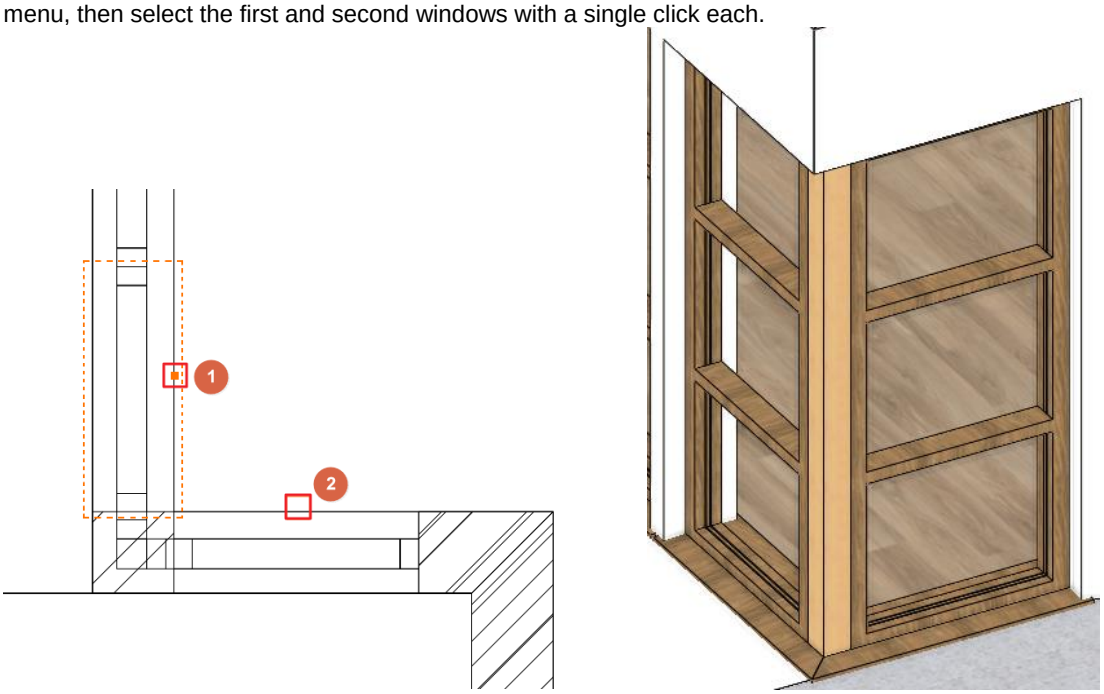

- Undo the modification.

## 1.5.4. Creating a Corner Window

Standard windows can be combined in any combination to form a corner window.

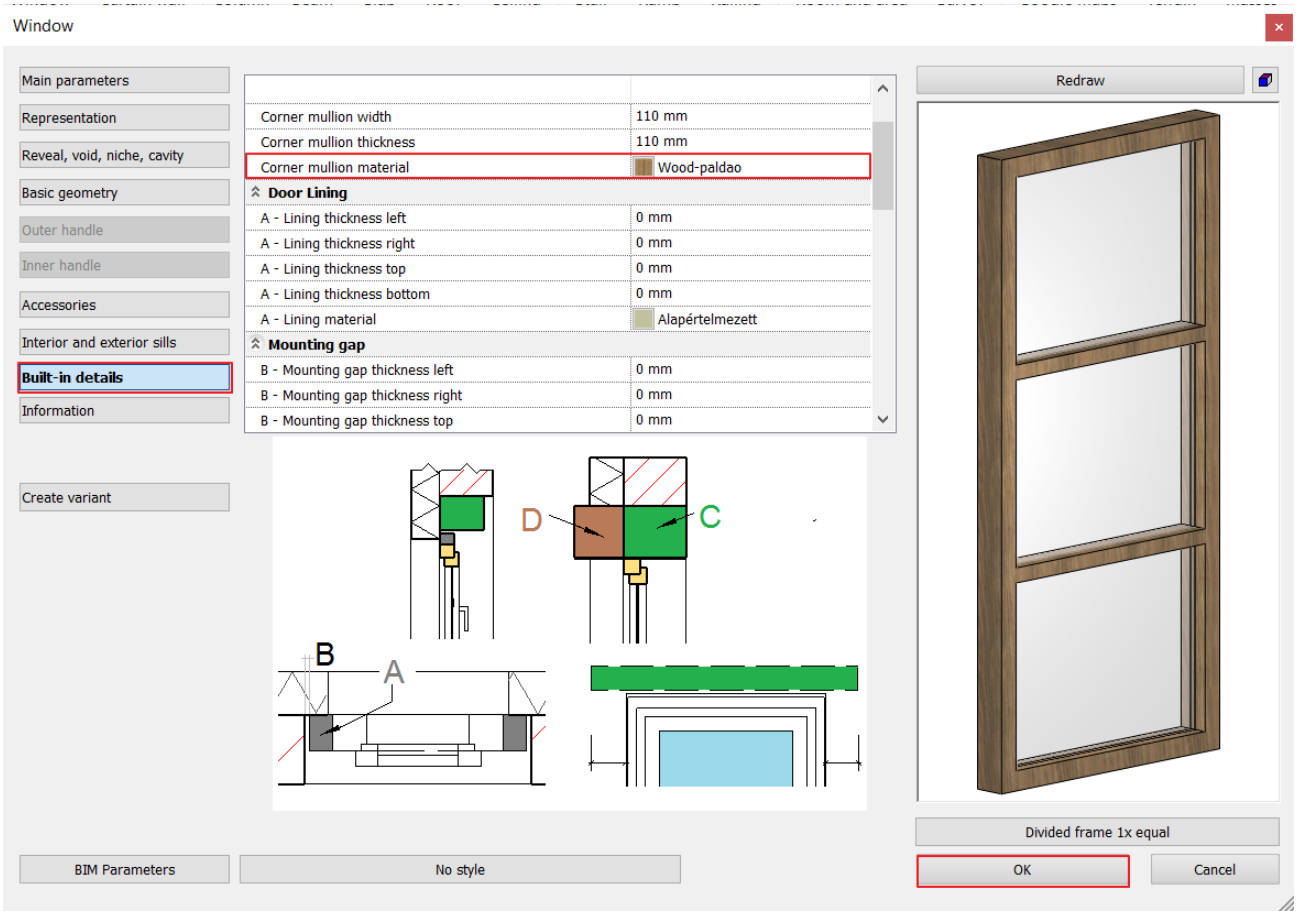
When creating a corner window, place two windows on both sides of the corner where two walls meet.

Use the **Join two opening on wall corner** command from the **Ribbon / Building / Window / Windows on wall corner** menu, then select the first and second windows with a single click each.



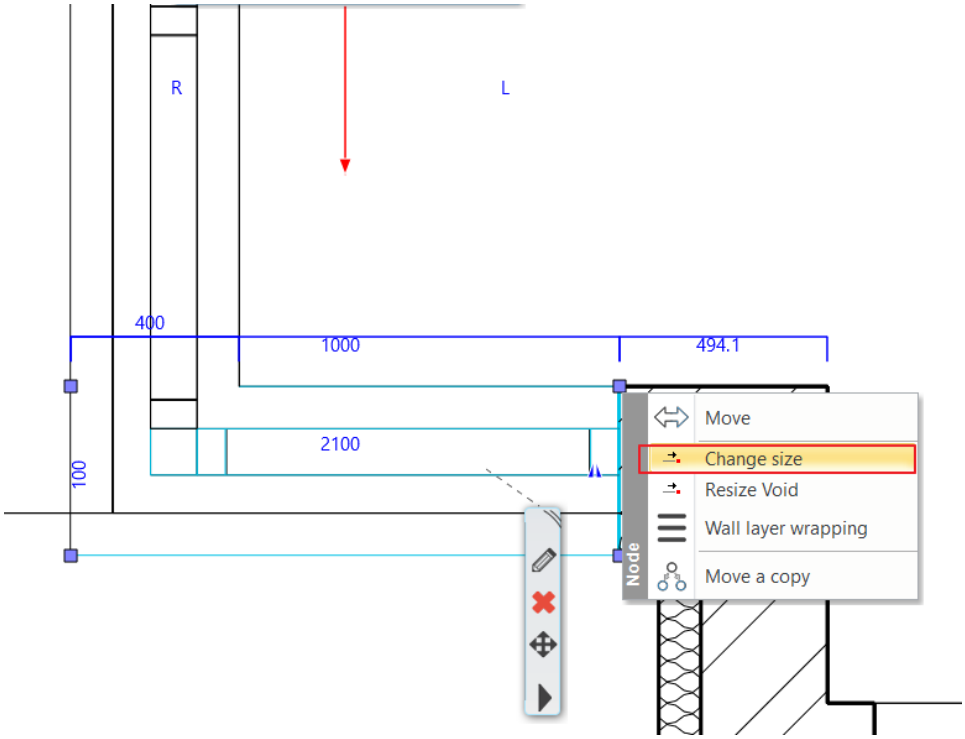

ARCHLine.XP automatically creates a mullion element between the two windows. Click on the windows to see which window the program has assigned the mullion element to.

- Replace the element's material with "**Wooden Paldao**" under the **Built-in details** tab in the window properties dialog.

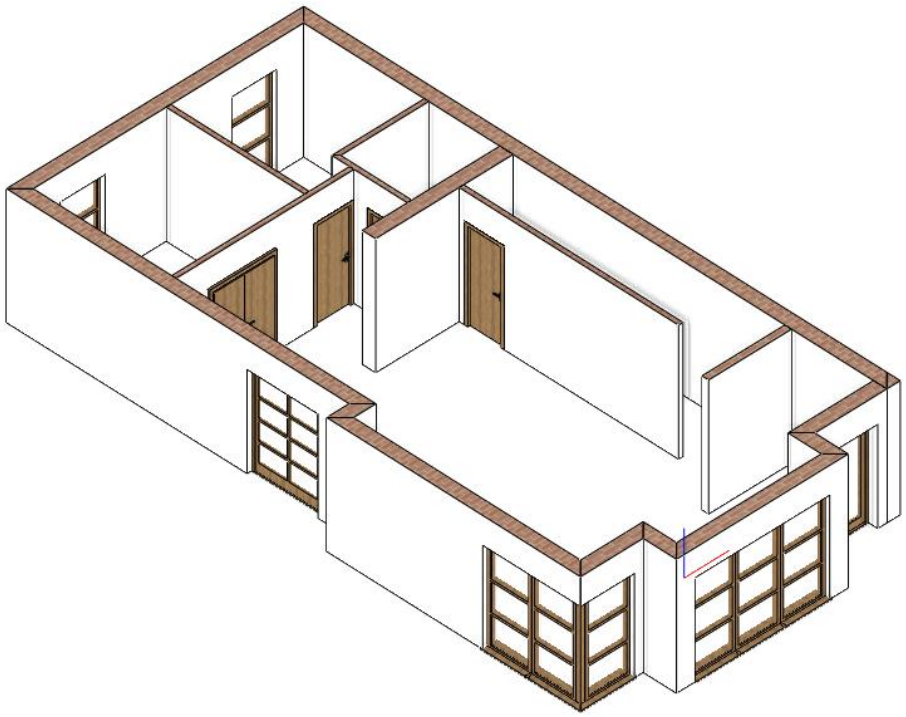



Finally, let's modify the width of the two connected windows to match the original drawing.

- Select one of the windows.
- Click on the blue corner point marker and choose the **Resize** command.
- Adjust the size to match the original drawing, where each window is 1000 mm wide.
- Repeat these steps for the other windows.




After placing all the windows, the result should look like this:



# 1.6. Slabs and Ramps

## 1.6.1. Slab tool – Creating floors

After completing the wall drawings, let's continue our work by creating the slab. First, set the parameters you will use for this task.

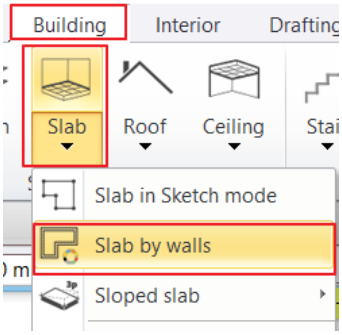
- Before creating the slab, right-click on the **Slab Tool** in the **Ribbon / Building menu** and choose its properties.
- Modify the slab material. Select a new material for the slab's upper surface by clicking on the first material.
- In the dialog that appears, you'll see the material library with materials used in the current project (only the materials used so far). Here, you also have the option to access all of the program's materials. Click on the home icon , and look for the "*Parquet / Strips*" material category, then choose *"parquet_rovere_03."* Select the material by clicking on it, and then close the dialog with "OK."

- The second material determines the side material of the ceiling. Click on it and change it to "*Bright White*," which is the same as the one used for the wall side. In the library, click on the home icon, type "bright" in the search field, and press Enter. Choose the "*Bright White*" material.

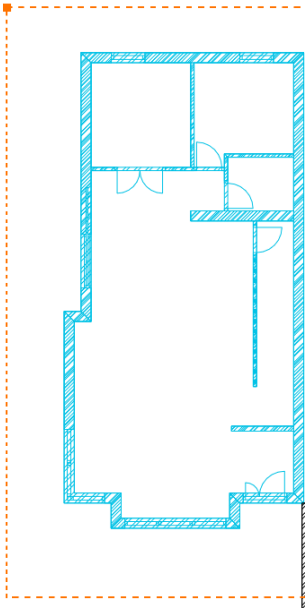
- Close the slab dialog with the **OK** button.

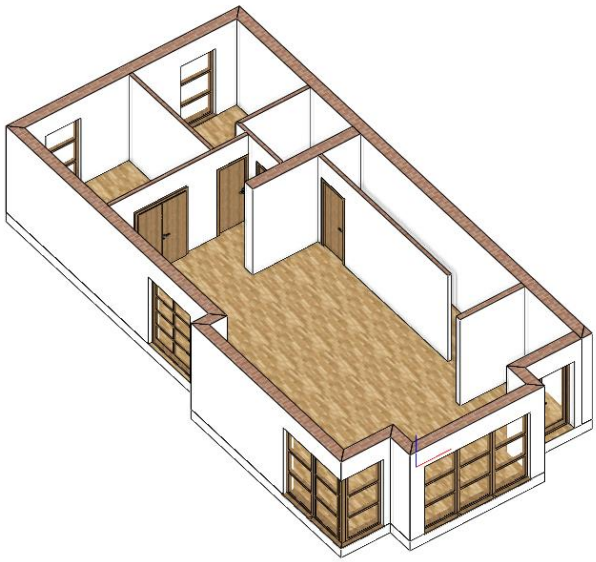
  The settings are now ready, and you can start creating the slab.

- Activate the floor plan window.
- Select the **Ribbon / Building / Slab / Slab by walls** command.




- Select the walls on the floor plan using the selection rectangle.
- Press Enter, and the slab is now created.

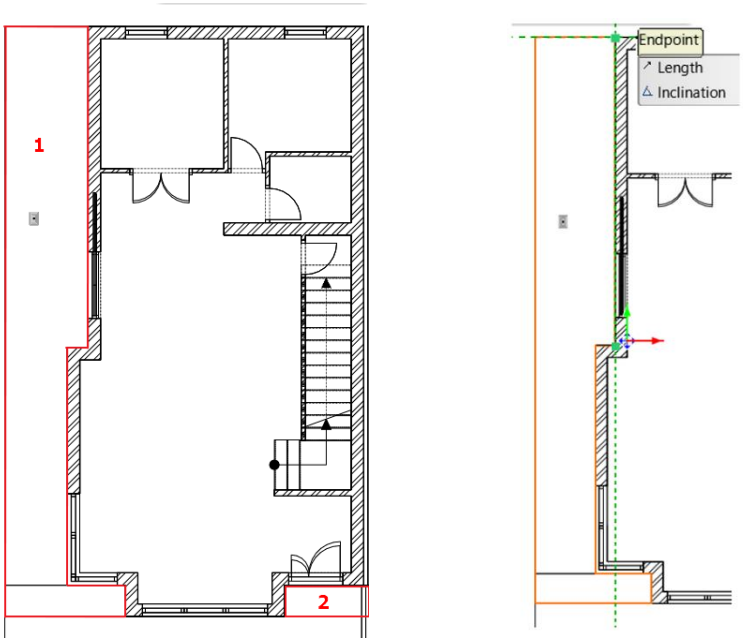




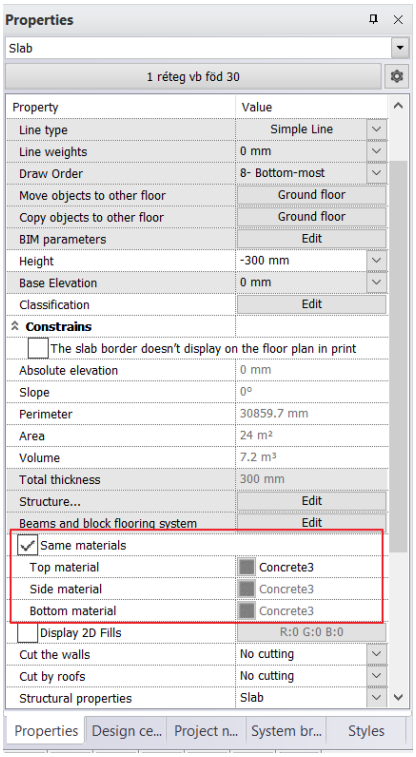
## 1.6.2. Slab Tool – Creating a Terrace

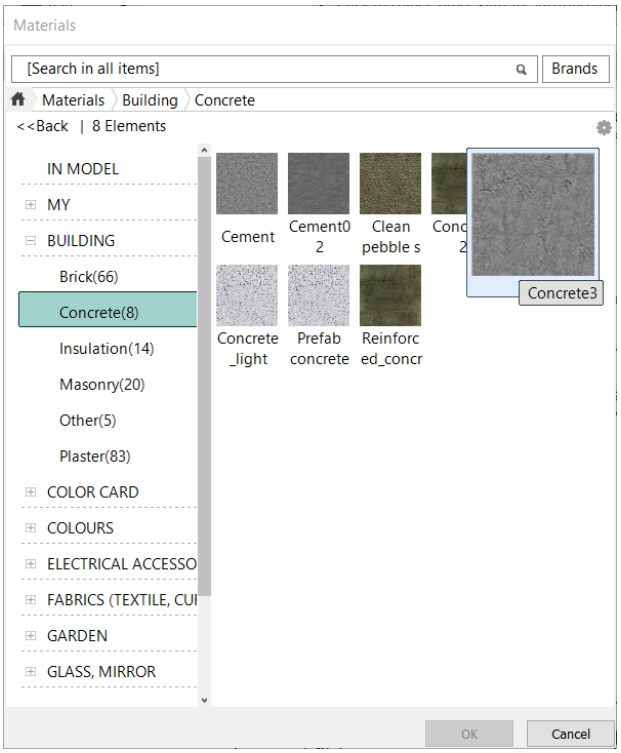
Next, we will create a terrace using the slab tool.

- First, enter the **Layer Manager** and activate the **Slab** sheet. Now you can see the terrace on the left side of the building (1) and the ramp (2) in front of the entrance.
- Draw the terrace on the left side using the **Ribbon / Building / Slab / Slab in Sketch mode** command.

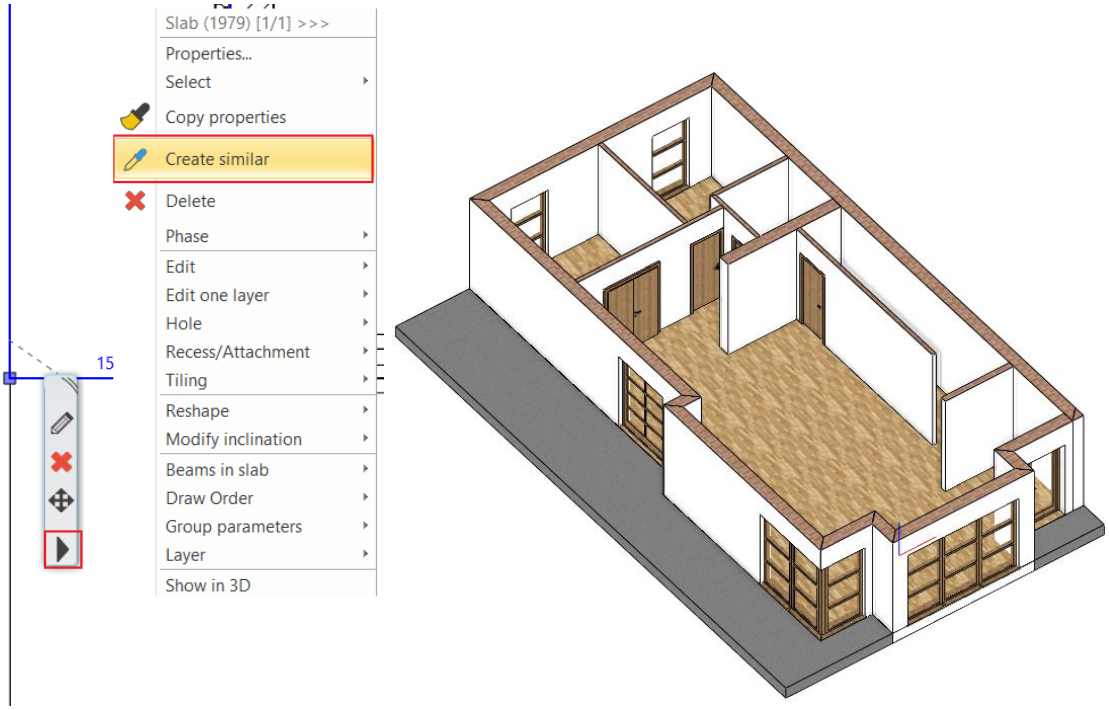



- Select the created slab by clicking on it.
  In the Properties tab that appears on the left, enable the "Same Materials" option, and set the material to "Concrete3" for the new terrace.



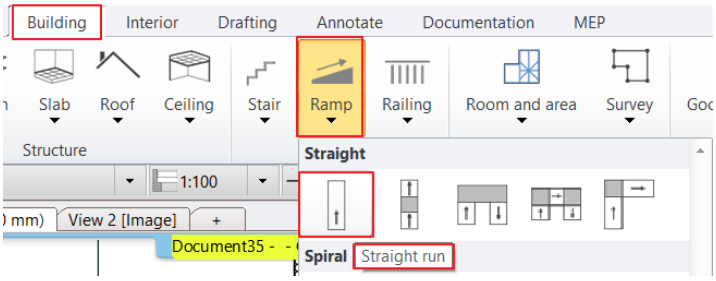

- Select the created slab, and from its local menu, choose the "Draw as" command. Draw the second slab.



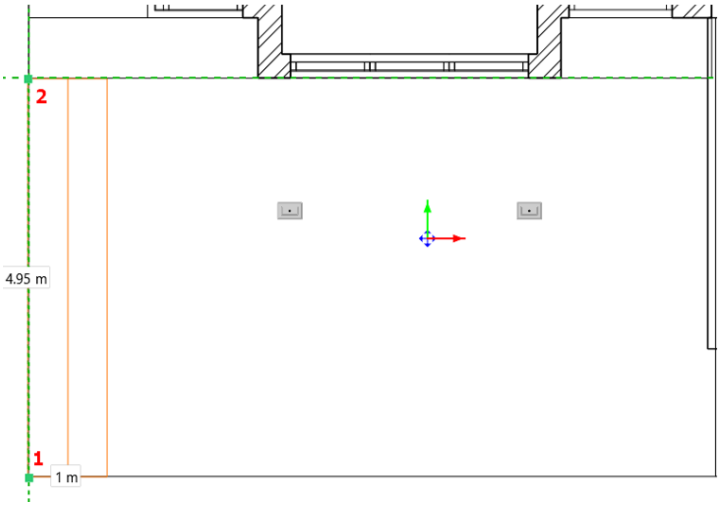

## 1.6.3. Creating a Ramp

You can create a ramp conveniently using the Ramp tool, especially for situations like the entrance to the building.

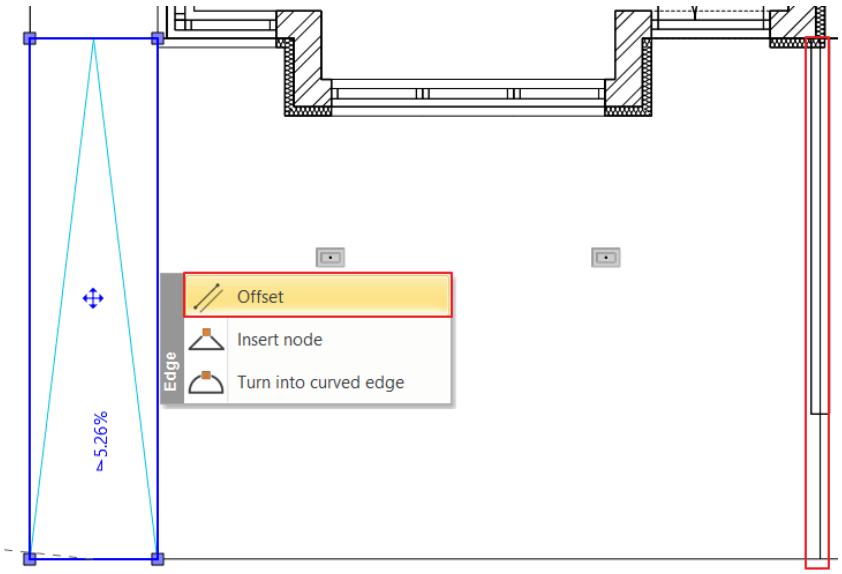
- Start the ramp command from the **Ribbon menu / Building / Ramp** commands, then choose the very first ramp type, the **Straight run** from the **Straight category**.



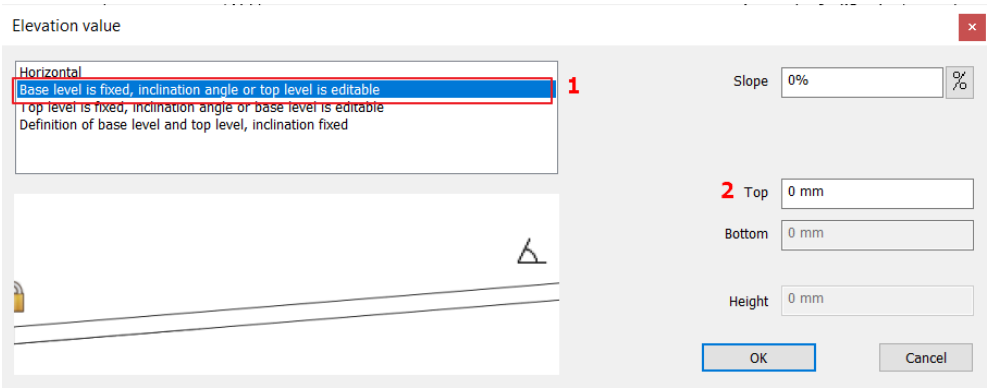

- Place the ramp by specifying the lower (1) and upper (2) points.



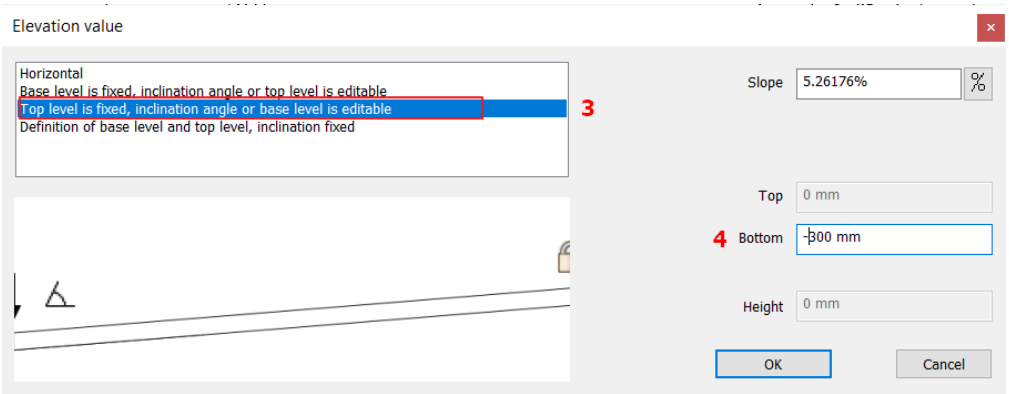

- Click on the ramp, then right-click on the right edge marker, and choose the Offset command to adjust the width of the ramp to reach the opposite wall.



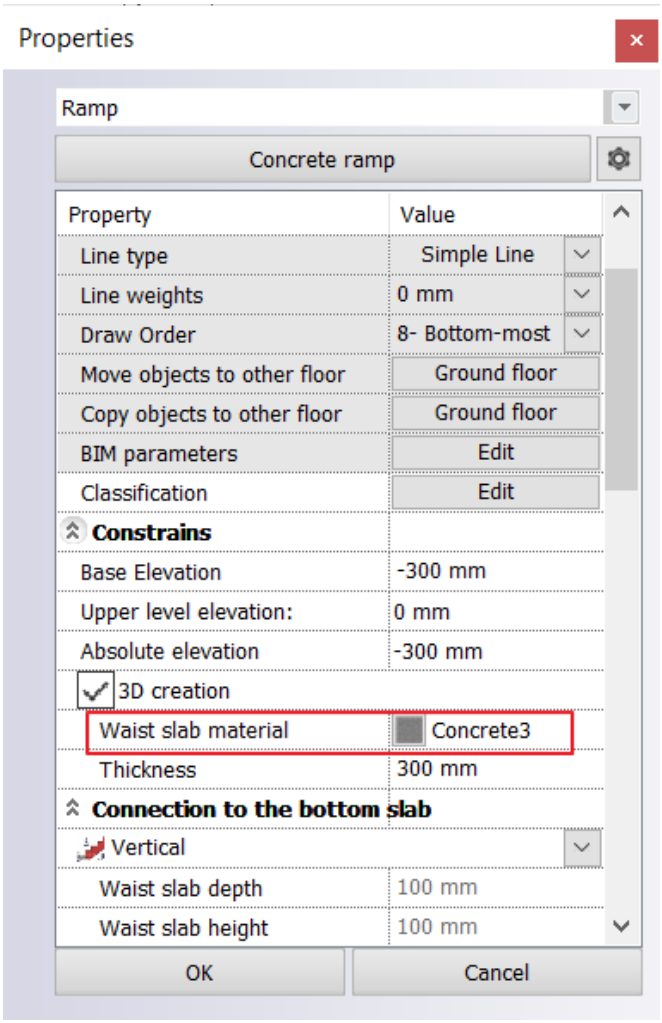

- Click on the ramp, then click on the small triangle-shaped marker next to the Move marker. This will open the Elevation value dialog.
- The top of the ramp is at 0 meters, and the bottom starts at -0.3 meters. First, select the second option: "**Base level is fixed, inclination angle or top level is editable**" (1), then enter the arrival height of the ramp (2):



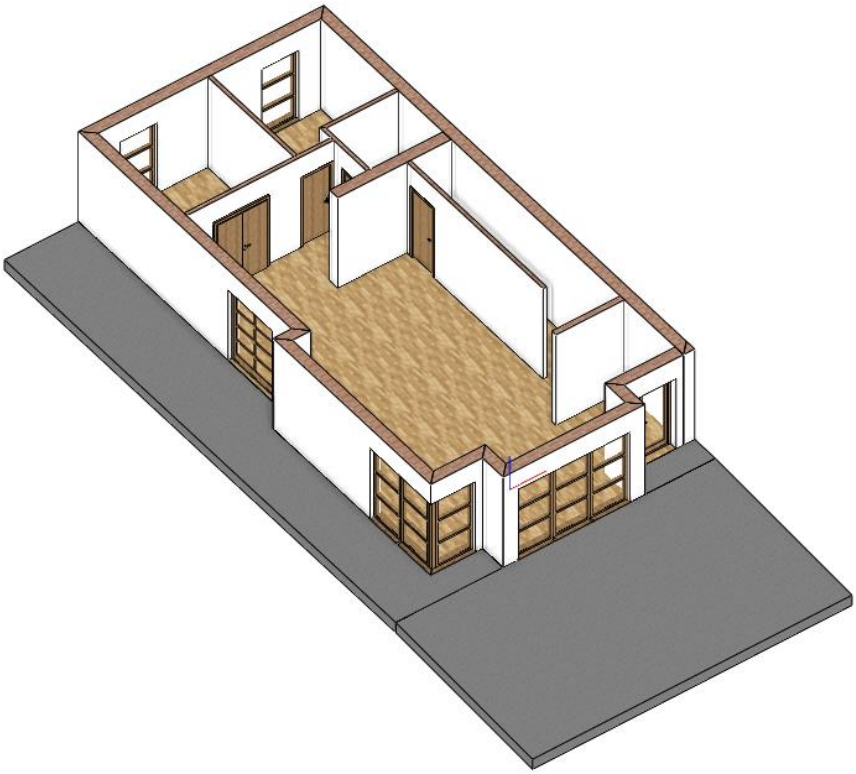

- Next, choose the third option: "**Top level is fixed, inclination angle or base level is editable**" (3), and then enter the lower value (4):




- Close the dialog box with the **OK** button.
- Click on the ramp and in the menu that appears, click on the pencil icon.
- This will open the Properties dialog, where you can change "**Prefabricated concrete**" to "**Concrete 3**".


Properties
Ramp
Concrete ramp
Property
Value
Line type
Simple Line
Line weights
0 mm
Draw Order
8- Bottom-most
Move objects to other floor
Ground floor
Copy objects to other floor
Ground floor
BIM parameters
Edit
Classification
Edit
Constrains
Base Elevation
-300 mm
Upper level elevation:
0 mm
Absolute elevation
-300 mm
3D creation
Waist slab material
Concrete3
Thickness
300 mm
Connection to the bottom slab
Vertical
Waist slab depth
100 mm
Waist slab height
100 mm
OK
Cancel

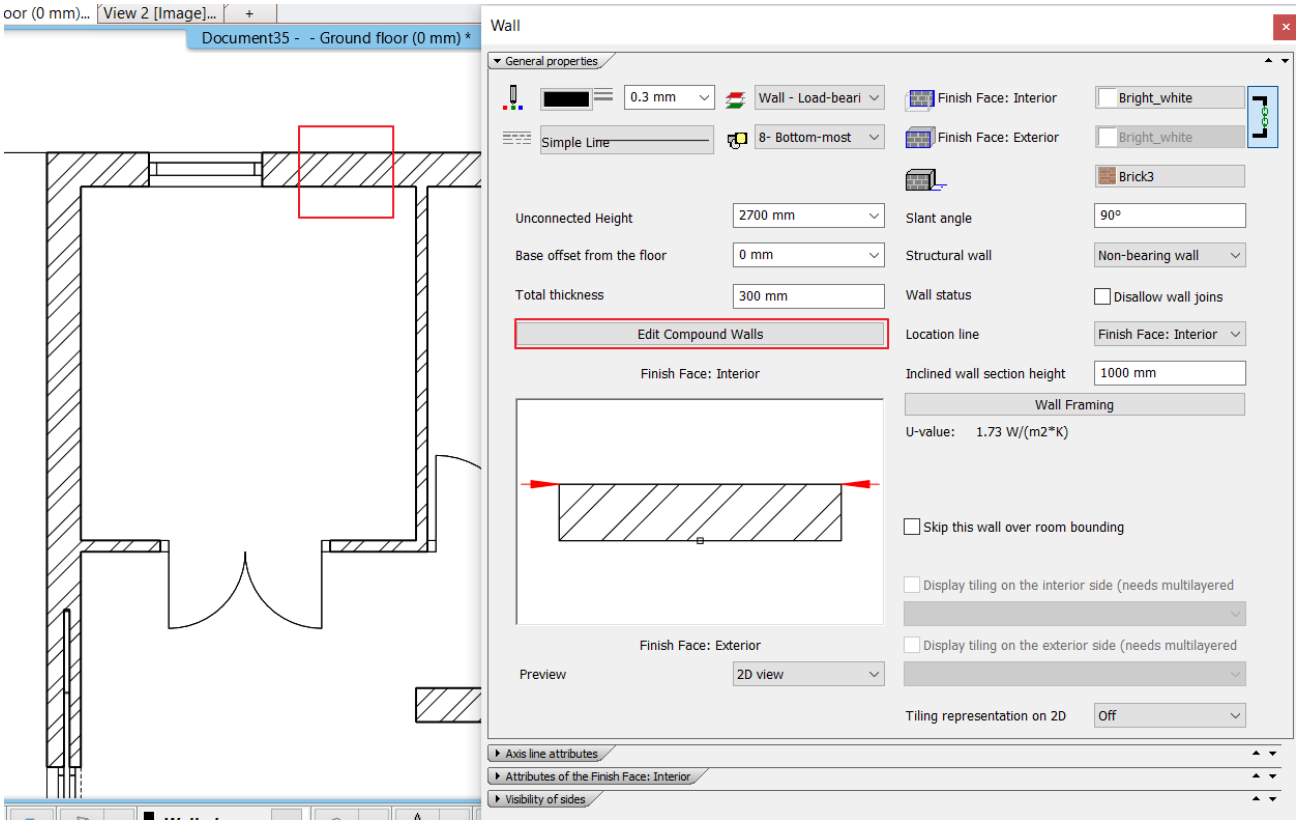
The result:



# 1.7. Layered Walls

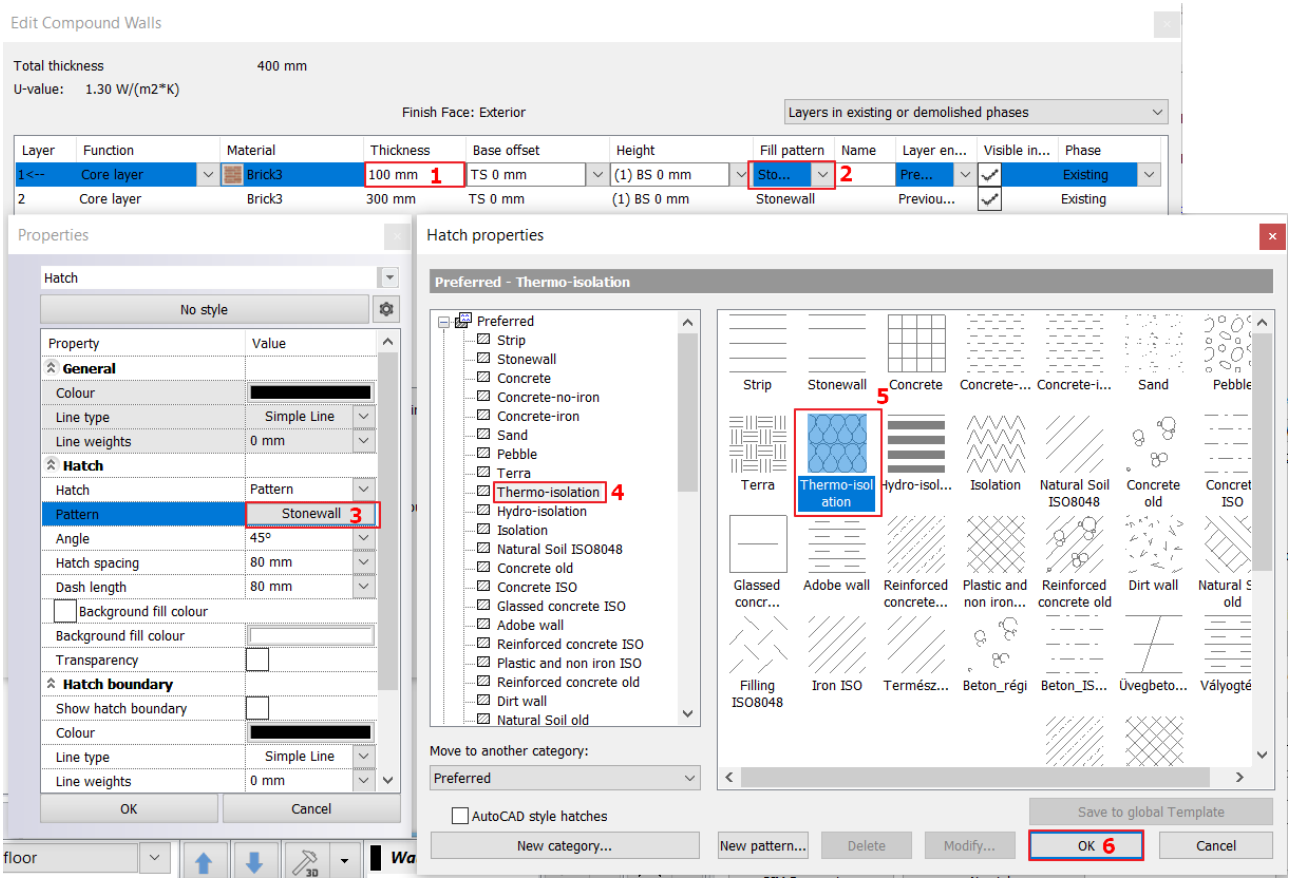
We will transform the drawn walls into layered structures so that we can add an insulation layer.

- Select one of the main walls on the floor plan, then go to its properties. In the dialog box, choose the **Edit Compound Walls** menu.

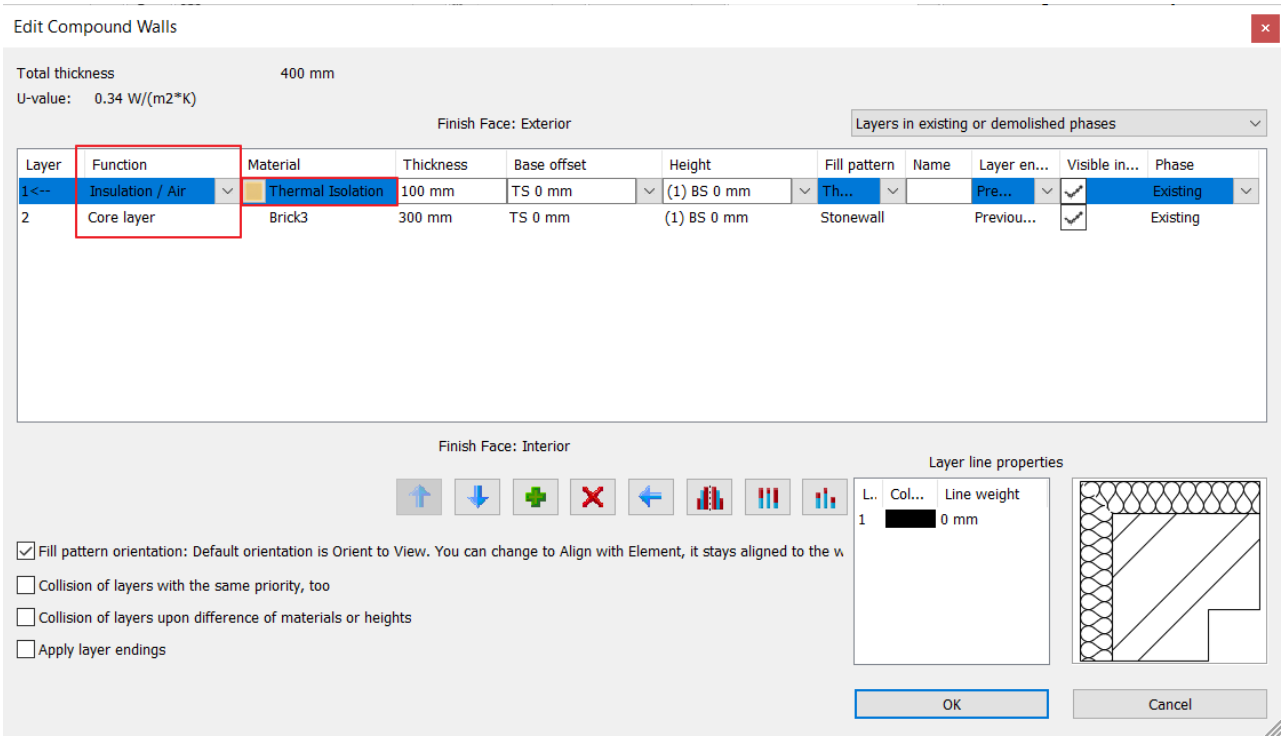



- In the Edit Compound Walls dialog, click the plus button to add a new layer.

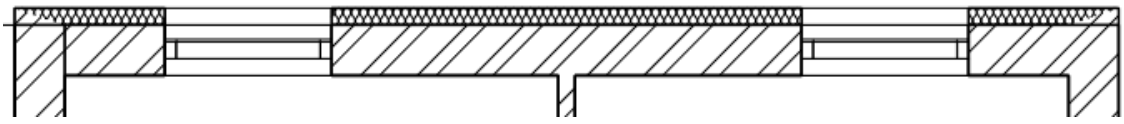
- Change the thickness of the top layer to 100 mm (1), then click on the *Stone Wall* in the **Hatching** section, and select the **Edit** option (2). In the Properties dialog, click on the Stone Wall under **Pattern** (3), then choose the *Thermo-insulation* folder (4), and the Thermo-insulation hatch (5), then accept the settings with the OK button (6).



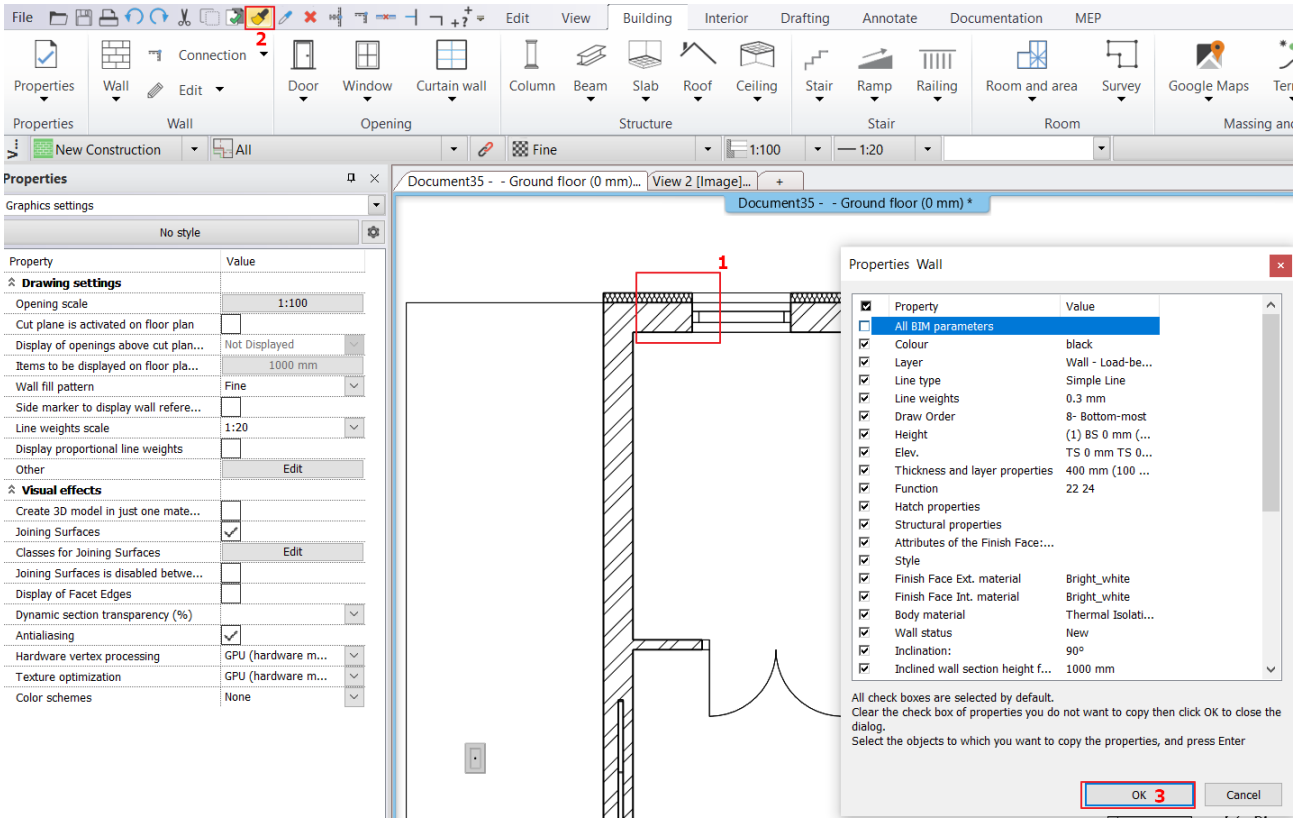

- Change the material of the insulation layer to Thermal Insulation, set the functions of the layers to Insulation / Air, and then accept all dialogues with the OK button.



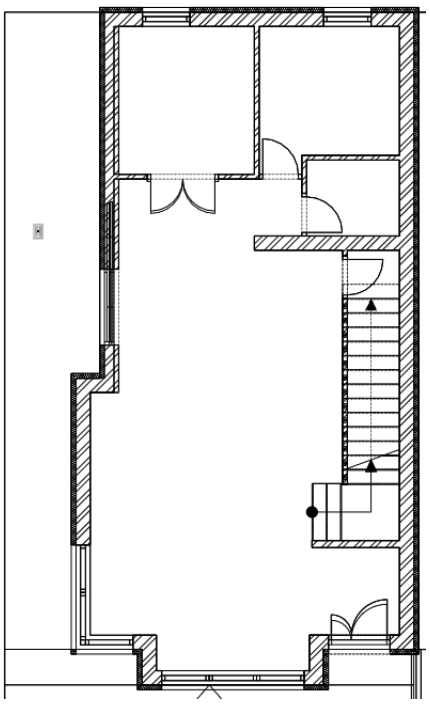

The result:



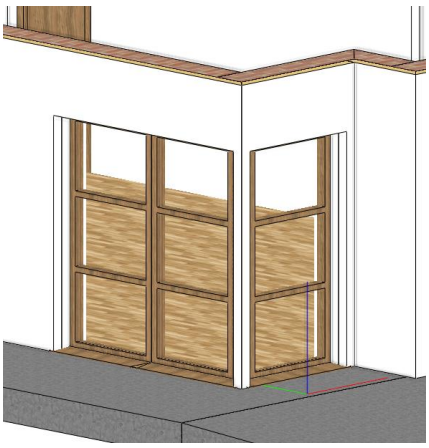
- Copy the layered structure to all the other walls. Select the layered wall, then choose the Copy Property feature from the quick access toolbar. In the pop-up properties dialog, don't change the selection of properties, just accept with the OK button.



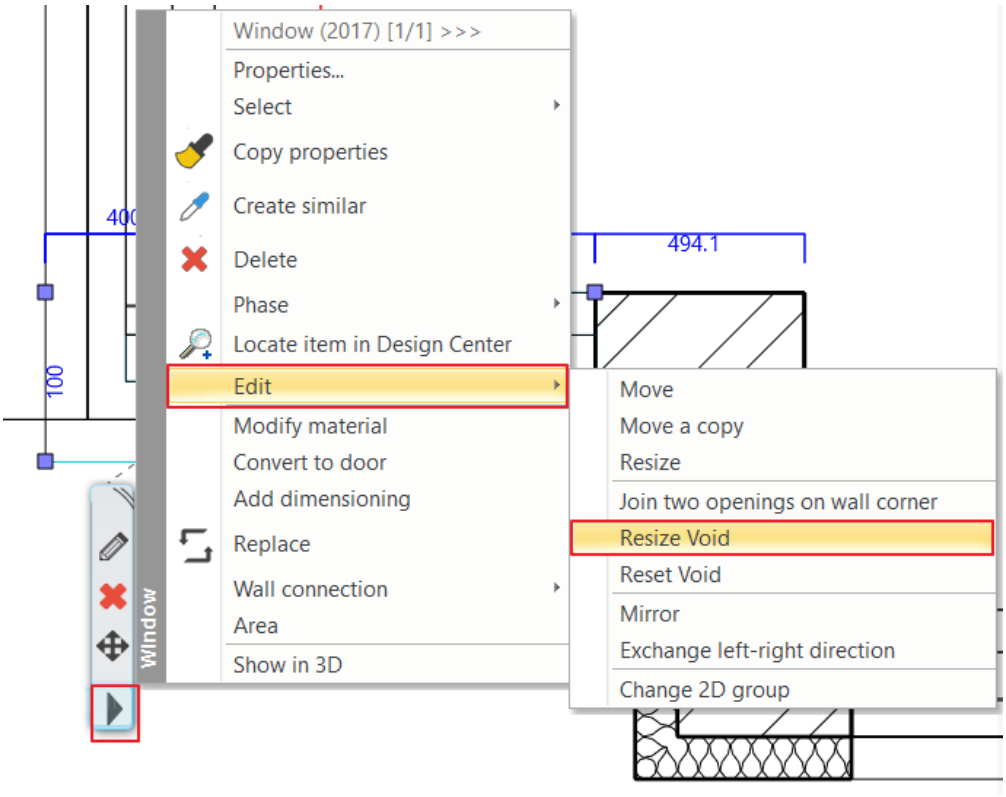

- Select all the external main walls, then press Enter to accept the command.



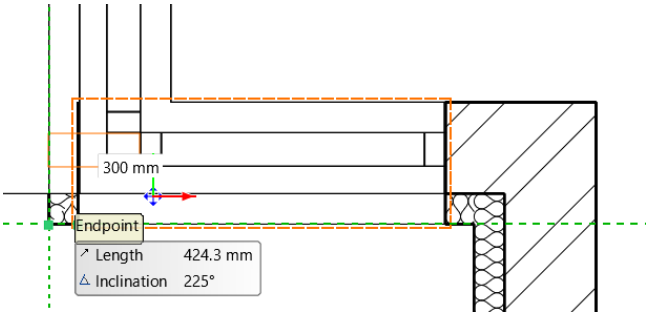
- Switch to the 3D view and zoom in on the corner window. The insulation wall layer we added has not been cut out by the program, so you will need to resize the void.



- Activate the floor plan view. Select one of the windows, and from the local menu, choose the Edit, Resize Void command.




- Modify the width of the void to reach the edge of the wall.



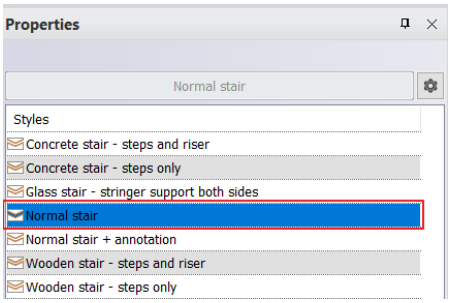

- While still in the command, repeat the resizing for the other window.

# 1.8. Creating stairs

## 1.8.1. Placing the stair

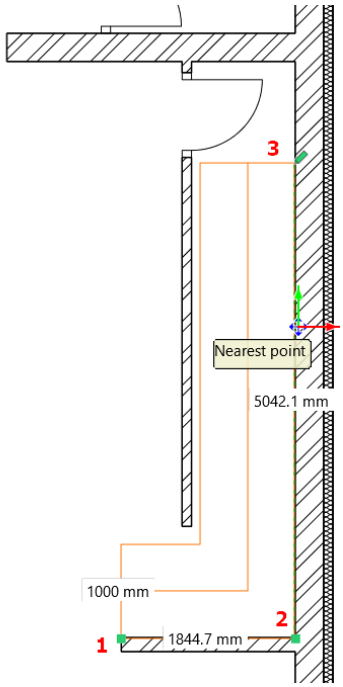
- Activate the floor plan and make sure the Ground Floor is active.

  We will place the stairs on this level.




- Open the **Ribbon / Building / Stair** command. Here you will find the tools needed to create and edit stairs.
- Start the **Building / Stair / L form + landing** command.

  Once the command is started, the Property panel on the left displays the stair styles used previously. You can also use these styles in your work.

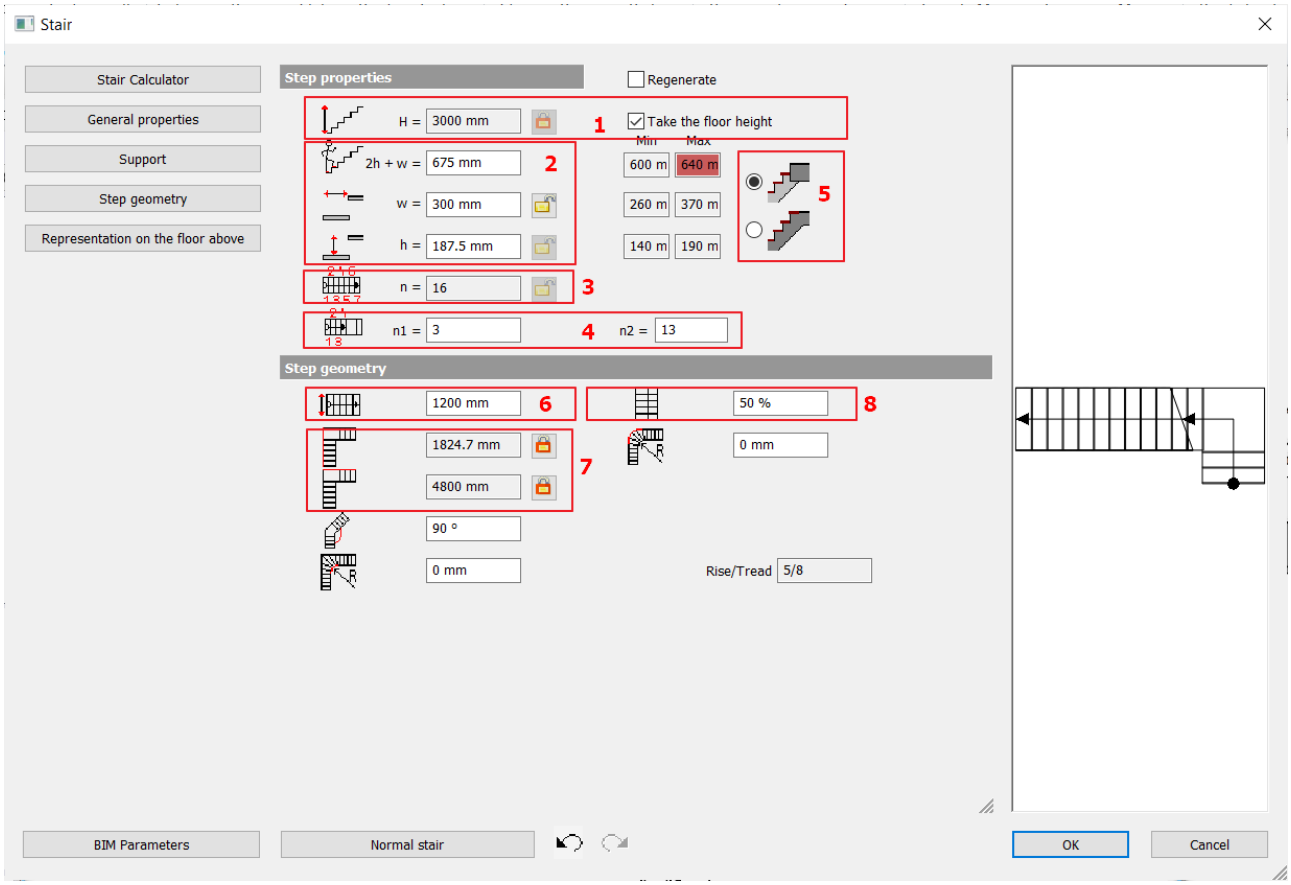



- Before placing the stairs, modify its reference point using the Space bar or set it in the menu above so that the "At left side" option is visible.
- Place the stairs with three points. Specify the starting point (1), the break point (2), and finally the endpoint of the stairs (3).

## 1.8.2. Modifying the Placed Stair's Properties

Let's modify the properties of the placed stairs. To do this, click on any part of the stairs and select the pencil icon from the floating menu.

- After the Stair dialog appears, modify the following values:




### *Floor height (1)*

- Activate the "**Take the floor height**" option so that the staircase's arrival height value is automatically overridden to **3000 mm** according to the project.

### *Action and entry parameters (2)*

We do not change these values; the software automatically calculates them based on the specified height and the number of steps. The staircase is considered ergonomic if these values fall within the minimum and maximum values shown on the right side. If the values exceed the limits, the software displays them in red. The software allows for the placement of a non-ergonomic staircase, leaving it up to the designer to decide whether to adjust the values or not.

### *Number of the steps (3)*

The number of steps is calculated based on n1 and n2 values.

- **n1, n2 (4):** For a winded staircase, n1 and n2 determine the number of steps on the straight section.
- Set the number of steps to **n1: 3 steps** and **n2: 13 steps.**

### *Staircase termination (5)*

You can set whether the last step of the staircase is at the floor level (lower illustration) or the last step itself forms the floor level (upper illustration).

### *Width (6)*

Here, we can adjust the width of the staircase, which is currently set to 1200 mm.

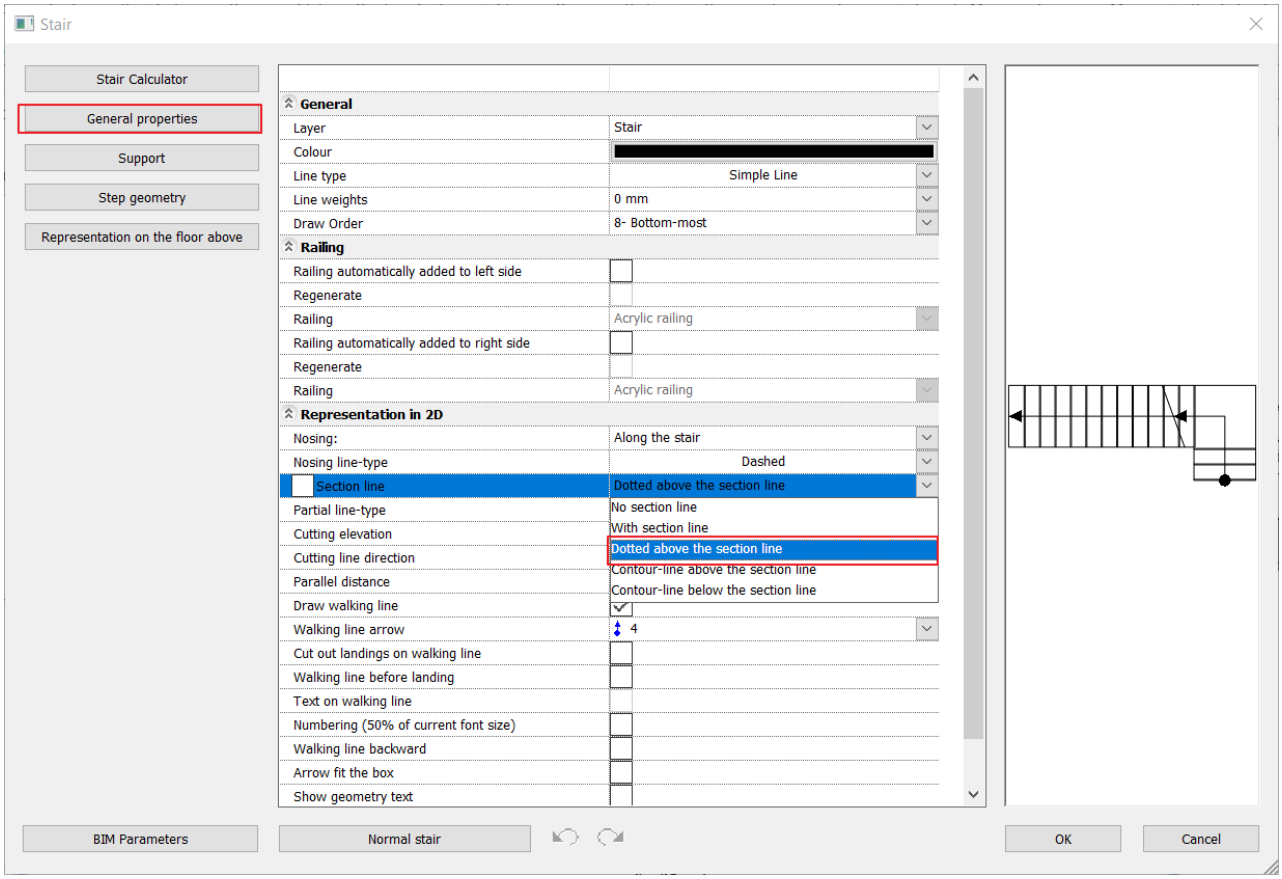
### *Side parameters (7)*

These two values indicate the lengths of the staircase arms. Change the length of the second step to 4800 mm. To do this, unlock the padlock.

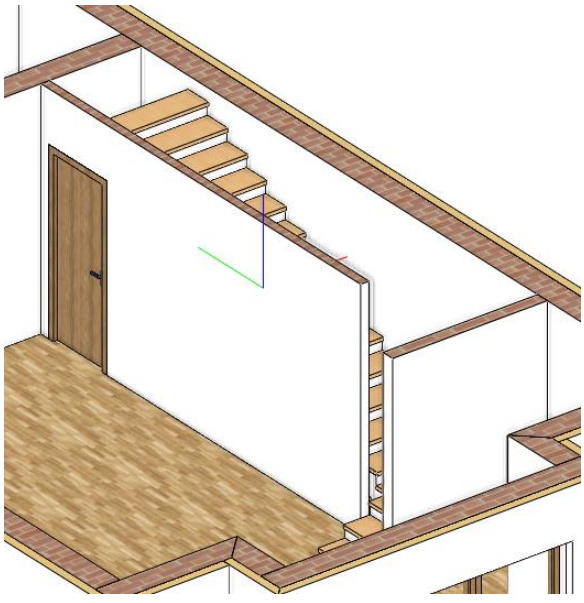
### *Path (8)*

In this case, the value is set to 50%, so the path aligns with the center of the staircase.

- Go to the General Properties tab and change the 2D representation of the staircase above the section line to dashed, then click OK to accept.

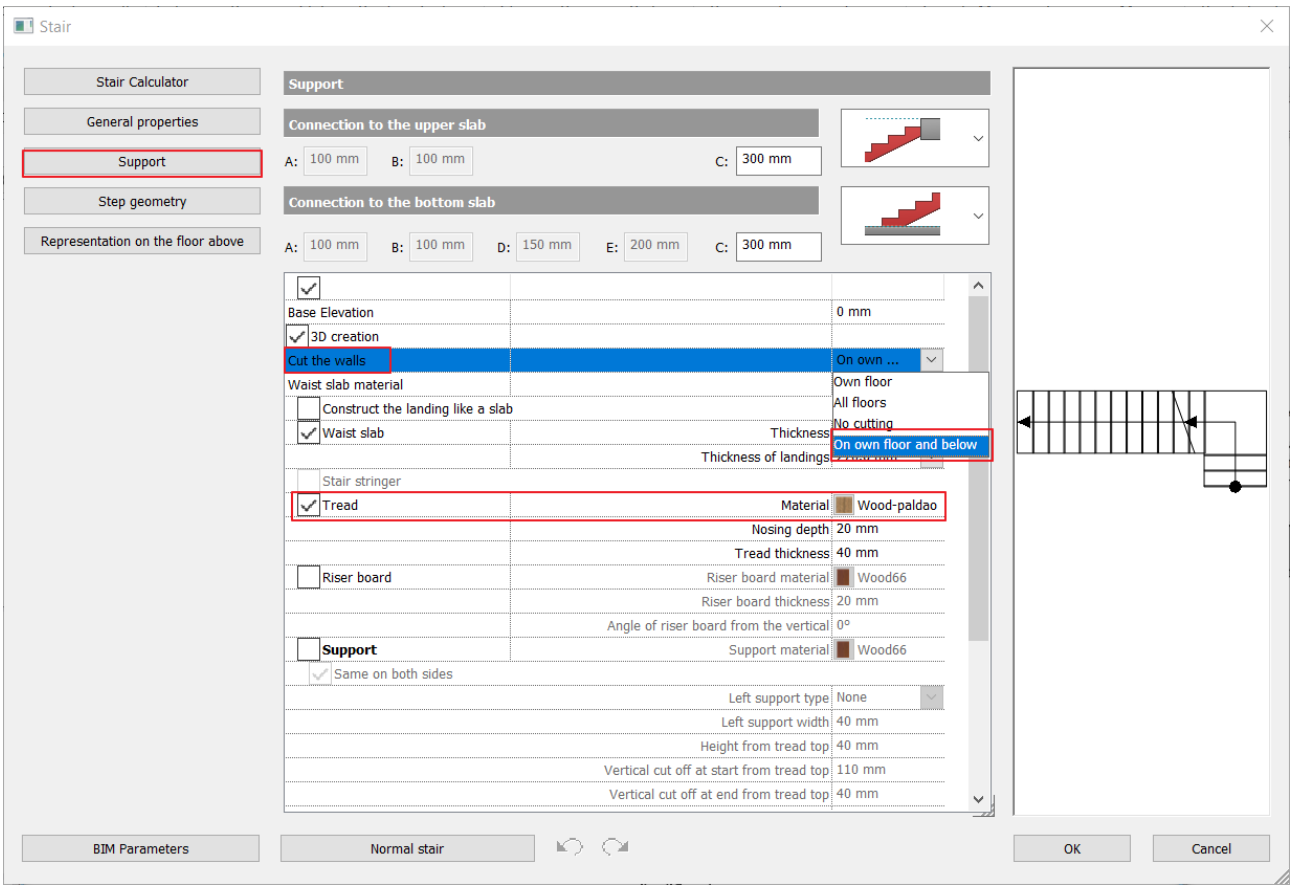



The staircase is completed, but it did not cut the adjacent wall.

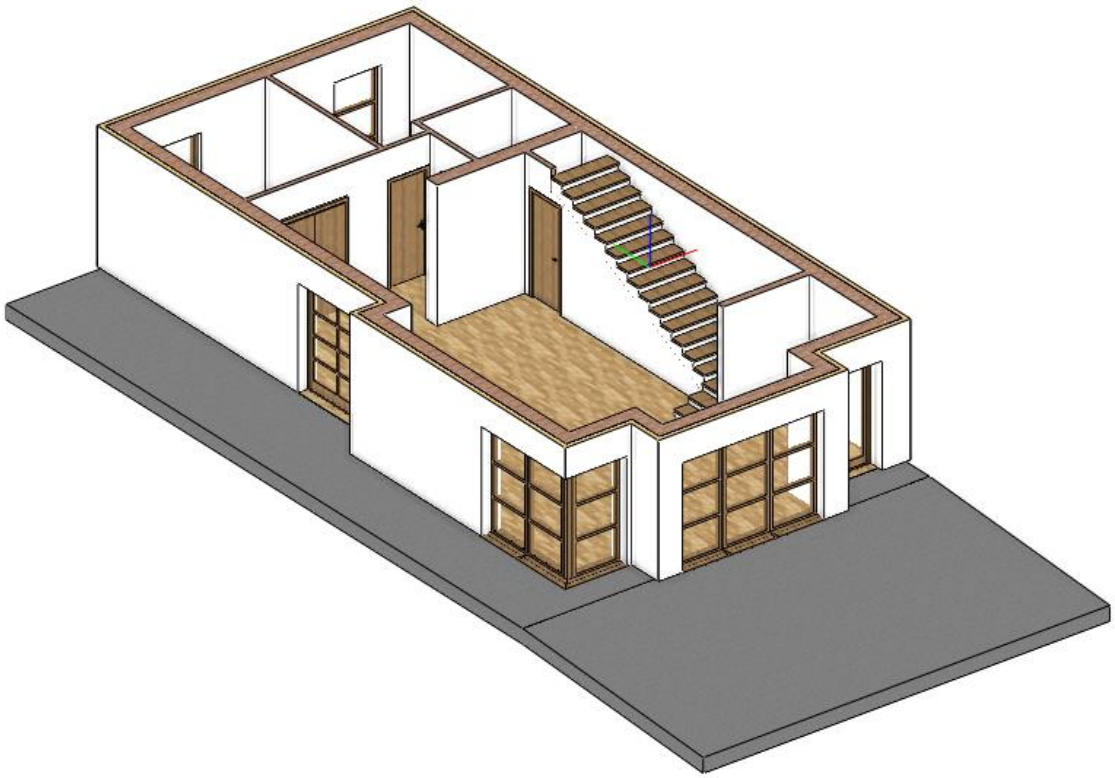


- Go back to the staircase properties, and select the **Support** tab. Modify the **Cut the walls** option to "**Own floor and below**." This way, the staircase will cut the top of the wall.

- Finally, change the material of the tread to the same one used for the doors: "**Wooden-paldao**."




- After making the adjustments, accept the changes by clicking the "**OK**" button. Use the 3D hammer tool to rebuild the 3D model so that the wall cutting takes effect.



# Workshop 2: Multi storey building, working on second floor

# 2. Workshop: Multi storey building, working on second floor

In this workshop we will look at the design of levels and the relationship between layered walls and slabs. We will also create staircase symbols and edit railings on the floor plan.
Before we move on, watch the tutorial video Multi storey building, working on second floor:

## 2.1. Creating the first floor

ARCHLine.XP automatically creates multiple levels when you start a new project. You can import or create the contents of floors. These floors are ready to use and can be fully customized, renamed, deleted; any number of floors can be added to create your own building structure.

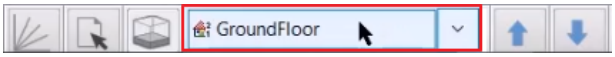
This project requires the addition of a second floor. We need to implement these to create the content of the first floor:

- ❖ Copy ground level to the first floor,
- ❖ Clean up content,
- ❖ Modify the architectural elements.

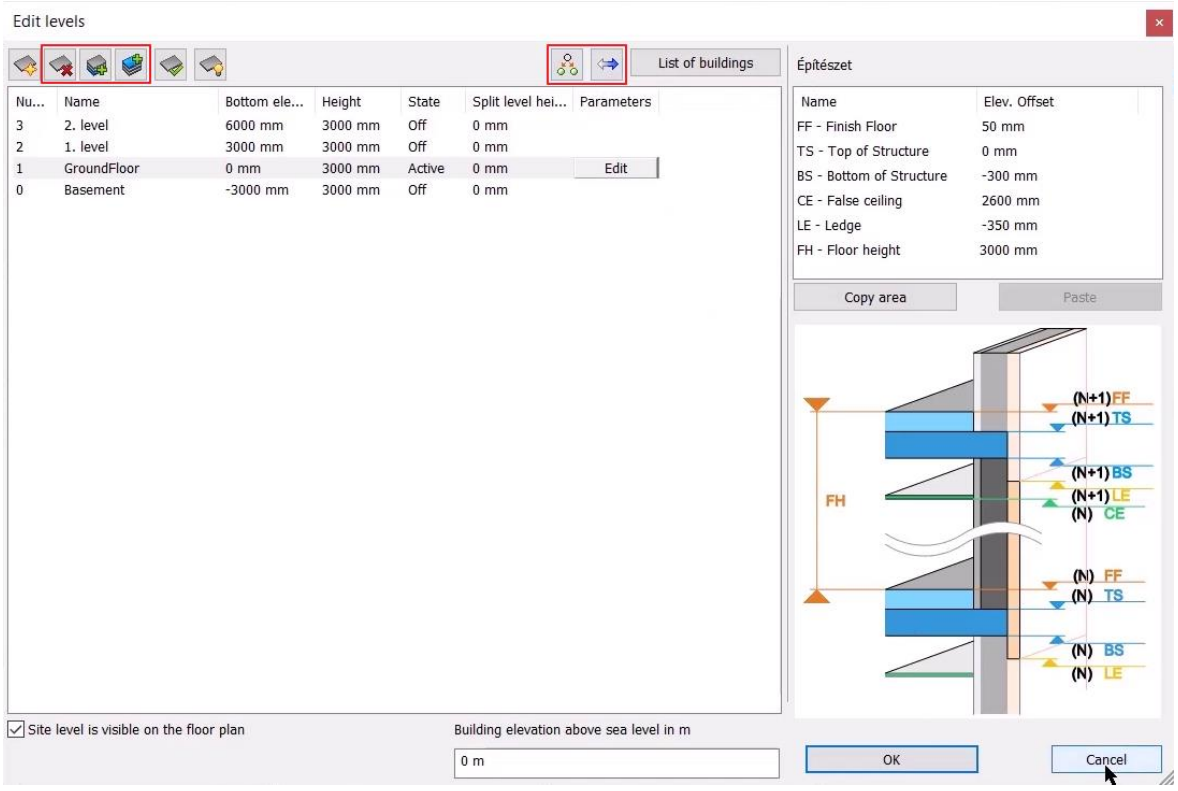
### 2.1.1. Level management

Let's see how we can manage levels in ARCHLine.XP!

- The Level manager is located at the bottom of the status bar. If the 2D view is active, click on the Ground Floor name.



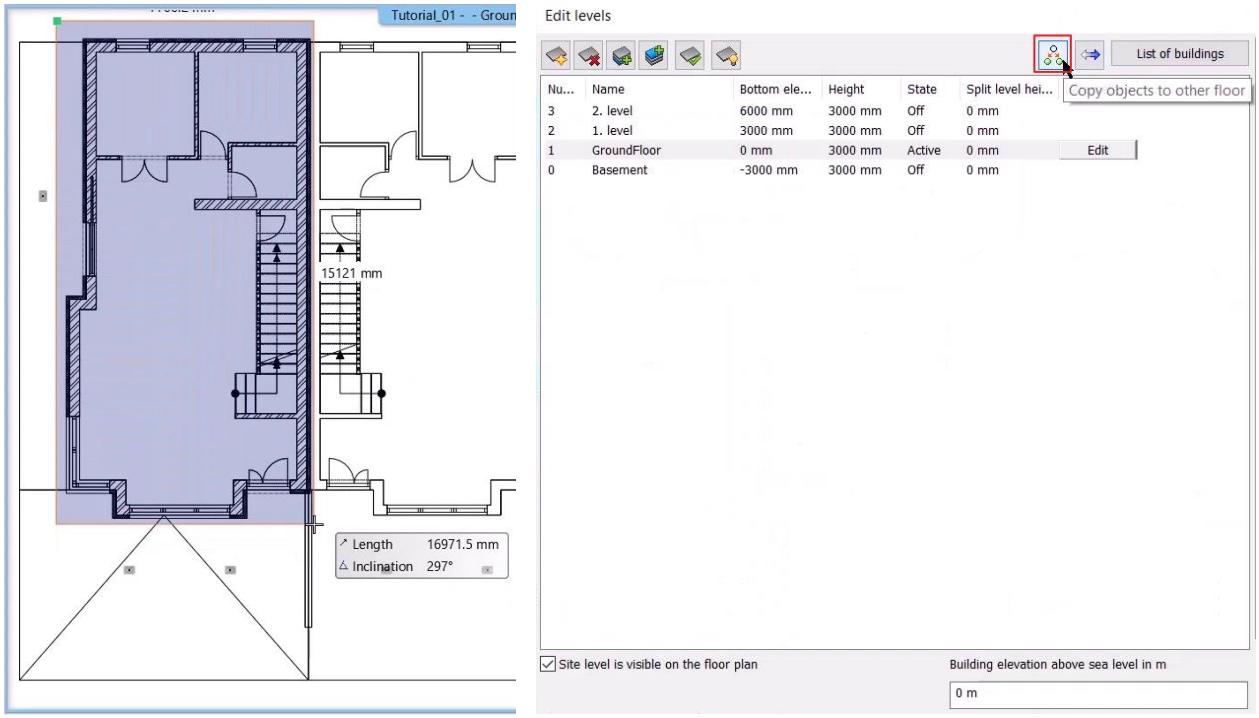

- By default, the program creates 4 levels. Above and below these levels you can insert additional levels or delete them. You can copy or move them to another level with the commands on the right.



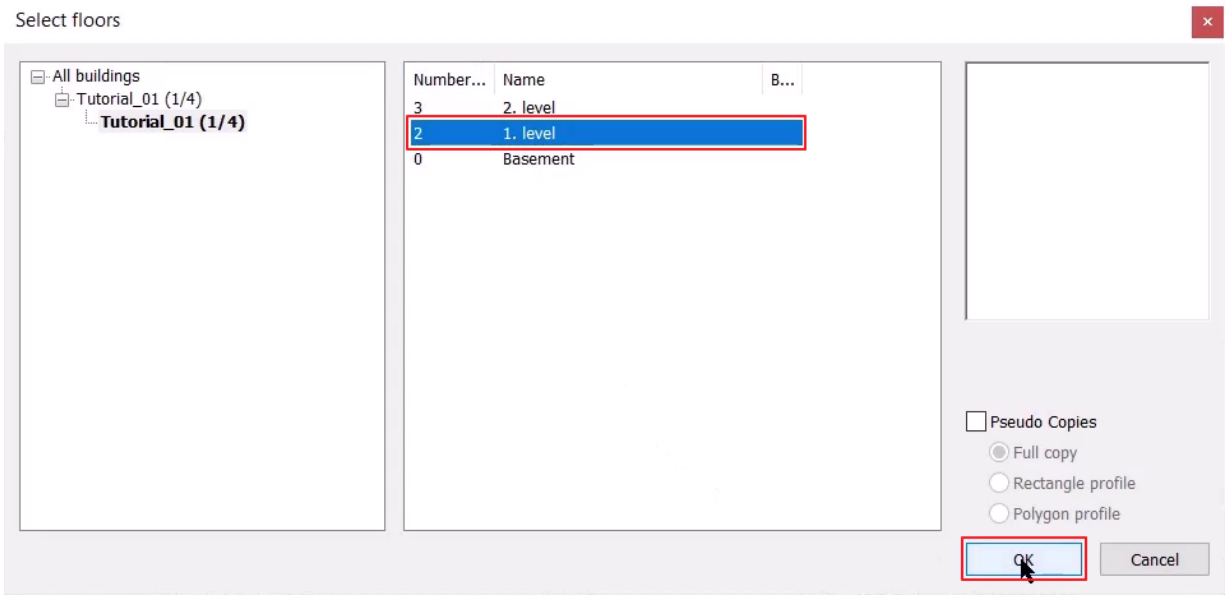

### 2.1.2. Copying the ground floor to the first floor

To speed up the work, it is useful to know that you can easily copy and move items to other levels.
What we have created on the ground floor in this project, walls and windows, will be copied to the first floor, and this is how we will create the architectural elements on the first floor.

- After selecting the floor plan, click the level dialog and select Copy to another level.

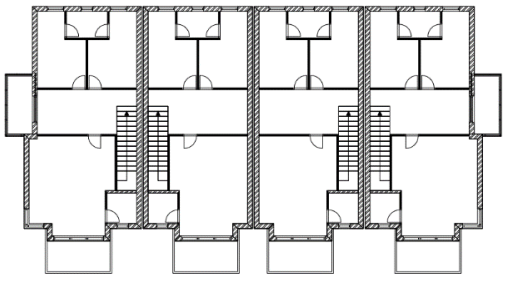



- Then select the level to which you want to copy the selected items. In this project, this will be the 1st Level. OK, I accept.




- This completes our copy for the 1st Level.

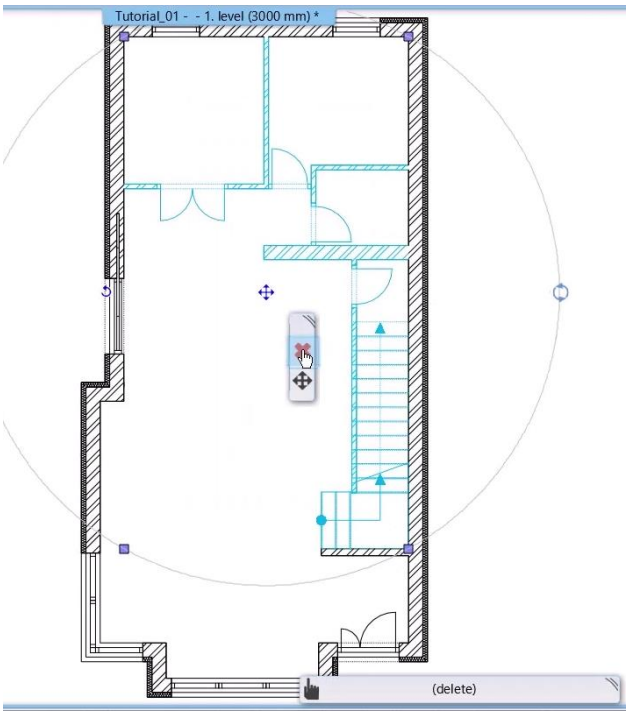
  These levels are completely separate and you can switch between them using the **Page Up** and **Page Down** keys.

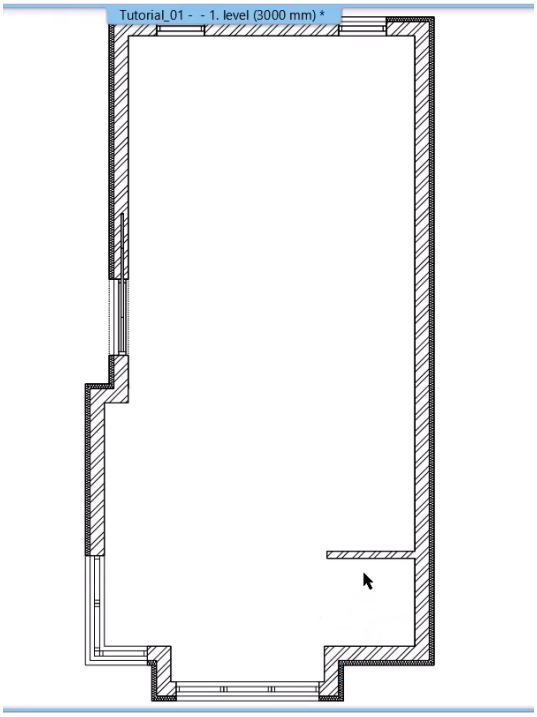


## 2.1.3. Removing unnecessary elements from the floor plan

In the following we will modify the content of the first floor. We will remove the unnecessary elements (partitions, doors and stairs) and create new ones later.

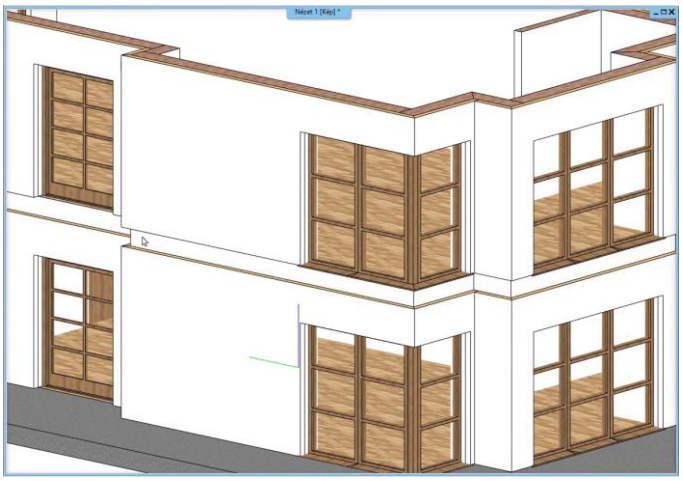
- I'll select the elements by making a left-to-right rectangular selection. I will need this partition wall later, so I remove it from the selection by pressing Ctrl.
- I delete unwanted elements with X.



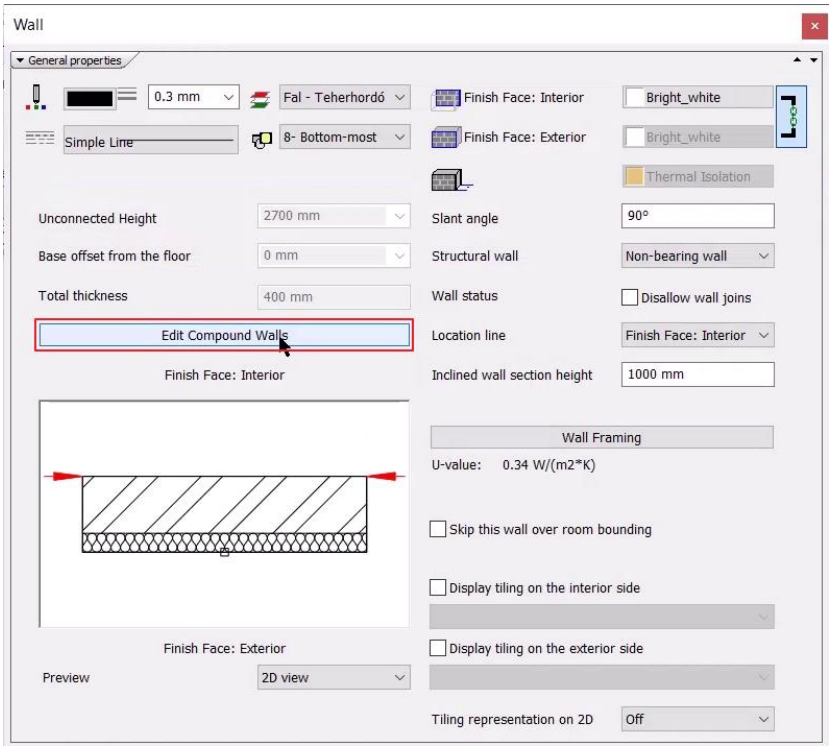

## 2.1.4. Restoration of the thermal insulation layer

In the 3D view you can see that the insulation layer is currently not correct, we want the insulation layer to meet the bottom plane of the slab.

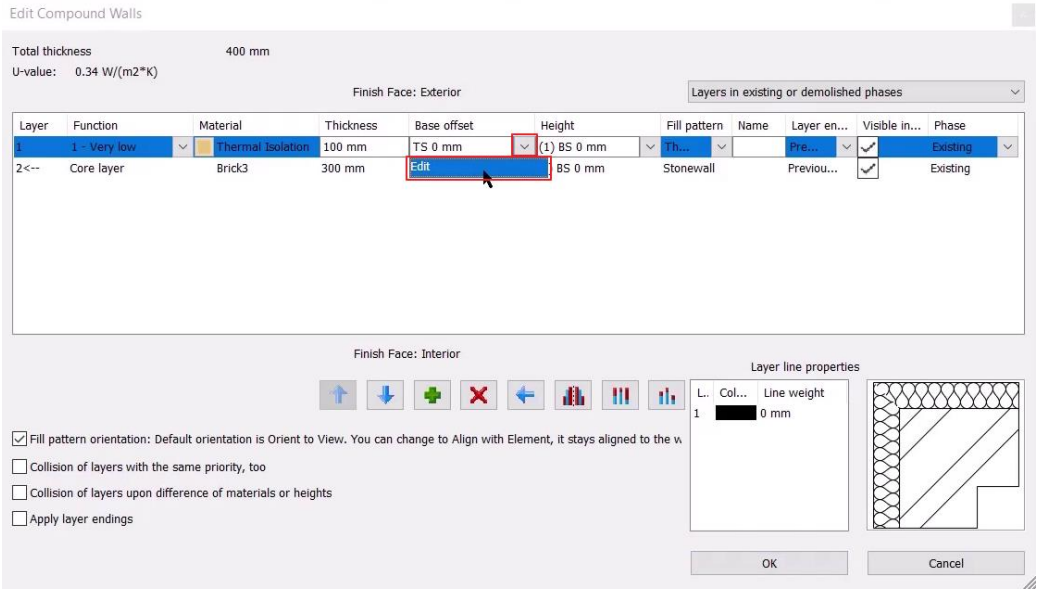


To do this, we need to adjust the base height of the wall layer properties as follows:

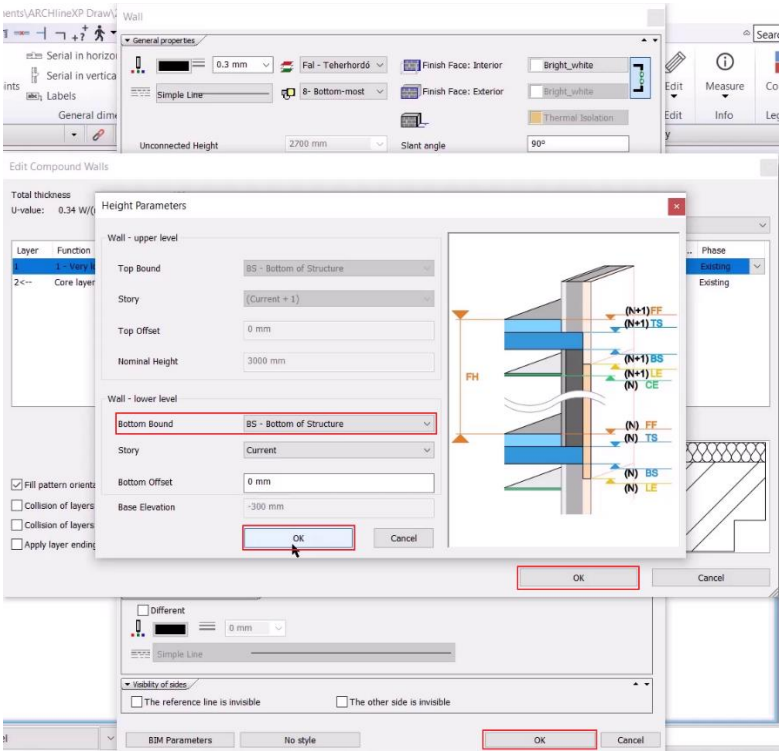
- Go back to the floor plan, then select a wall you want to modify. In the local menu, click on the pencil icon to access the Properties dialog and select the „Edit Compound Walls” option.

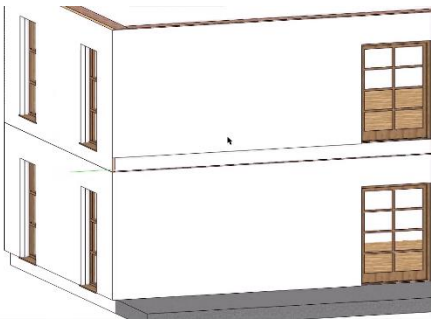



- Currently, the top of the load-bearing layer is selected as the base offset of the insulation, and this will now be changed. Click on the arrow and select the Edit option.

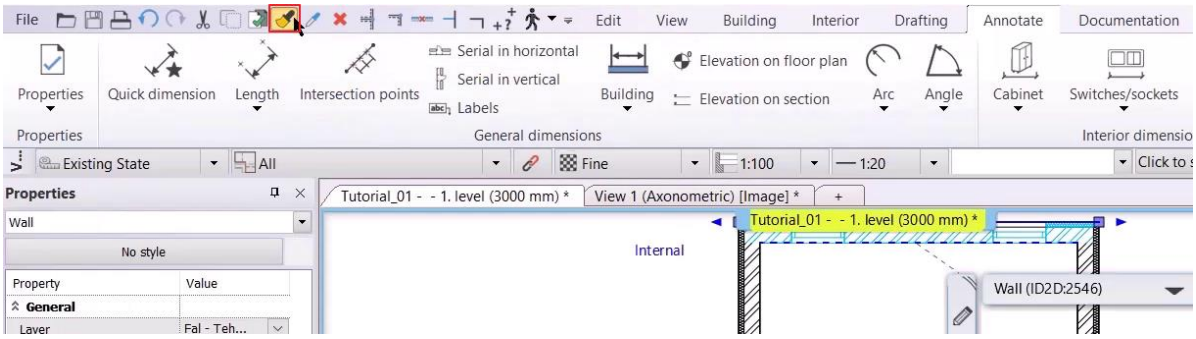



- The diagram on the right will help us in the following. Here you can see that the insulation layer is currently connected to the top of the load-bearing layer (TS). This must be adjusted to align the bottom of the insulation layer with the bottom of the load-bearing layer (BS).
- In the Wall – lower level section, we select BS - Bottom of Structure layer as the Bottom Bound. This way the bottom of the slab and the bottom of the insulation will run in one plane. Okay, I accept all three dialogs.

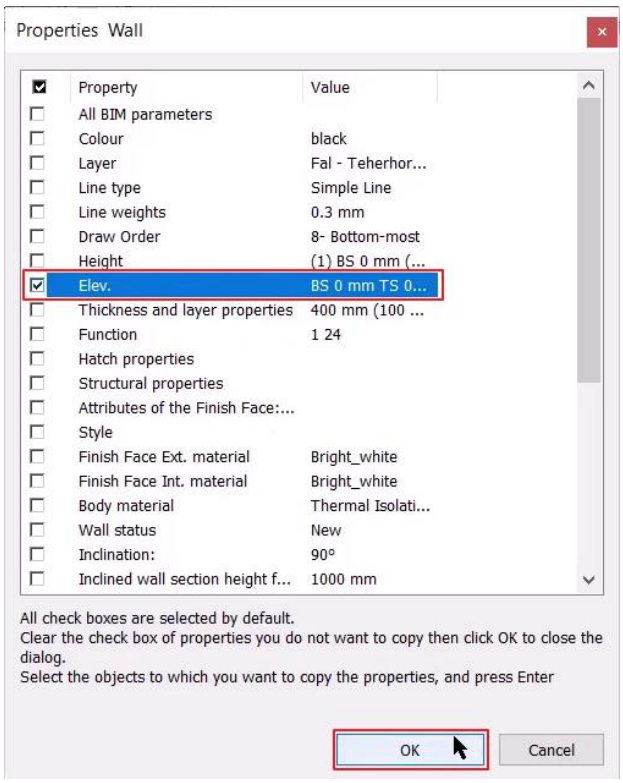


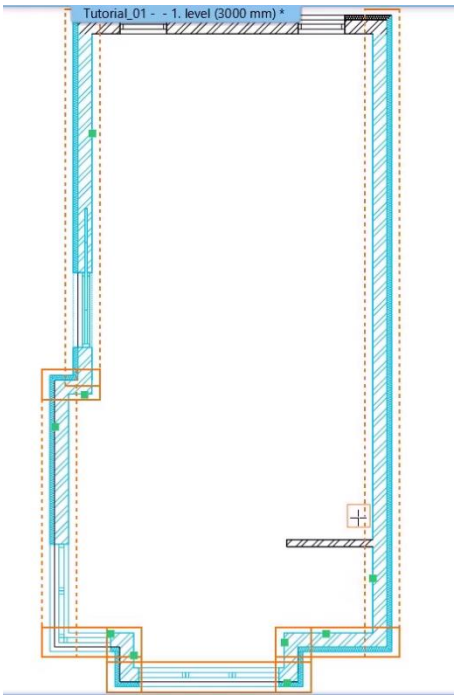



- Let's see the result in 3D. We want to do the same for the other walls.
- Go back to the floor plan. Select the wall on which you have successfully made the modification, and then select the Copy Properties command.




- Specify which parameters want to copy: choose only the Elevation. Select the walls and press Enter to confirm.



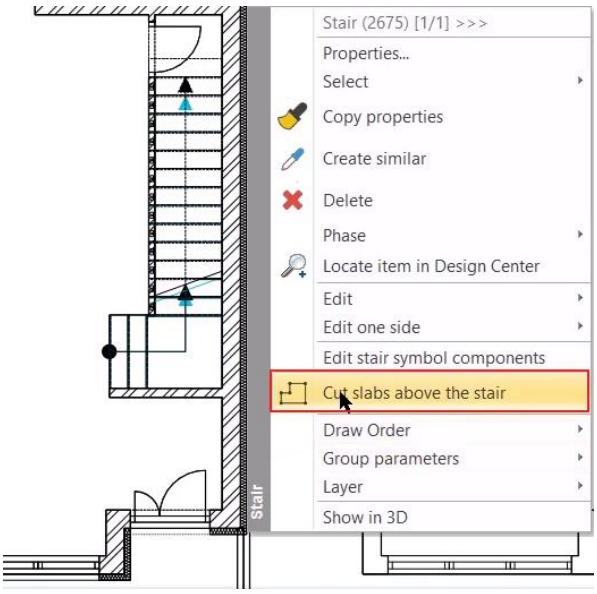

Let's take a look at the 3D model - we have finished the modification! If you don't want to see the line between the two levels, rebuild the 3D model.

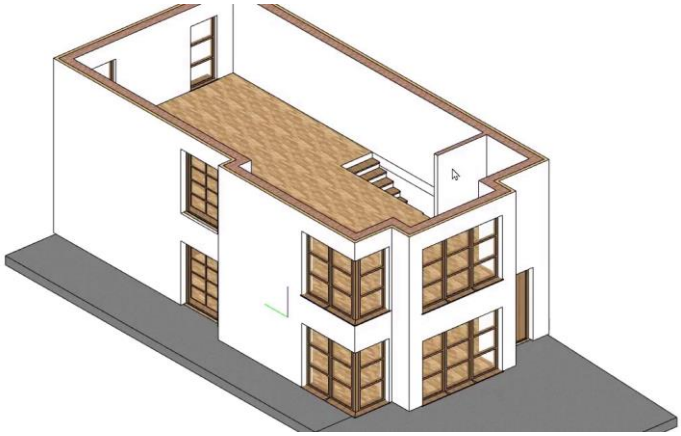
# 2.2. Stairs

## 2.2.1. Opening of the slab above the stairs

Since there is a staircase from the ground floor up to the first floor, we need to design the opening in the slab. The slab opening can be drawn manually following any contour line, or using an automatic solution, the software will calculate the optimal slab opening shape above the stairs based on the stairs already created. We will now use the automatic creation.

- Switch to the floor plan view, then make sure that the ground level is the active level.
- Click on the staircase and from the local menu select "Cut slabs above the stair" command.
- The program automatically creates the opening, which you can see immediately in 3D.

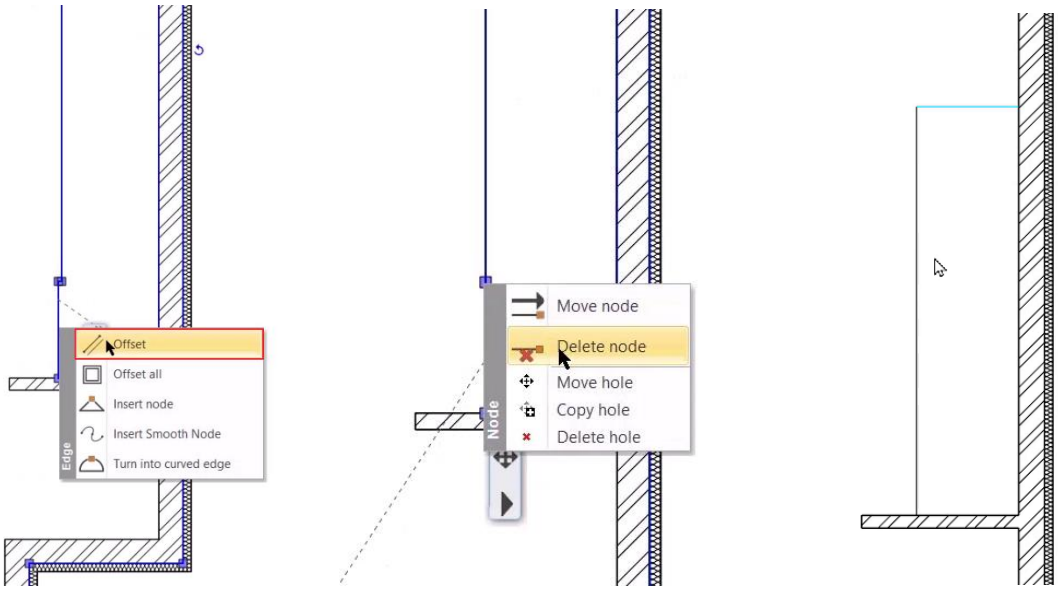


***Edit slab opening***

Edit the slab opening to get a completely rectangular slab opening.

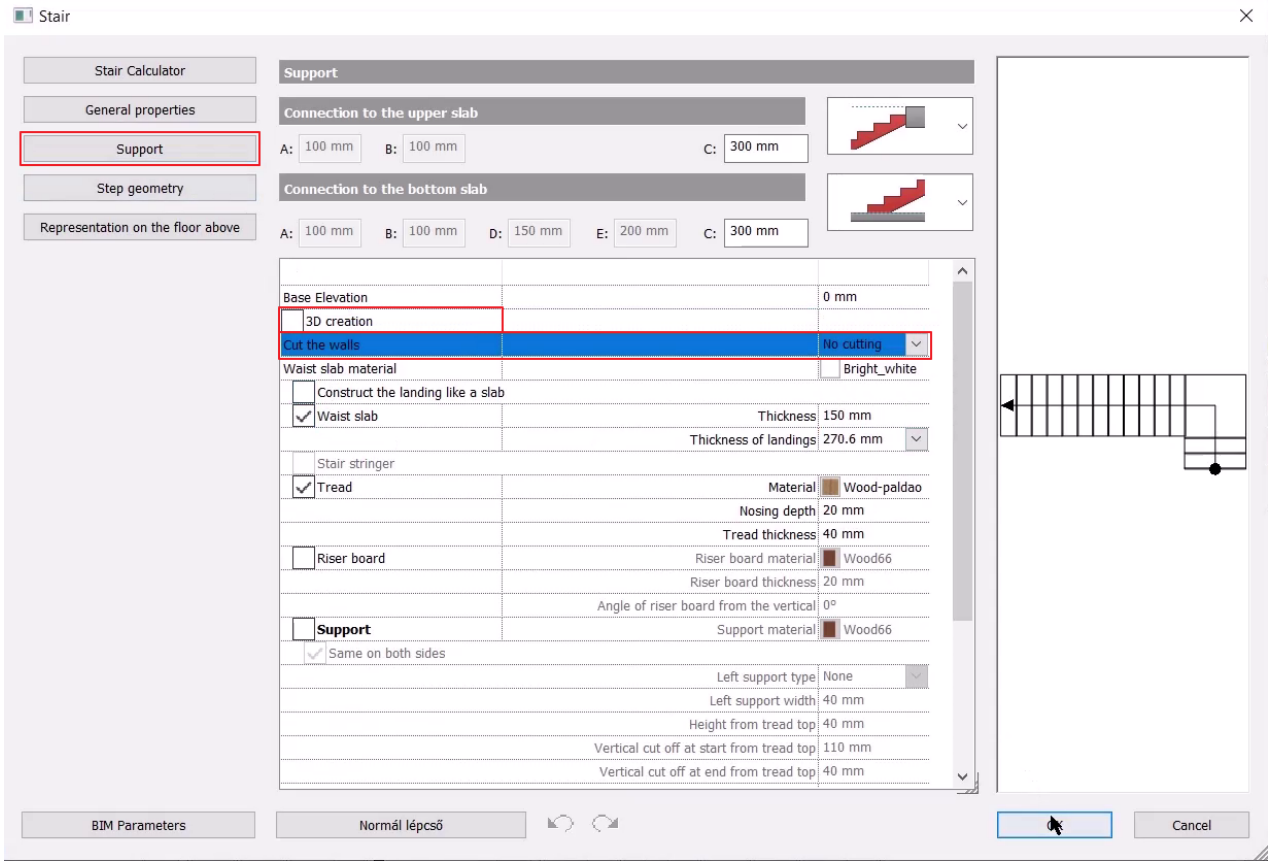
- Select the first level to highlight the slab opening, then click on the edge marker and select the Offset command. Pull in the edge as a continuation of the longer edge, and delete the unnecessary node using the Delete Node command.

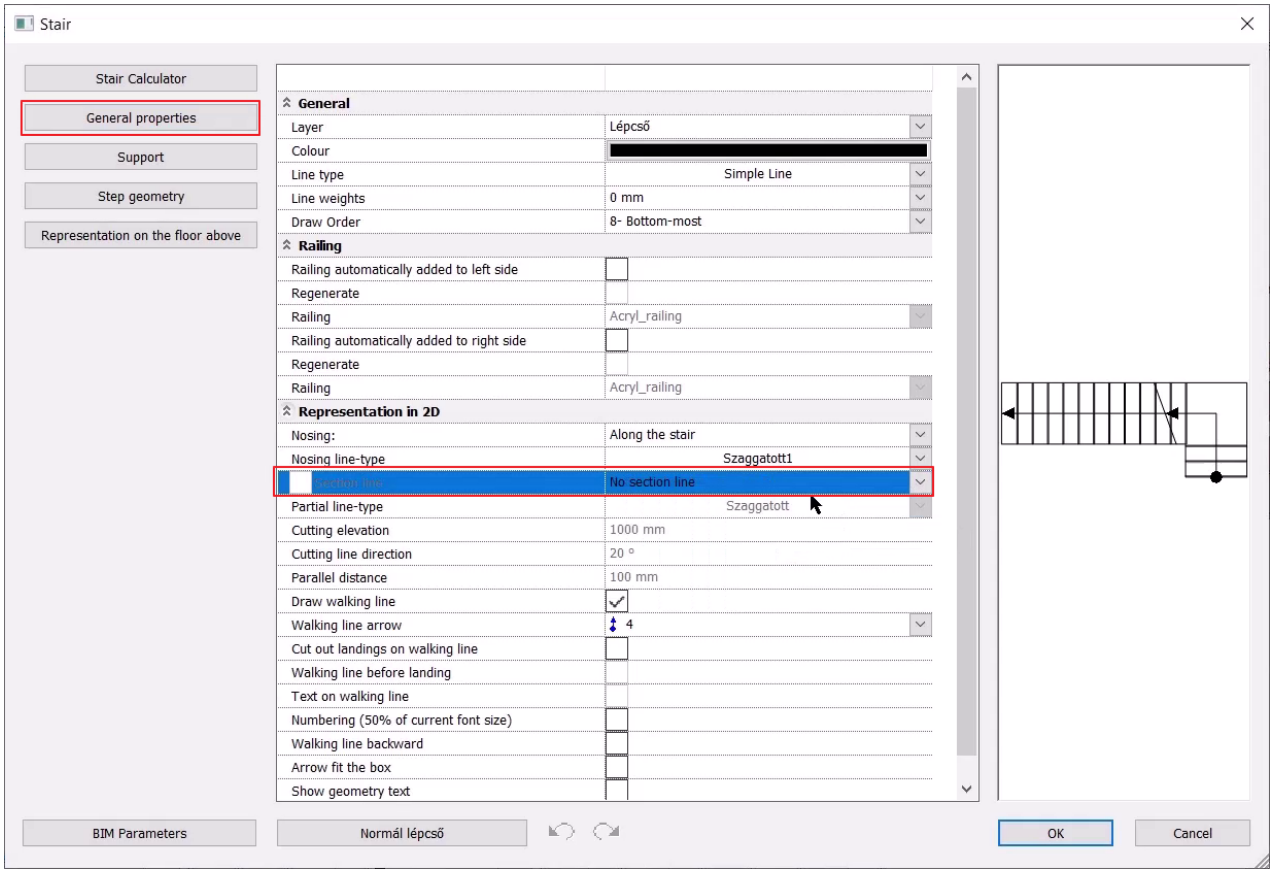



## 2.2.2. Symbolic representation of a staircase on the first level

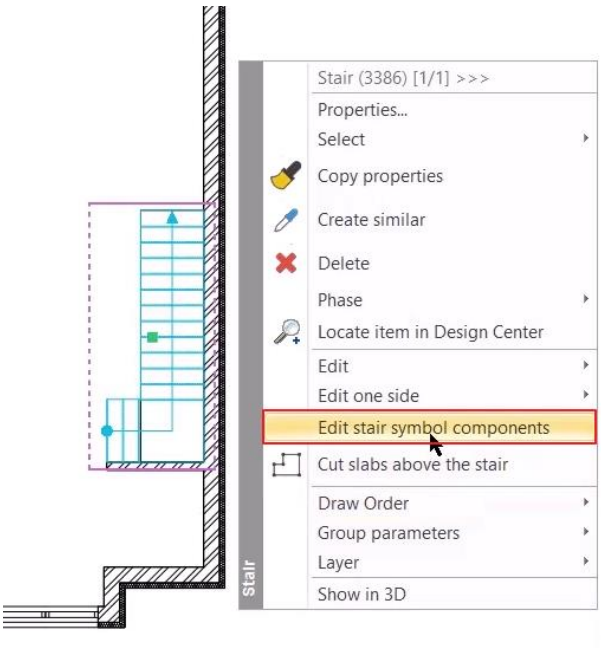
On the first floor, we also need to visualize the staircase. To do this, we need to do the following:

- Go down to the ground floor, select the staircase, then click on the Level manager and select „Copy object to other level" command.
- Copy the staircase to the first level.
- In this case, the stairs will also appear in 3D, but we don't need this, we just want to keep the floor plan representation.
- Go to the properties dialog of the staircase and in the **Support** tab, turn off the **3D Creation** option and set the Cut the walls to "**No cutting**". And in the **General Properties** tab, set the option to have **no section line** on the stairs, so you get the correct plan view.

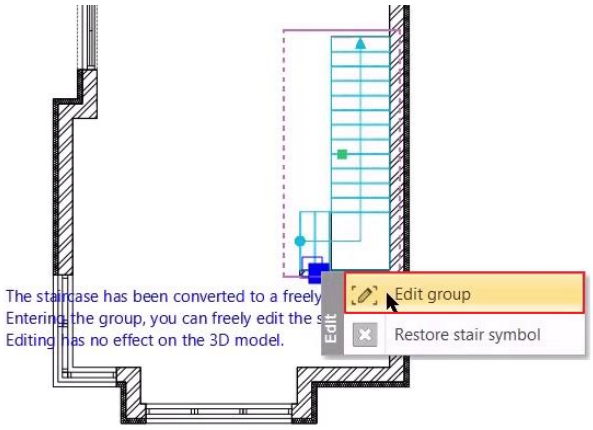


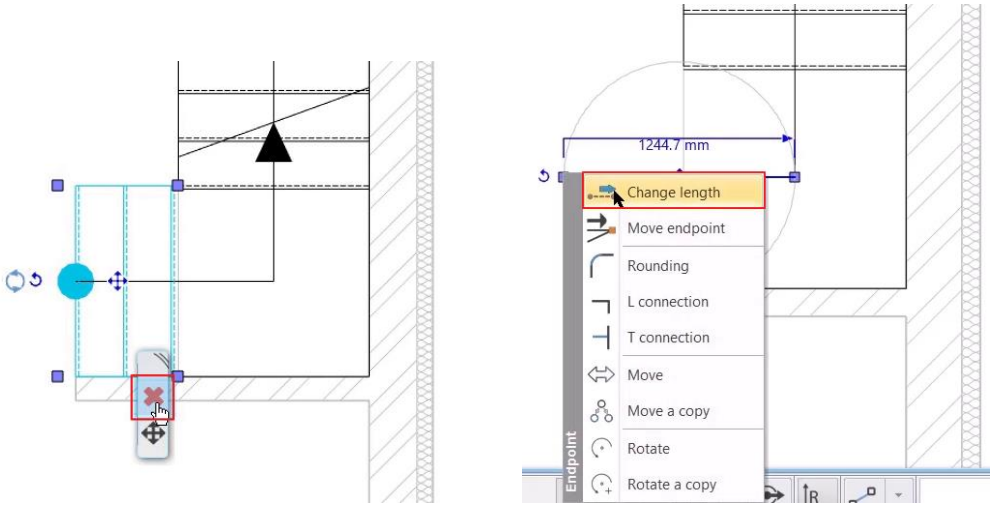

- We have finished setting up the stairs. We accept with OK.
- Also change the representation of the stairs on the first floor, as the first two steps are not visible on the upper floor. To do this, click on the stair and select "**Edit stair symbol components**" from the local menu.



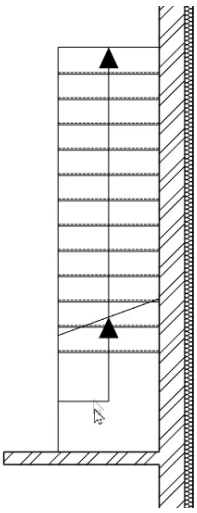

- The staircase on the floor plan converts to a freely editable group, where you can enter and edit the staircase components as 2D elements (lines, text, etc.). Click on the icon to edit the group.




- Delete the lines of the first two steps of the staircase and change their length.




- When you have finished making changes, right-click on any element on the staircase and from the local menu choose Close group command.
- When you exit the group, you will see the modified symbol of the completed staircase.

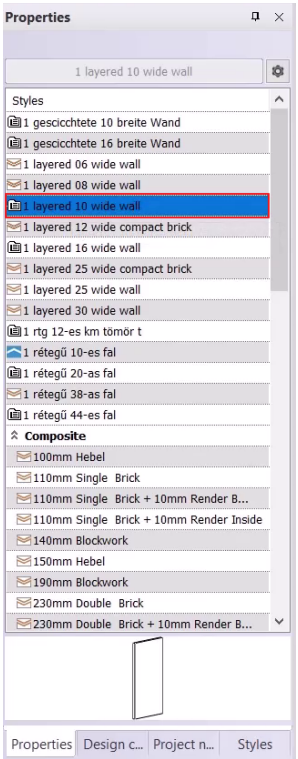


# 2.3. Partition walls

## 2.3.1. Wall drawing

In the following, we will edit the partition walls of the first floor. Here we could import the DWG drawing as we did on the ground floor, but now we will use a different method to draw the walls.

- Select the Building menu - Wall tool!




### *Wall styles*

You can work with different wall styles, which are displayed on the left after you start the wall command. The preview window informs you which wall styles you are working with. Whenever you start an element creation command (e.g., wall, door, window, etc.) the Properties panel appears on the left and displays all the element styles.

- We will now use the 1 layered 10 wide walls:

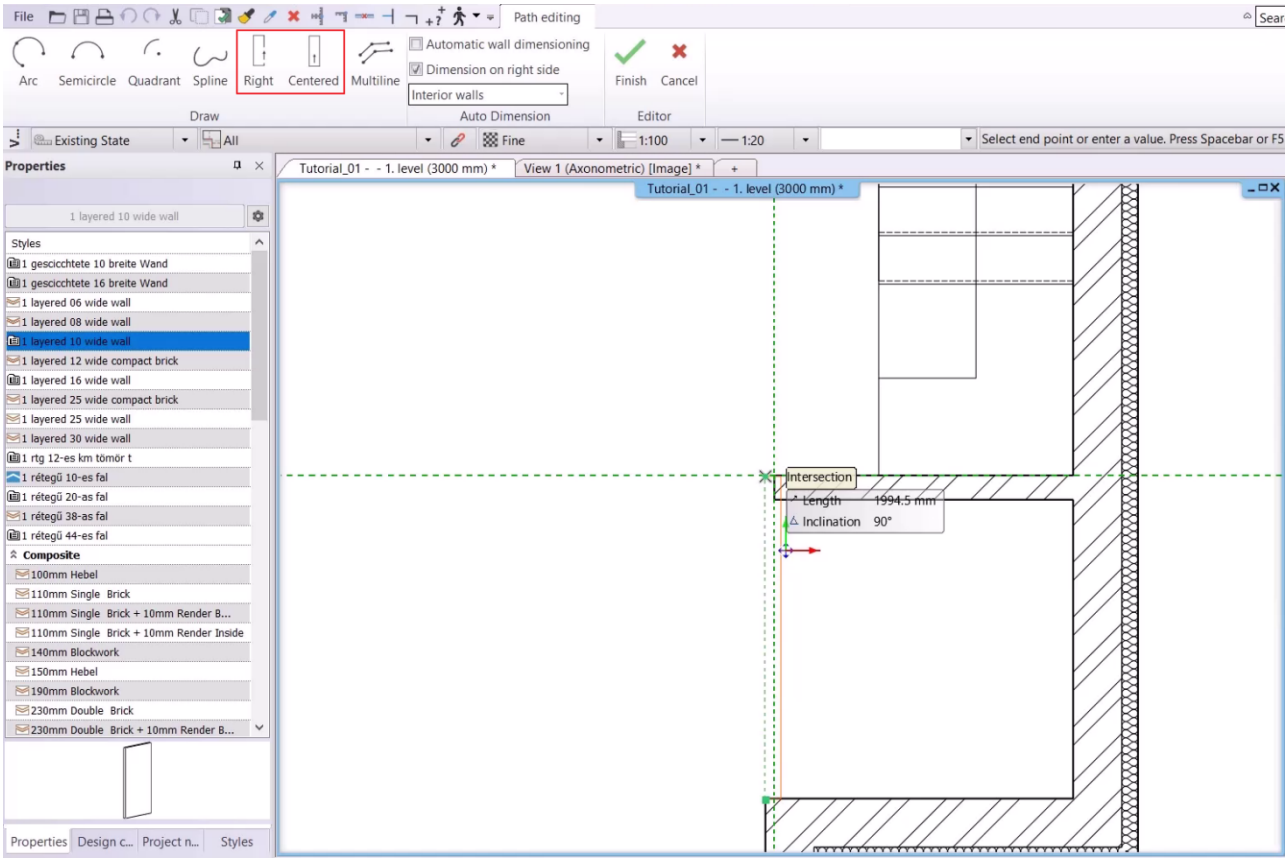
### *Reference line*

For the wall starting from the corner point, you can see that a blue line appears in the middle of the wall, this is the reference line. With this reference line we can specify the position in which we want to draw the wall.

There are 3 ways to switch reference lines:

- ❖ On top in the menu bar with **Left**, **Right**, or **Centered**,
- ❖ Pressing the **Space** on the keyboard,
- ❖ Or by pressing **F5 key**.

- Now we need the reference line to be on the left, so let's switch to that.
- When connecting to the wall, you can use the alignment lines, which are automatically indicated by a green dashed line. This makes it easy to connect the walls correctly.
- By holding down the **Shift** key, the program locks the direction, so you're sure you're not creating a slanted wall.




### *Automatic wall dimensioning*

The program allows you to automatically dimension the walls.

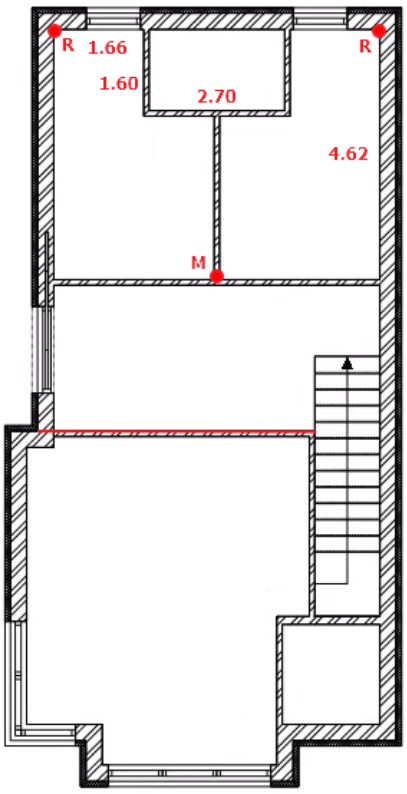
- Select **Annotate - Building - Automatic wall dimensioning**.
- Start drawing the vertical wall next to the stairs in the usual way using the Building - Wall tool.
- When the first section of wall is created, you will see that the automatic dimensioning is immediately generated.
- You can even turn this off while drawing by using the Automatic wall dimensioning option on top. Turn it off, then continue drawing the walls.
- Dimensioning is not needed in this project, so we delete it.

## 2.3.2. Partition walls on the first floor

Based on what you have just learned, proceed to create the partition walls (1 layered 10 wide walls) using the Building - Wall command:

### *Continuing the wall drawing*

- Starting from the top left corner of the building, you need to create the next wall. To do this, we use the Reference Point , which is available at the bottom of the Status Bar. We click on the top left corner, then move the cursor to the right and enter the distance: **1.66**. This will be the starting point of the wall of the room.
- I move the cursor down and enter the length of the wall: I type **1.60**. I accept it with Enter.
- I move the cursor to the right, enter the length: **2.70**. Enter.
- Then I close the room upwards by holding down the Shift key.
- The next wall is a horizontal partition wall, running the full width of the building. For this we also use the Reference Point. I click on the command, then place the reference point in the top right corner of the building. I move the cursor vertically downwards and enter the value **4.62**.
- From here I draw the wall horizontally across the entire width of the building.
- The last partition wall shall run vertically upwards from the midpoint of the wall just created. If you move the mouse roughly to the center of the wall, the program will automatically mark and print the midpoint. The wall is started from here and then connected to the opposite partition.
- We have finished drawing the partitions.

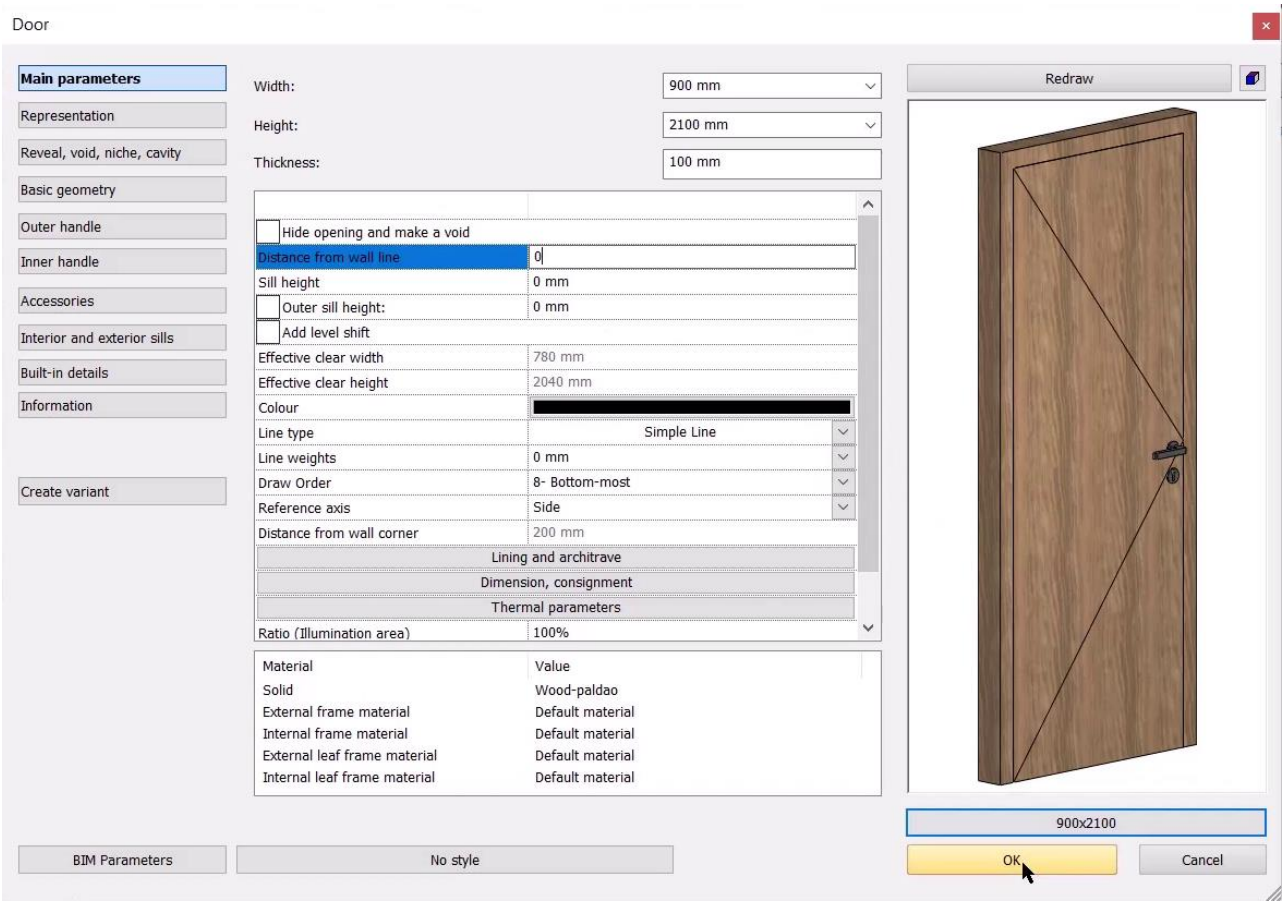



# 2.4. Openings: doors, windows

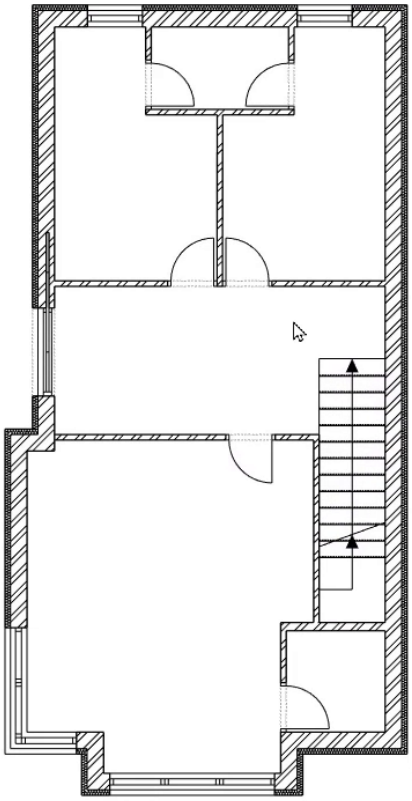
## 2.4.1. Doors on the first floor

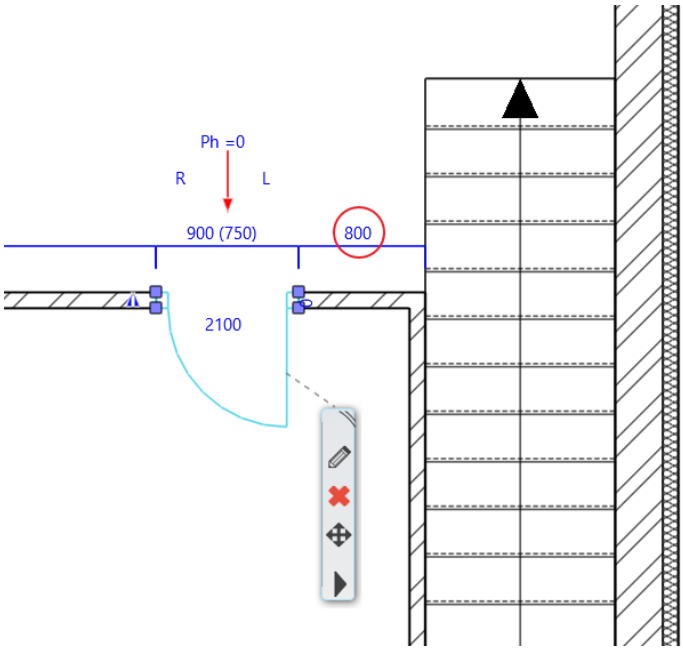
Since we have not imported the DWG drawing for the first floor, we will use the **Placing door** command instead of the Door by two points command. Here we can also set the door properties in advance.

- Right-click on the Door command and select the Property option.
- Start with the settings you see here to place the doors, which you will be able to edit later.




- Place the doors using the Building - Door - Placing door command.
- The reference point is indicated here by a green pencil, which can also be set using the space bar, depending on which point you want to use to place the door. As a reference point, you can specify a seeded point on the floor plan, or you can specify a distance, similar to the previous option.
- After placing it down, the opening direction must be determined using the mouse.
- Place all the doors as shown in the following image. For the horizontal partition, place the reference point on the right side of the door and 0,8 m from the wall.

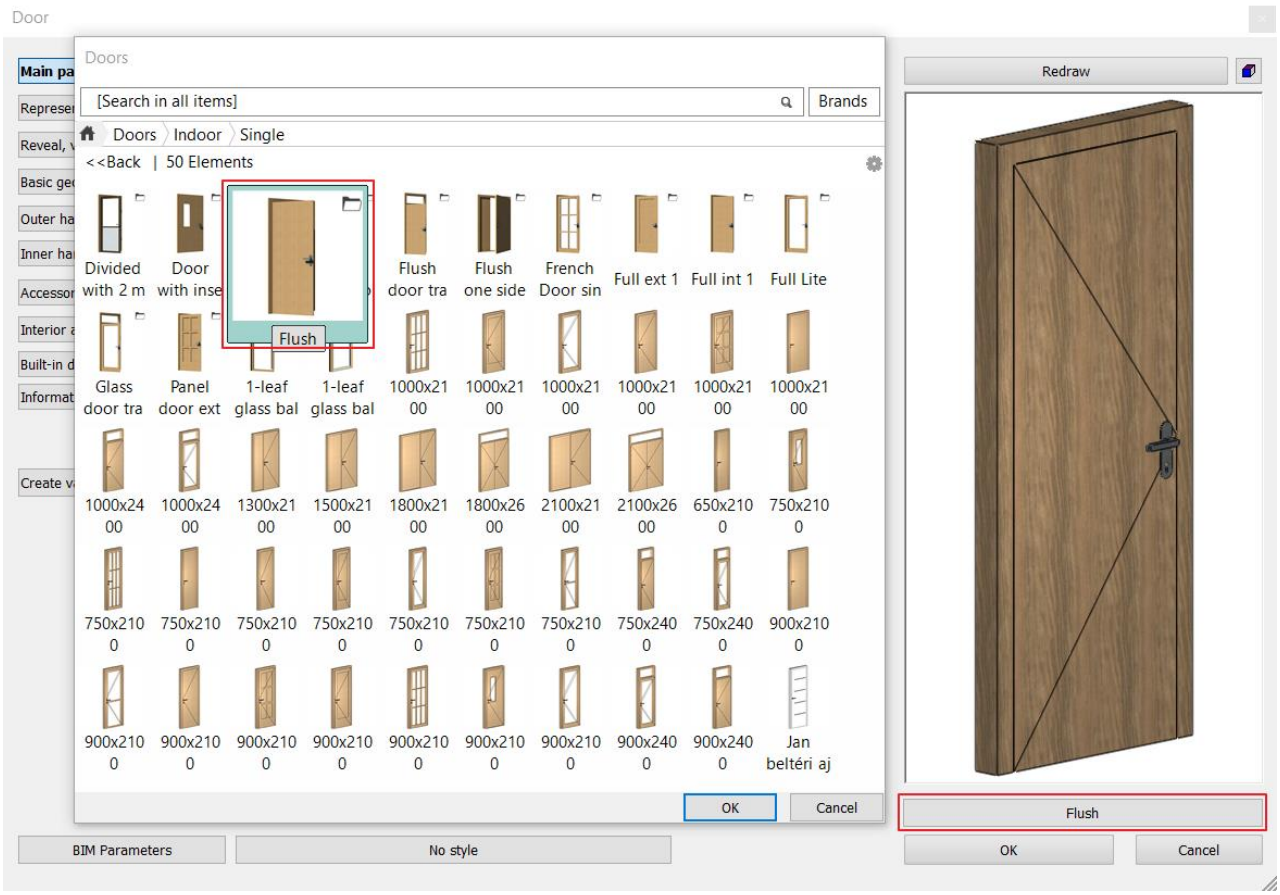




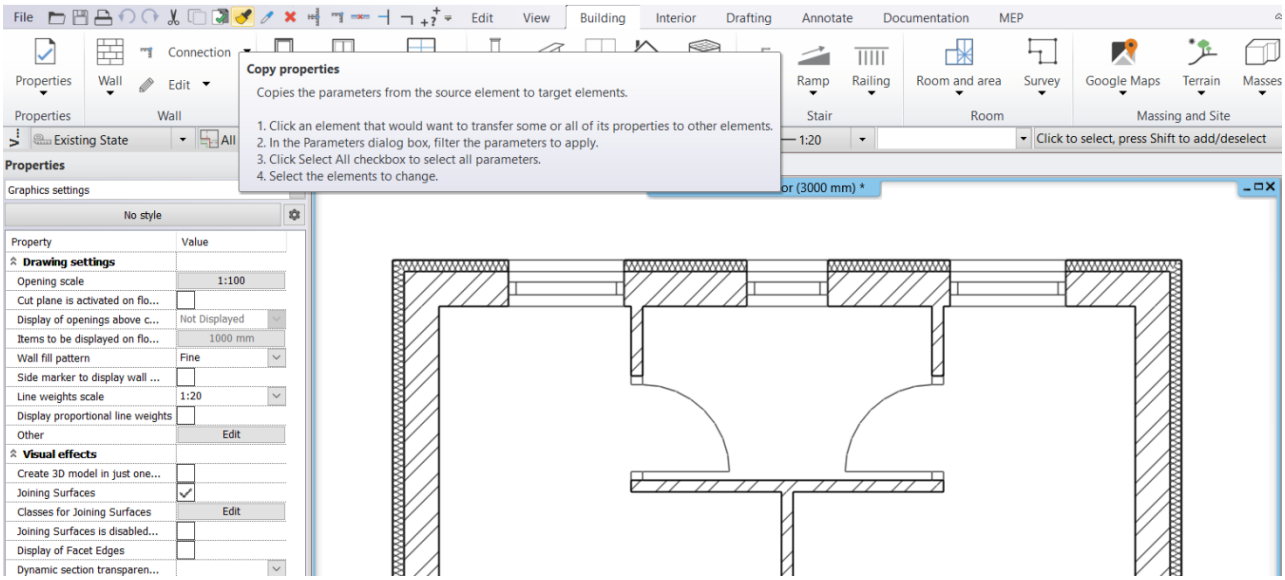

## 2.4.2. Modifying doors

***Bathroom:***

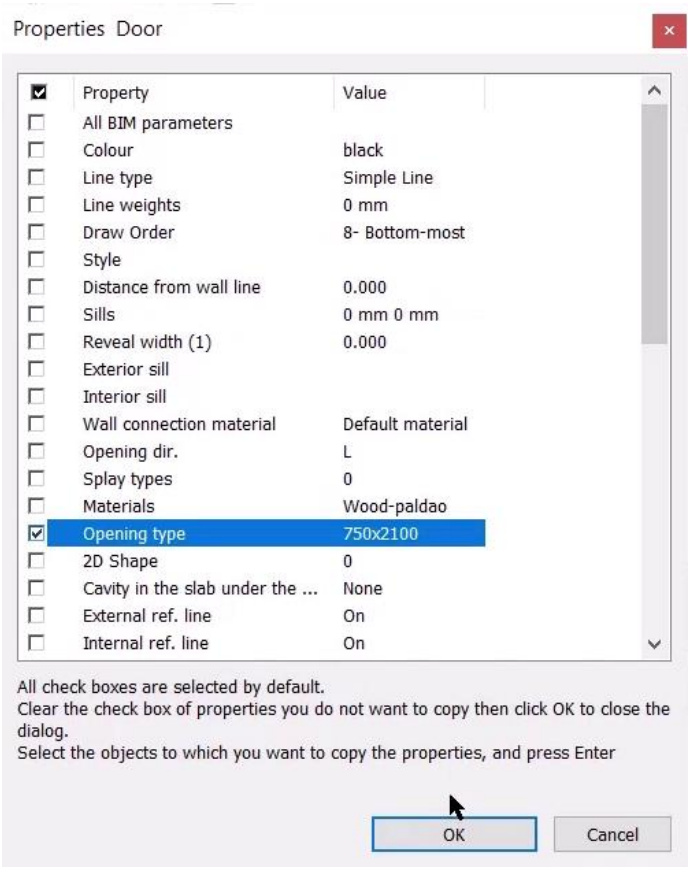
- Change the width of the two bathroom doors!
- We could do this either on the floor plan or in Properties on the left, but for now we'll use the variants again.
- Click on the door, then on the pencil icon.
- Click on the name of the door and you will see a folder icon appearing, indicating that multiple variants of this door type have been created. Let's choose the 750x2100 one.
- The program asks if I want to keep the previously set dimensions. We answer no and then accept with ok.




- The door on the left is finished. We want to modify the right door as well, which we can do simply by using the Copy properties.



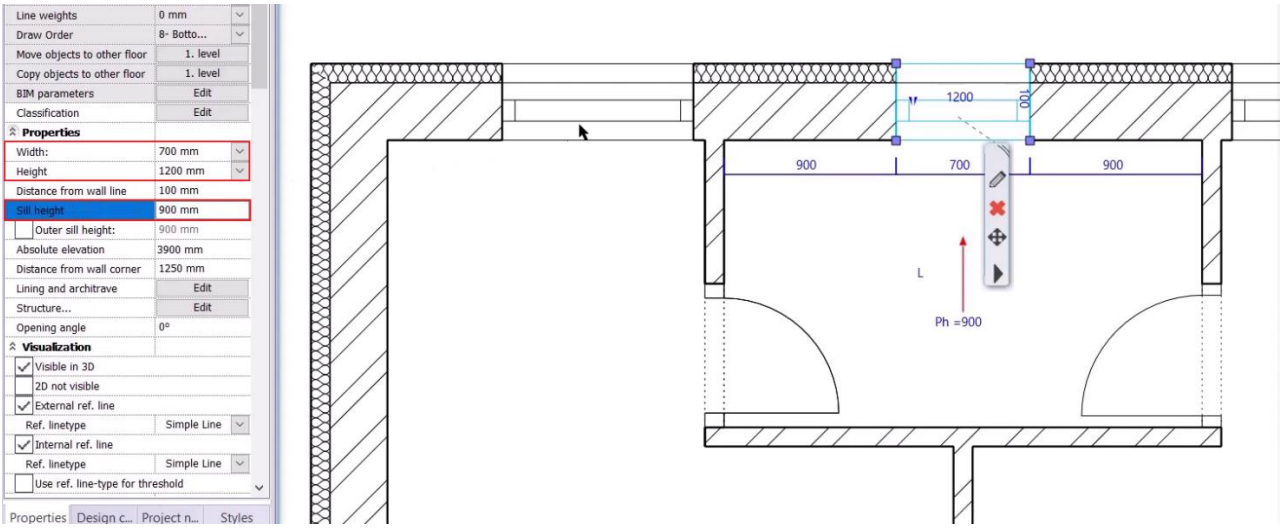

- Click on the command, then click on the door whose property you want to copy.
- In the pop-up window, we specify that we want to copy the *Opening type*, and then select the door we want to modify. Press Enter to accept, and this door is created.



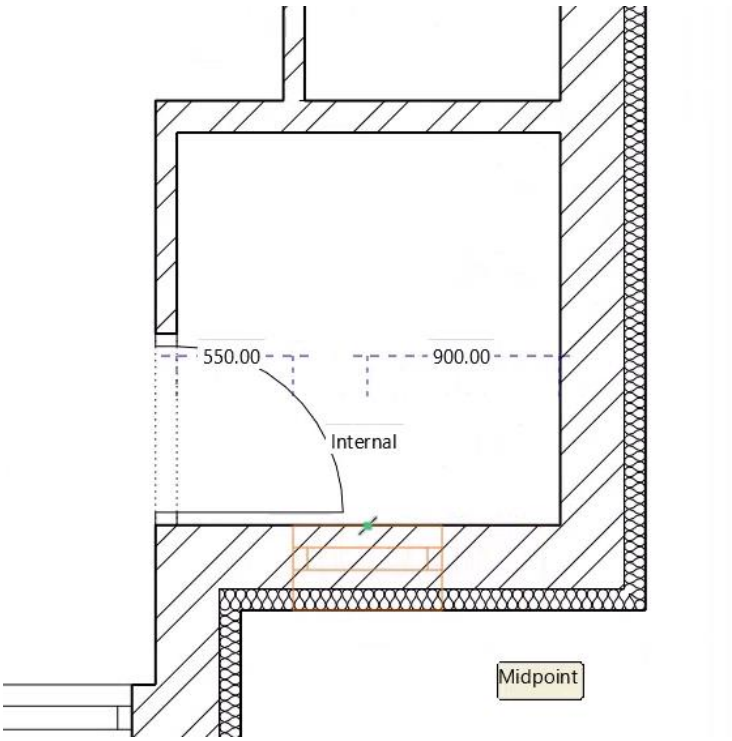

## 2.4.3. Windows on the first floor

There are two windows on this floor which are similar to the windows already made, but of different dimensions. Let's learn the method to create a new window by copying the properties of an existing window using the "**Create similar**" command.

- Activate the layers of the first floor plan in the Layer manager.
- Select the window you want to create a similar one and choose "**Create similar**" from the floating menu by clicking on the black arrow.
- Move the cursor to the center of the section of wall where you want to place the window, then use the space bar to move the reference point to the center. This will find the mid-point of the wall section and place the window there.
- Select the new window and change its properties: width: 700 mm, height: 1200 mm, parapet height: 900 m.




- Once this is done, use the Create similar command to copy this window to the storage room, also to the midpoint of the wall. It is important to place it on the inside of the wall so that the handle is in the correct position.

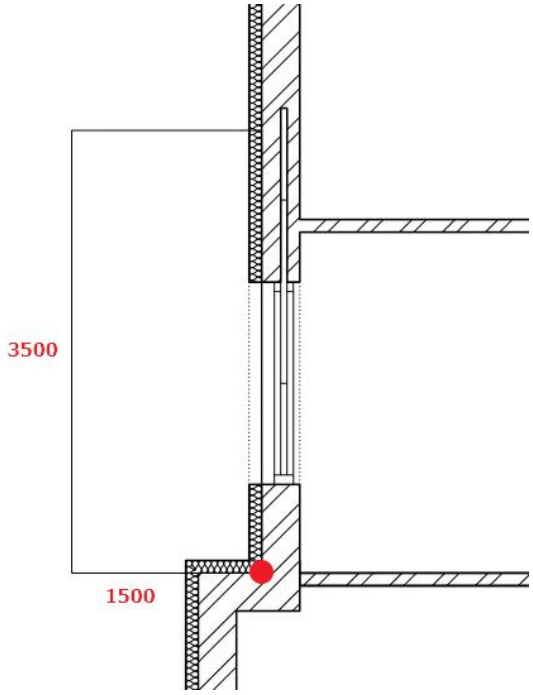


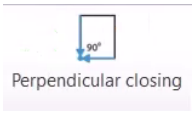

# 2.5. Slab tool

## 2.5.1. Creating a balcony

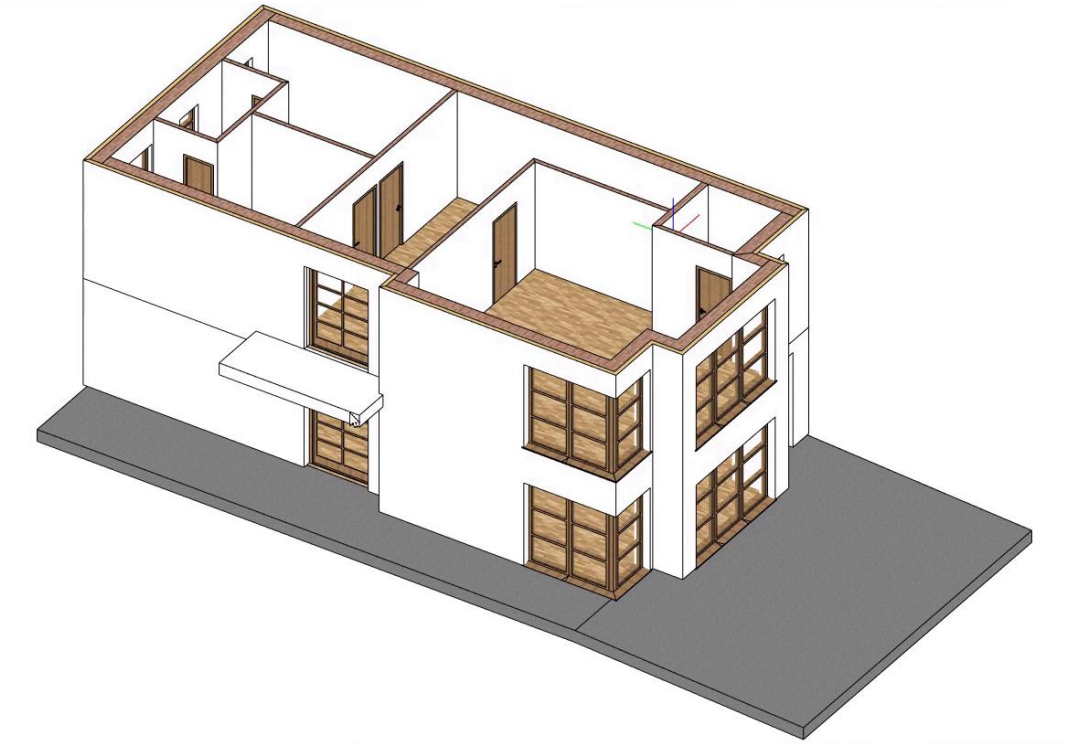
Here we create a balcony using the slab tool.

- First set its properties: right-click on Building - Slab, then Property. Base offset from the floor: 0 mm, Total thickness: -300 mm, Material: Bright white. I accept with OK.
- Draw the balcony on the left using the **Ribbon menu / Building / Slab / Slab in Sketch mode** command as follows:



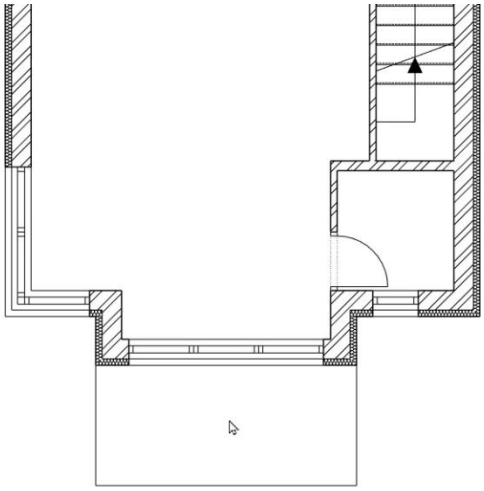

- The top third line does not need to be specified exactly, just click on the **Perpendicular closing** command at the top.
- The balcony is finished.

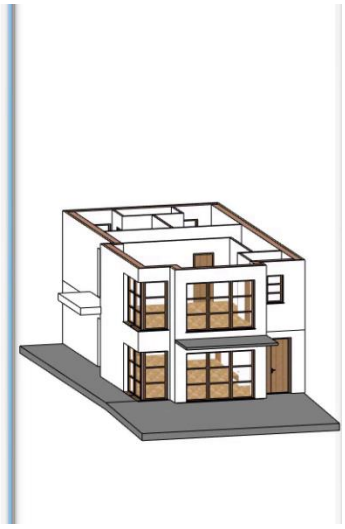


## 2.5.2. Creating a flat roof

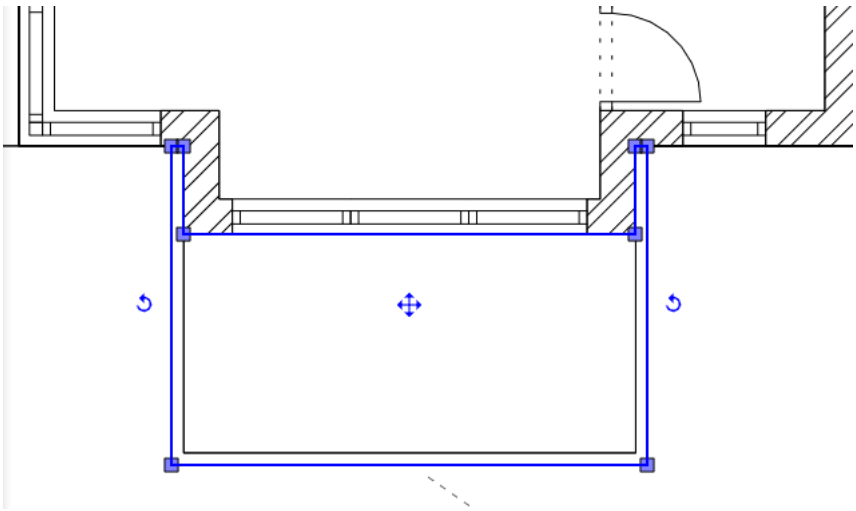
Make a flat roof over the driveway. On the plan, this is a multi-part structure, so two slabs need to be constructed.

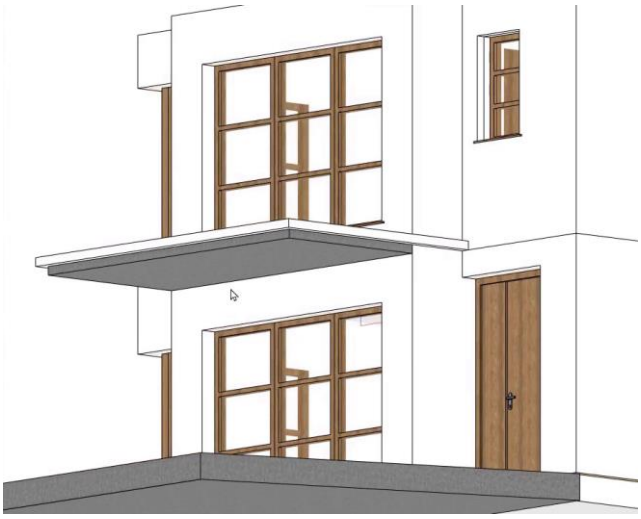
- In Properties, change the **Base offset from the floor to -300 mm** and the **Total thickness to -100 mm**.
- For the slab **material**, choose "**Concrete 3**".
- Start the **Slab in Sketch mode** command and draw the inner contour line of the flat roof so that it is 1850 mm wide.

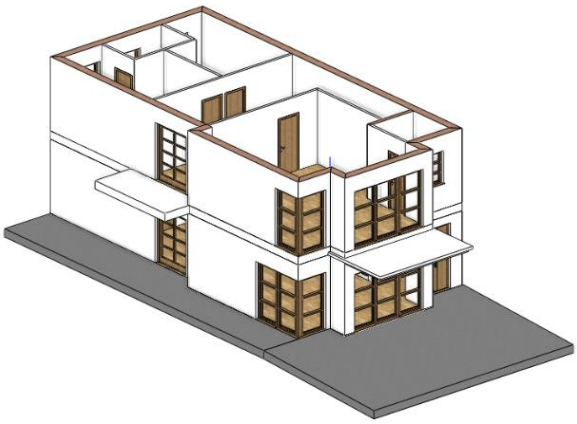




- Draw the second element, the outer contour of the roof.
- Set **Base offset from the floor to -200 mm** and **Total Thickness to -100 mm**.
- Select **Bright White** as the slab material.
- Draw the contour of the roof with the Slab in Sketch mode command in the same way as before.
- This will be modified: we need to increase the upper decorative slab dimensions by 100 mm on all sides.
- I select the flat roof, then click the edge marker and choose **Offset all** command. I drag the cursor outwards, then type 100. This increases the size by 100 mm in all directions.
- We want the main wall to meet everywhere, so I use the Offset command to pull it back at the top, and I add extra nodes on the sides.
- I click on the edge marker, then choose **Insert Node**. Then I click between the two nodes and choose **Offset** again. This gave us the result we wanted:





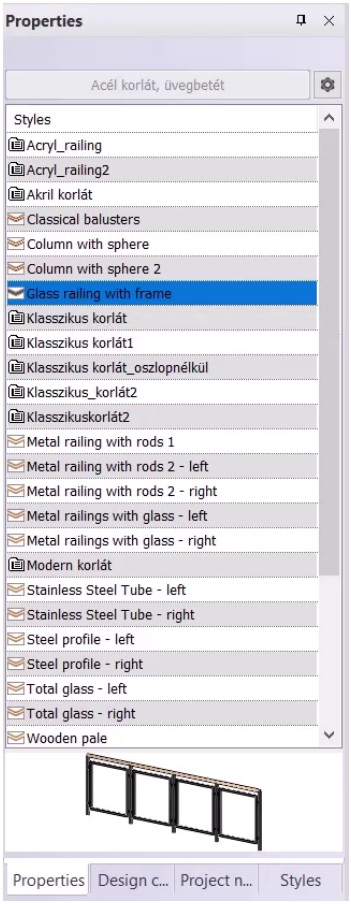


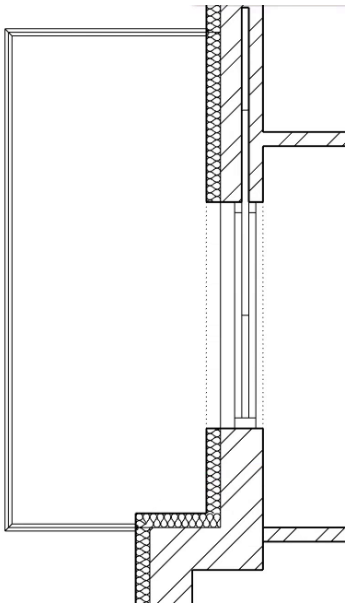
## 2.6. Railing

### 2.6.1. Railing editing with style

A railing will be installed on the balcony on the first floor.
Before placing it, choose the style of the railing.

- Click on Ribbon menu / Building / Railing / Railing command.
- On the left, activate the "Glass railing with frame" style.

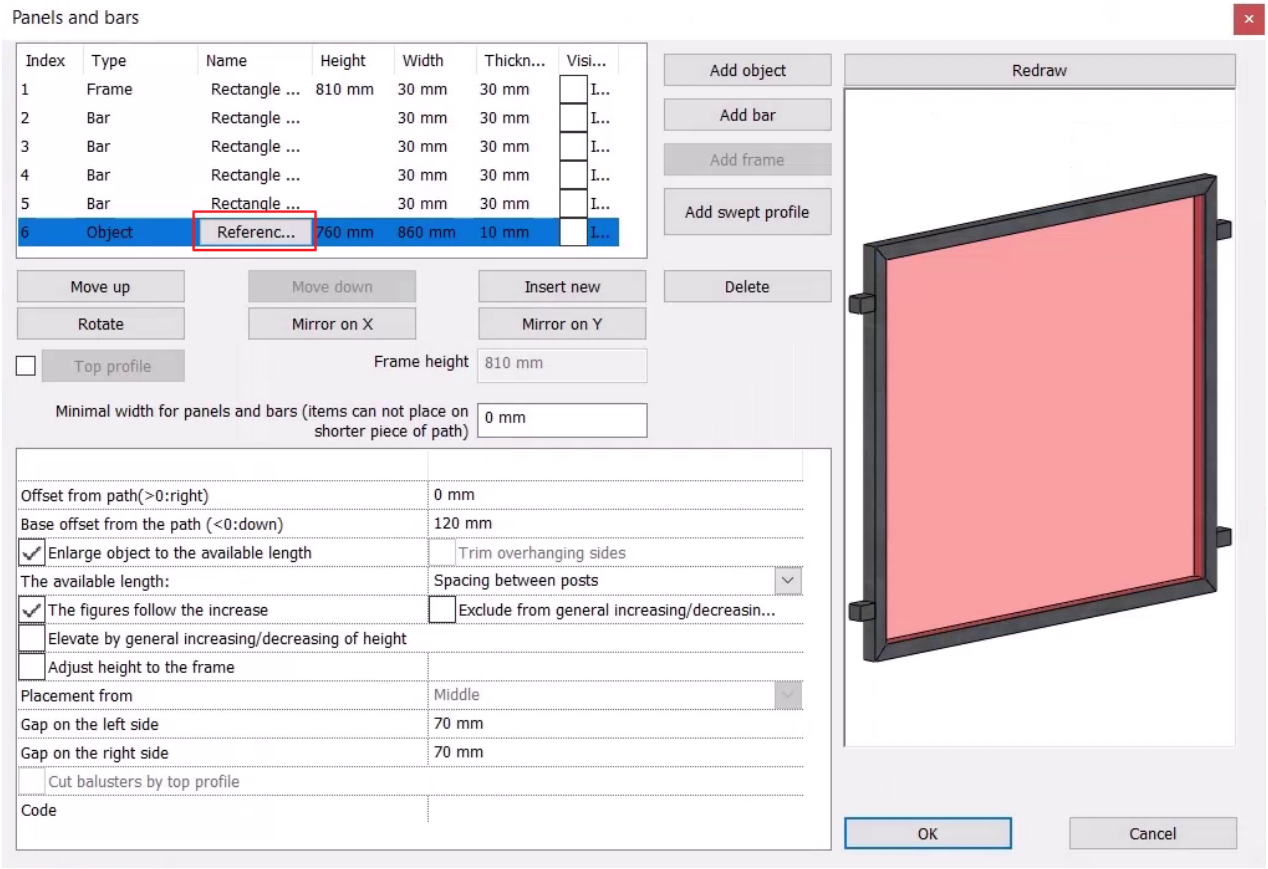


- Draw the railing along the contour of the slab.
- When you are ready, press Enter **twice**.
- Activate the 3D window.
- **Click on the railing** and lower it by 100 mm. To do this, click on the **blue arrowhead** and select **Move**. Move the railing **downward**, **type 100** and press **Enter**.

Finally, modify the glass material of the railing.

- Click on the railing, then on the pencil icon.
- On the left, select the **Panels and bars** menu. Here you can choose which of the elements of the railing you want to modify.
- Select **Object**, then click on **Reference** to select **New material**.




- Click on the existing material (in this case Glass 26) and then on the **Modify** button.
- Select „**Blue glass 02**” from the Materials list.
- Click OK to accept the modification.

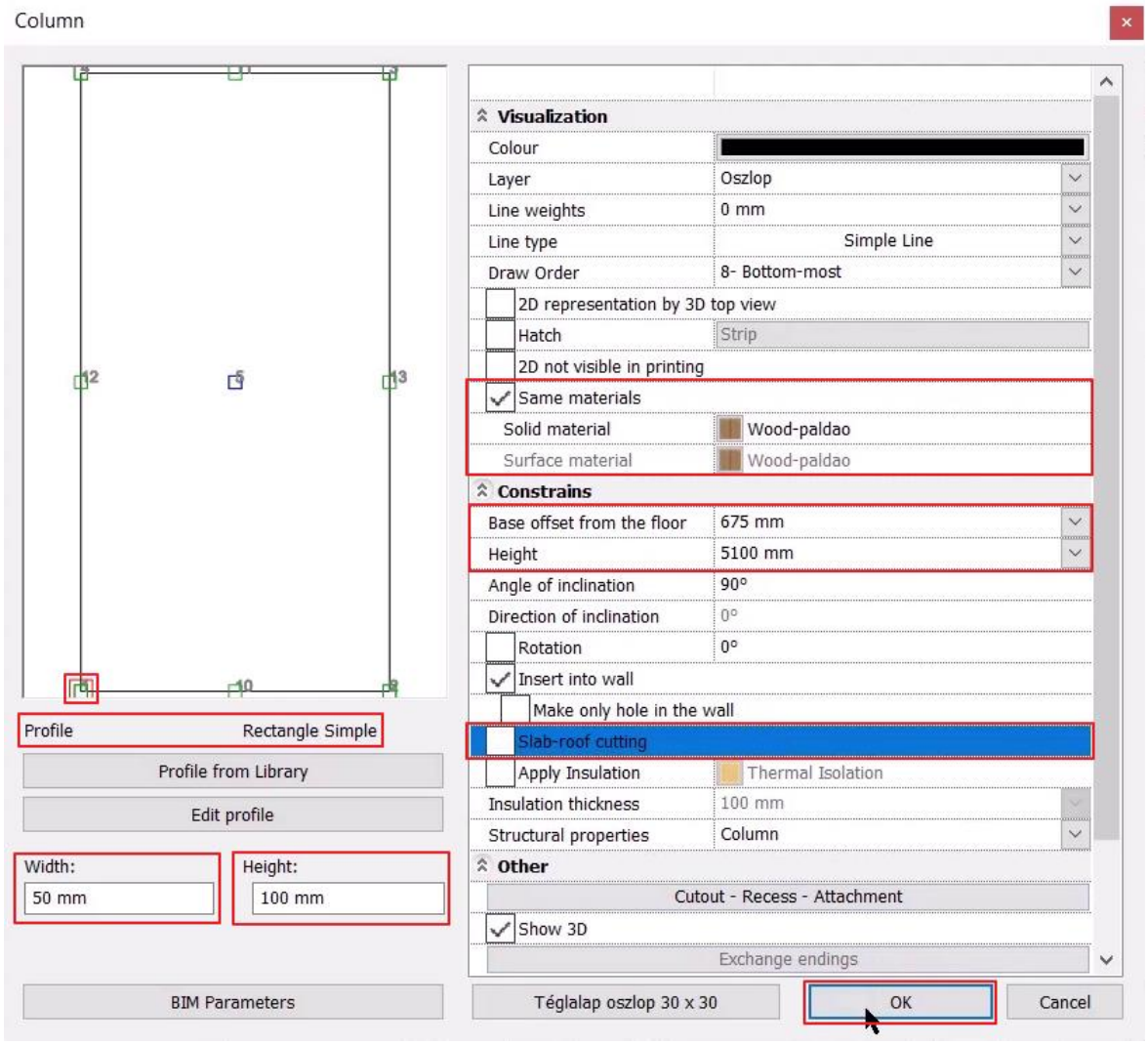
The railing is finished.

## 2.6.2. Creating a railing with the column tool

Let's see how you can create columns along the staircase, which also act as dividers and railings. This is an alternative solution besides the railing tool. Set the properties of the columns needed for the railing.

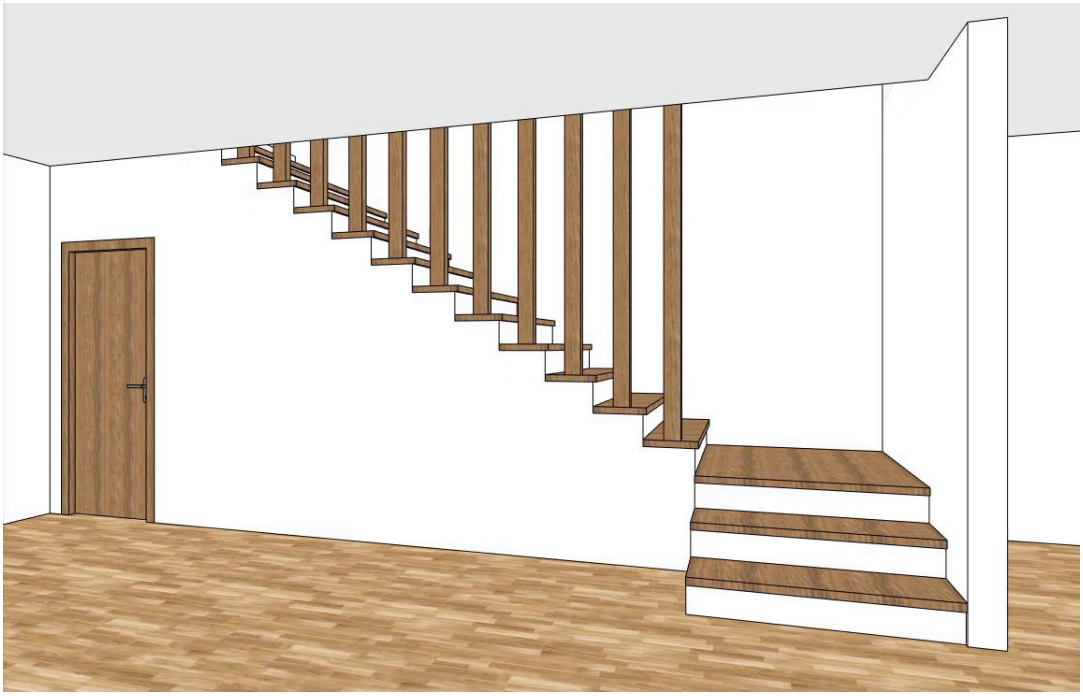
- The floor plan shows where the columns should be placed.
- Right-click on **Building** menu - **Column** to set the properties.
- Set the values of the cross-section profile. Click on **Profile from Library** and then on Select profile. Select "**Rectangle**".
- Change the width to **50 mm** and the height to **100 mm**.
- Set the reference point to the bottom **left** corner, simply click on it.
- The „Base offset from the floor” is **675 mm**.
- Height is **5100 mm**.
- Change the material to "**Wood-paldao**" and activate the "**Same materials**" option.

- Switch off the "**Slab-roof cutting**" function.
- Close the Column dialogue window by clicking OK.




- Activate the floor plan view and click on Column command to place the first column. Here we can see that we can indeed place it with its bottom left corner, since that is where we have set the reference point.
- If the first column is OK, then multiply it along the path you specified.
- Select the created column, then click on the **Move** marker and select "**Multiple copies with total distance**".
- In the pop-up window, enter the number of copies: **12**.
- Specify the reference point you want to copy and then place them on the entire column row.

The railing is complete with the column tool.

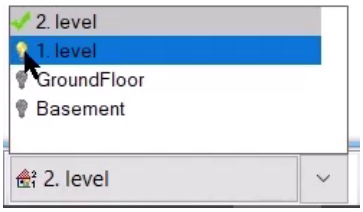


## 2.7. Creation of the closing slab

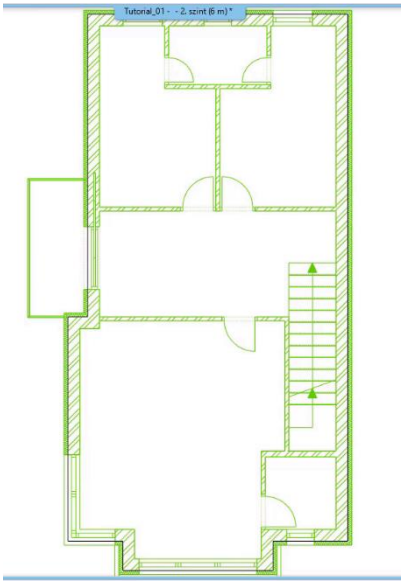
Before the roof itself is created, make the closing slab above the first level. There are many ways to make a slab; we will now copy the existing one.

- Activate the **1. level**.
- Mark the floor slab following the outer contour on the floor plan.
- Click on the **Level manager** in the Status bar and then on **Copy to other level** command in the window that appears.
- Select **2. level** from the list that appears and click OK.
- On the second level, click on the hole and select "**Hole / Delete hole**" from the local menu that appears.
- Modify the material of the slab in the Properties window on the left: **Top material: Bright white.**

What we need to adjust is that the outer edge of the slab meets the outer edge of the isolation layer. This will give the slab its final shape. We will do this by turning on the visibility of the floor plan on the first level, so that we can align the outer contour of the slab on the second level.




- Open the Level manager. The program will indicate with a green check mark which level is active, in this case 2. level. The other levels are represented by a light bulb symbol, currently turned off. Turn on the light bulb before 1. level.
- Clicking on the floor plan will immediately display the walls, openings and elements of 1. level. These are only visible, we cannot select them, but we can refer to them.

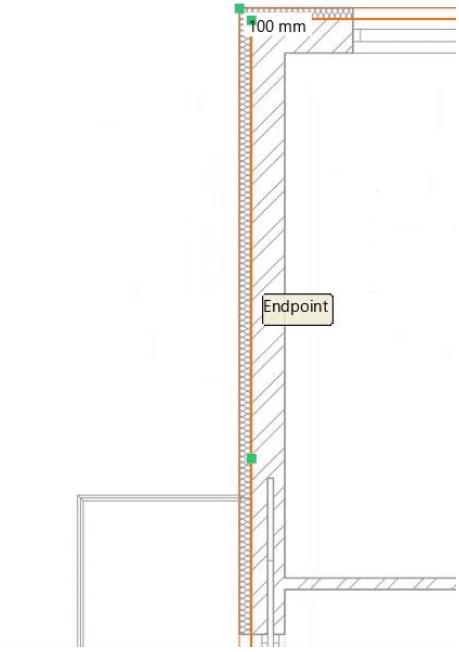


You can change the display of this, i.e., the green color, as follows:

- Click on the Gear icon in the bottom left corner, then select Inactive building color under Graphics.
- Click on the green color here to select the color you want (e.g., light grey).

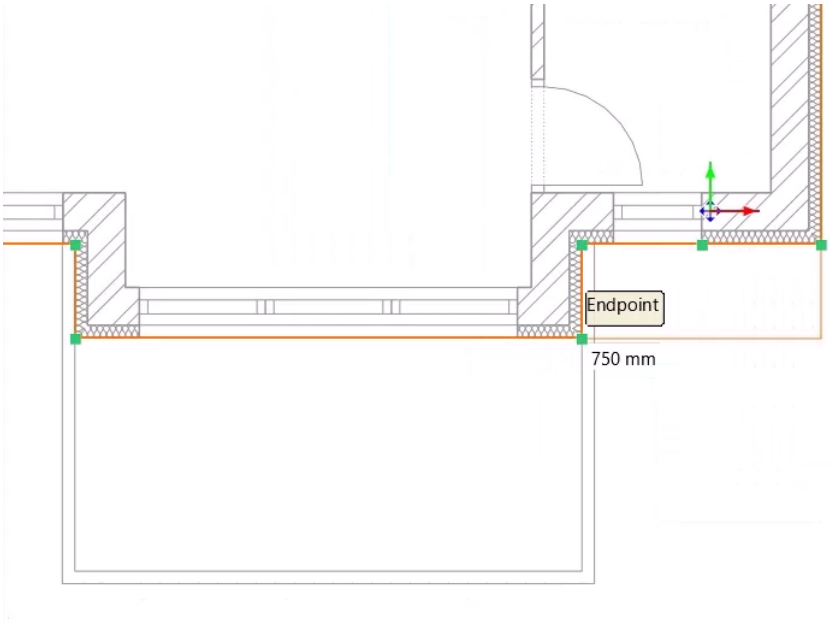
So, let's prepare the slab:

- Click on the slab outline in black, then use the **Offset all** command to drag the outline to the outside of the insulation.




Modify the slab at the two access points:

- Select the slab, then use Offset to pull it out to the outer plane on both sides.
- Delete unnecessary nodes.



We have finished the construction of the closing slab and the 1st level.

# Workshop 3: Roof Structure and Firewall Editing

# 3. Workshop: Roof Structure and Firewall Editing

On this workshop, we will deal with roof structures and firewall design. We will also explore how to place gutter and drains. In designing the roof, we will use the contour of the closing slab that we created in the previous workshop. With its help, we will easily draw the roof structure.

Before we start editing the roof, please watch the tutorial video on Roof Structure and Firewall Editing.

## 3.1. Roof

The ARCHLine.XP **Roof** toolset offers efficient solutions for designing roof structures at a professional level, whether it's a simple conceptual or highly detailed plan. You can create an unlimited number of roof structure types, design them in an antique, modern, wood, or metal style. Everything you design is parametric and flexible, allowing the designer to shape these complex elements as needed during the design process.

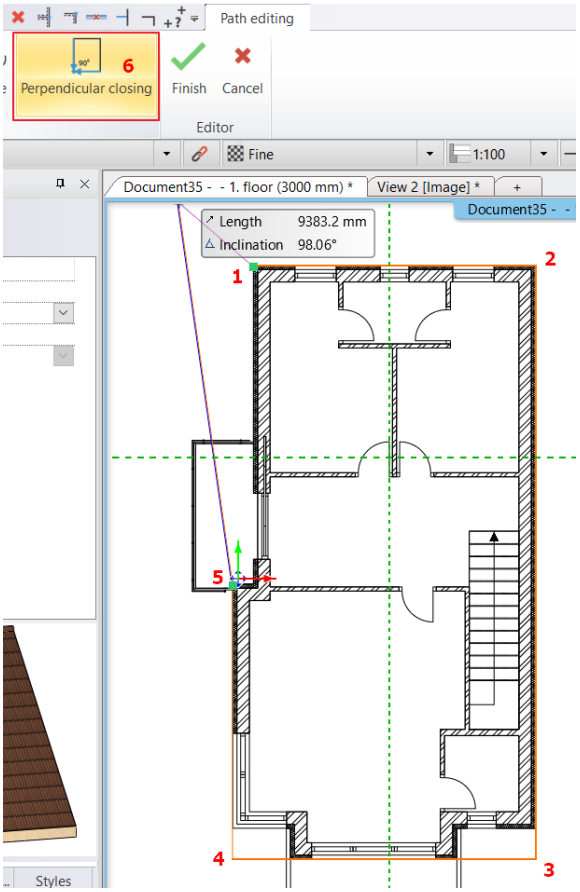
In this section, we will create a simple conceptual roof. Through this example, we will understand the following concepts:

- Roof design
- Transforming existing roofs
- Working with roof planes and roof height editing
- Setting roof materials and simple details
- Connection with other architectural elements

### 3.1.1. Roof Design

ARCHLine.XP has all the tools needed to create a roof structure, whether it recognizes the external contour by selecting the walls of an existing building or whether the designer draws it themselves. In both cases, the roof can be reshaped, changed, entirely redesigned, and enriched with further details. In this case, we are creating a conceptual roof that follows the contour line of an existing attic floor with some customization to grasp the basics of roof design.

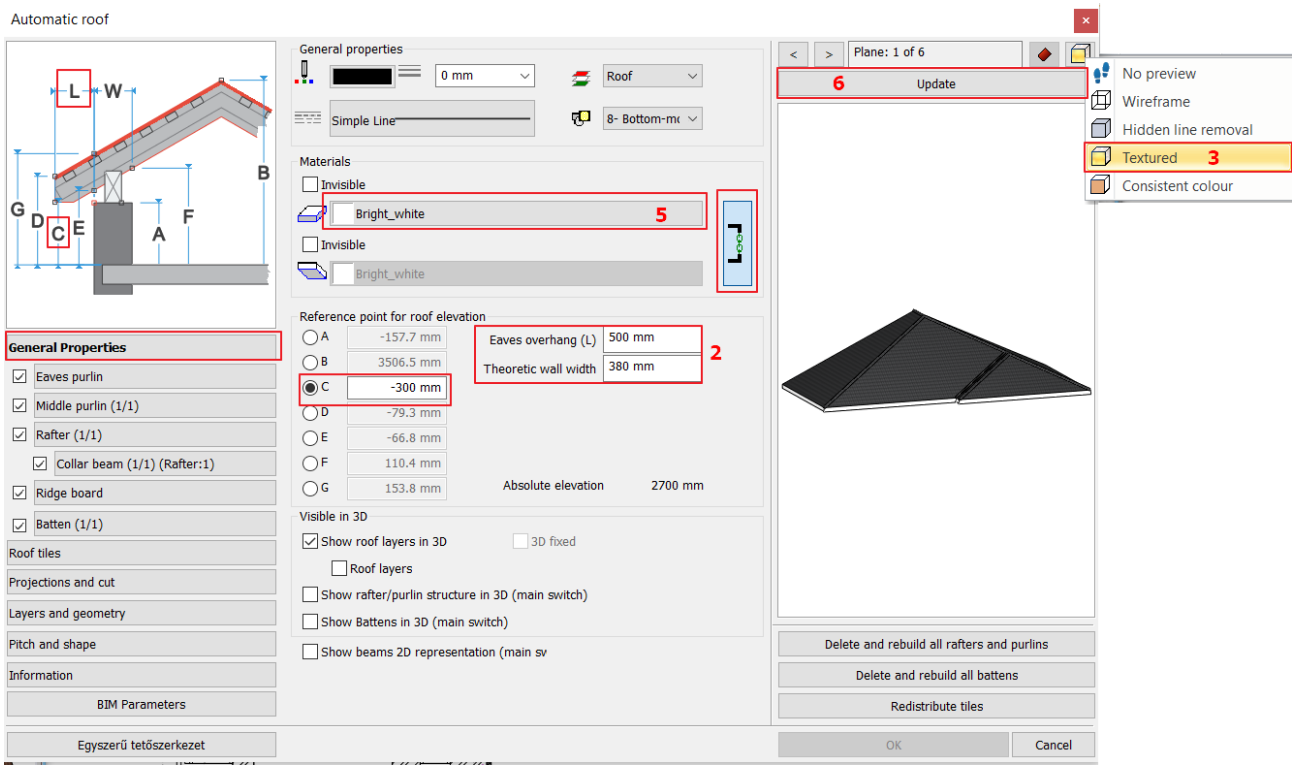
- Launch the **Ribbon Menu / Building / Roof / Roof in Sketch mode** command.
- Choose "Simple Roof Structure" from the roof styles on the left.
- Draw the outer contour of the roof on the second level along the closing slab, starting from the top-left corner.
- Instead of the last two clicks, choose the "Perpendicular Closing" command. This completes the roof.



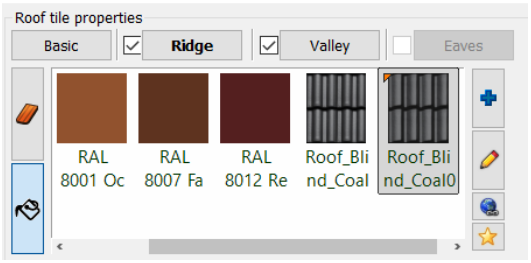
After finishing the drawing, click on the roof, and select the pencil icon. This will open the Roof Properties dialog. Let's make some modifications.

In the Roof dialog, you can set the details you see on the tabs (Eaves purlin, Middle purlin, Rafter, etc.), such as the cross-sectional profile or the material. Since we are working with a simple roof for now, we won't adjust these.

- On the General Properties tab, under Reference point for roof elevation, change the "C" value to -300 mm (1). The Eaves overhang (L) should be 500 mm, and the Theoretical wall width should be 380 mm (2). The theoretical wall width usually matches the most common wall thickness found on the floor plan.
- Change the display mode to textured (3).
- Under Materials, link the two materials (4), and change the material of the bottom and side surfaces from "Pine-natural" to "Bright white" (5). You can see the changes by clicking the refresh button (6).



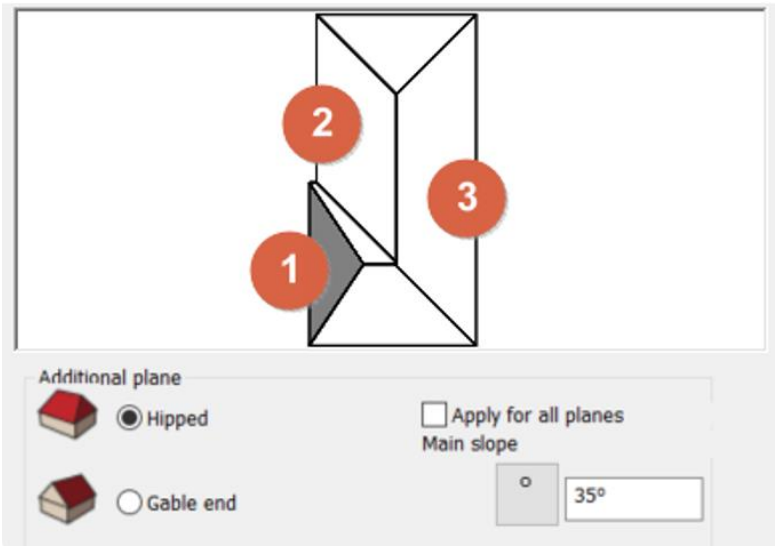

- Under the **Roof tiles** tab, in the **Roof tile properties**, click on "**Basic**," then on the paint bucket icon, and replace the current "Roof - brown" with "**Roof – Blind_Coal**." If you can't find this material in the list, click the blue plus sign to open the material library, where you can search for the desired material.
- Click on the "**Ridge**" and "**Valley**" roof tile settings and change the material from "Roof - brown" to "**Roof – Blind_Coal**." Click the refresh button to see the changes.



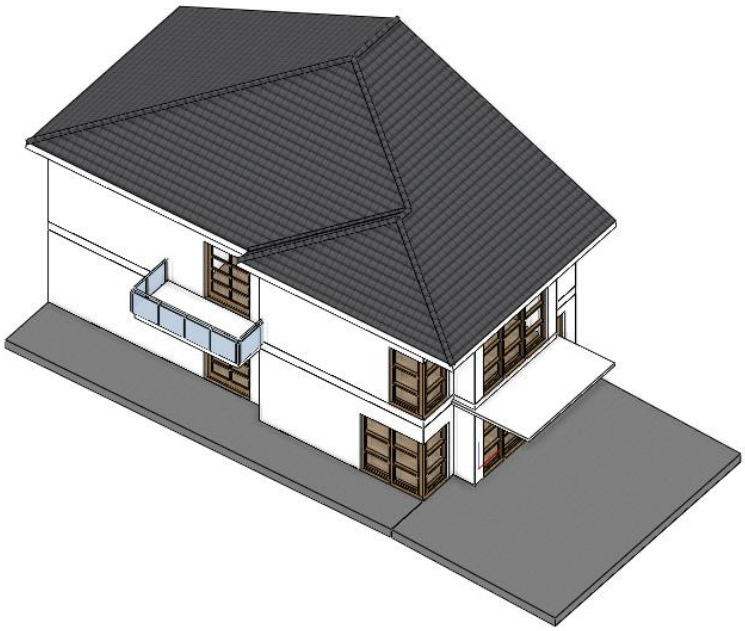

On the "**Projections and cut**" tab, you have the option to set on which level the roof should be visible and what symbol it should have on that level. You can also specify which levels the roof should cut through the walls or choose not to cut through them at all.

On the **Layers and geometry** tab, you can set the layer thicknesses for the roof.

- Click on the **Pitch and shape** tab and activate the "Apply for all planes" option, then change the roof plane slope from 42 degrees to 25 degrees. Click the "Update" button above the 3D view to check the changes.
- Click on the roof plane marked with the number 1 according to the diagram below and change the pitch angle to 35 degrees. Click the “Update” button above the 3D view to check the changes.



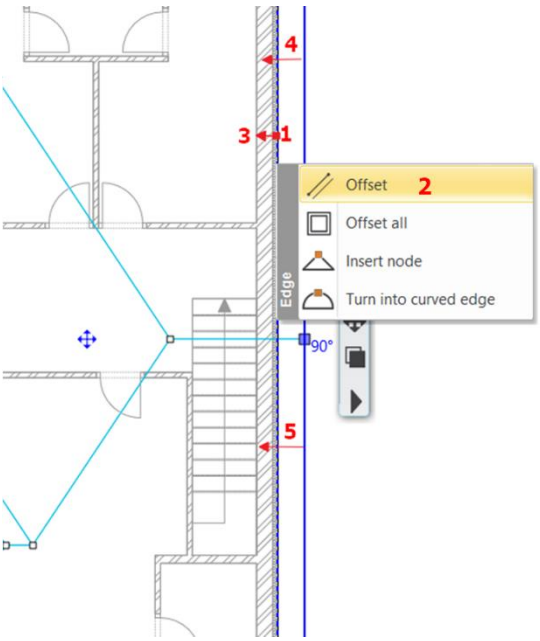

- Click on the **roof plane** marked with the **number 2** as shown in the diagram above and change the pitch angle to **35 degrees**.
- Click on the **roof plane** marked with the **number 3** and set the roof plane shape to **Gable end**. Click the **Update** button to preview the changes.
- Click the **OK** button and view the roof in both the floor plan and 3D view.



## 3.1.2. Changing the Roof Contour

This time, we will move two edges of the roof to create a firewall, separating this part of the building from the rest.

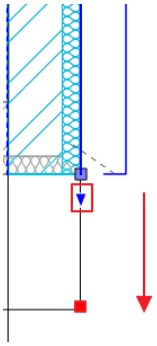
- Select the roof in the floor plan.
- Click on the **right edge** (1) and choose the "Offset" command from the appearing marker menu (2).
- Move it so that it aligns precisely with the inner wall plane (3).
- Repeat this for the two outer edges on the right side of the roof (4, 5).




## 3.1.3. Designing a Firewall with the Push and Pull Tool

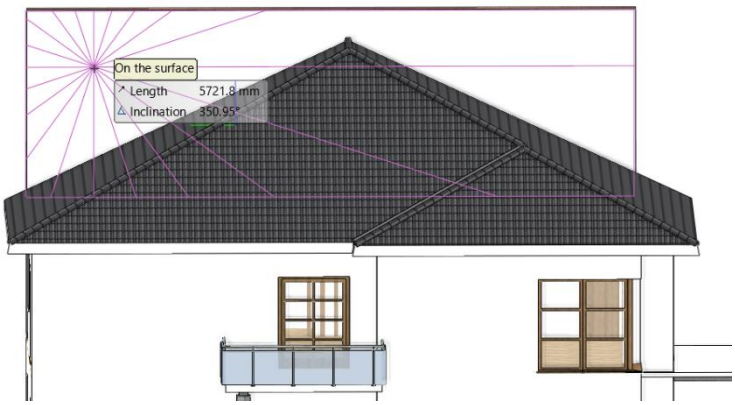
Let's create a wall that separates the two buildings. In this case, we will copy an existing wall, modify its properties, and then reshape it to precisely match the roof.

- Go to the first level.
- Select the right-side wall of the building.
- On the **Property** panel to the left, click the "**1. floor**" button next to "**Copy objects to other floor.**"
- Choose the **2. floor** and click **OK**.
- Select the new wall on the second level and change the **Height to 4500 mm** and the **Base Elevation** to **-300 mm.**
- Click on the arrow marker next to the wall endpoint marker and align it with the end of the roof structure.
- Repeat this for the other end of the wall.

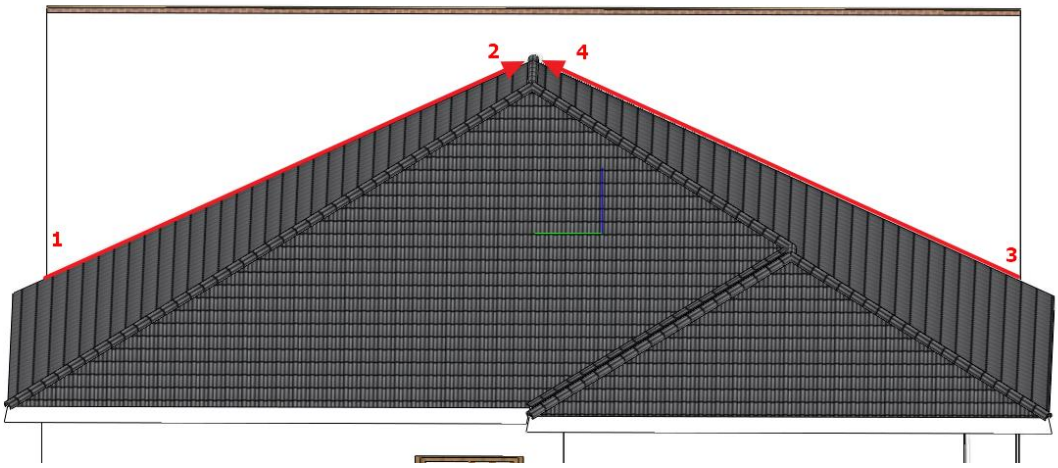


The firewall is currently a plain wall with a horizontal top. Let's redesign its shape (front elevation profile) to make it follow the roof's pitch. First, we'll consider the current shape of the wall in relation to the roof so we can use it as a basis for design.

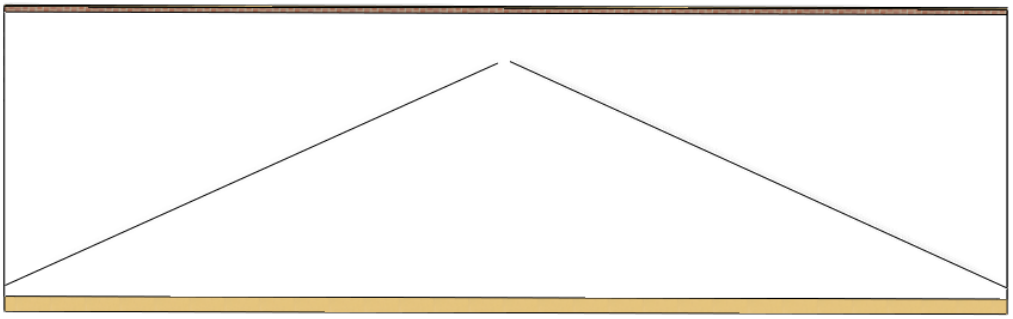
- Activate the 3D window.
- Adjust the view so that you're looking at the firewall head-on.
- Select the **Drafting / Line / Line** tool, then choose the surface you'll be working on, which is the firewall.




- Draw the first line along the roof pitch (1, 2). Finish the drawing with Enter. Then draw the other line on the opposite side of the roof (3, 4), and close the command with two Enters. Ensure that you draw the lines on the surface of the firewall, not on the roof.

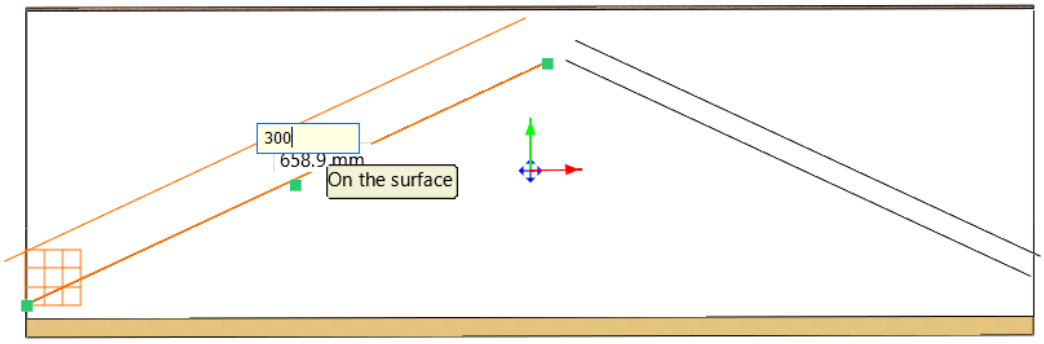



- Select the firewall in the 3D view, then click on the 3D hammer icon to isolate only the firebreak and the drawn lines.

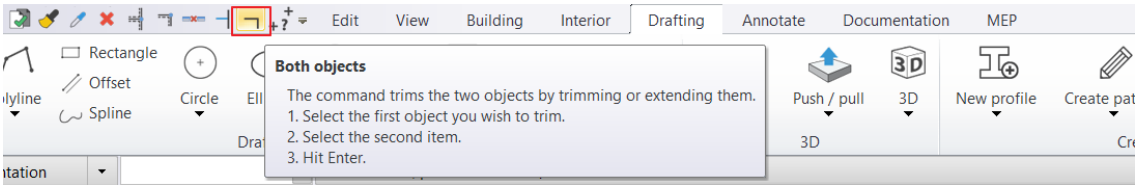


We will now copy the two guide lines 300 mm higher, as the firewall will overhang the roof by this amount.

- Select the **Ribbon menu / Drafting / Offset** command, choose one of the lines, drag the mouse cursor upward, and enter the value: 300. Repeat this process for the other line as well.

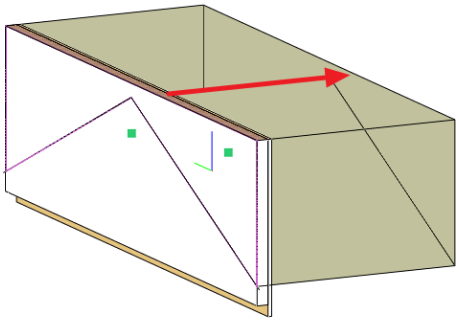



- Delete the originally drawn guide lines.
- Connect the two offset lines using the "**Both objects**" command. Select the "Both objects" command from the quick access toolbar, then click on both lines.



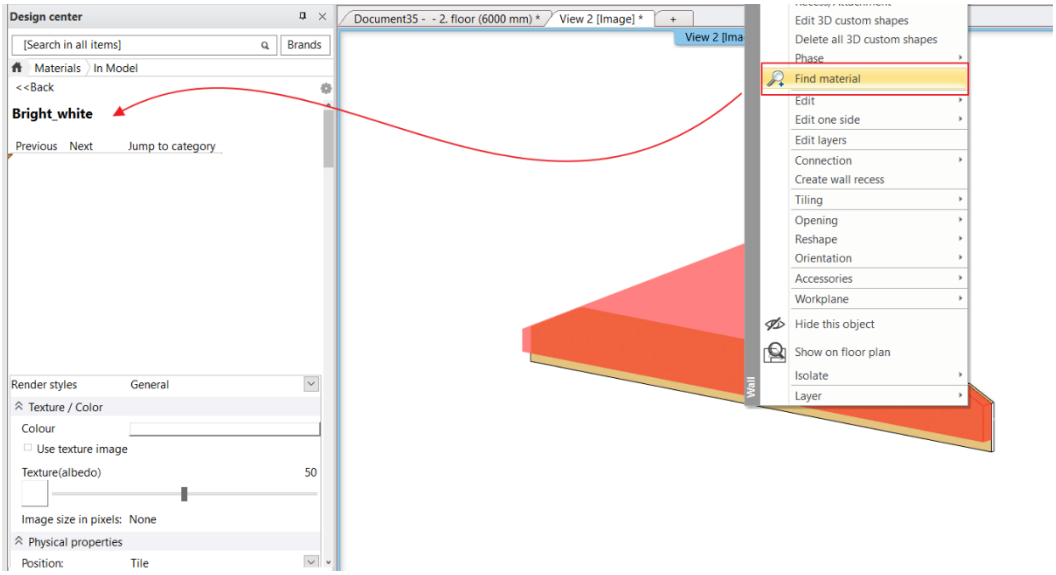

- We will cut the top part of the firewall. To do this, choose the **Ribbon menu / Drafting / Push / Pull** command.

- Select the upper part of the wall that you want to delete, then drag the mouse backward in the inset direction.



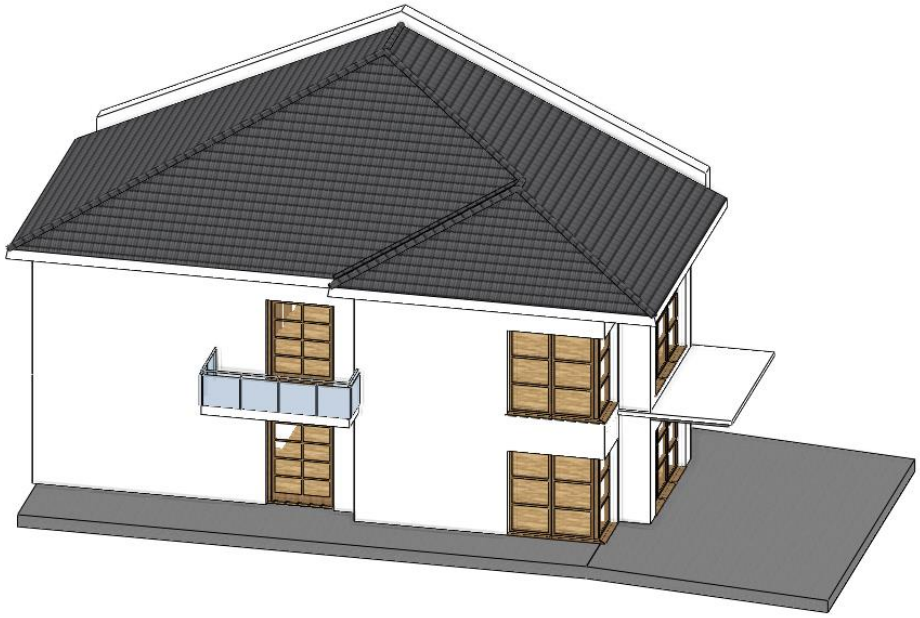
- Finally, delete the guide lines.

- We will change the material of the firewall. Right-click on the inner side of the firewall and choose the "**Find material**" command. In the side menu, you'll see the current material, which is "Bright White."




- Drag and drop the material onto the inner layer of the wall from the design center, and select the "**Replacing one material with another on this object**" command. Then, change the color of the inner layers.

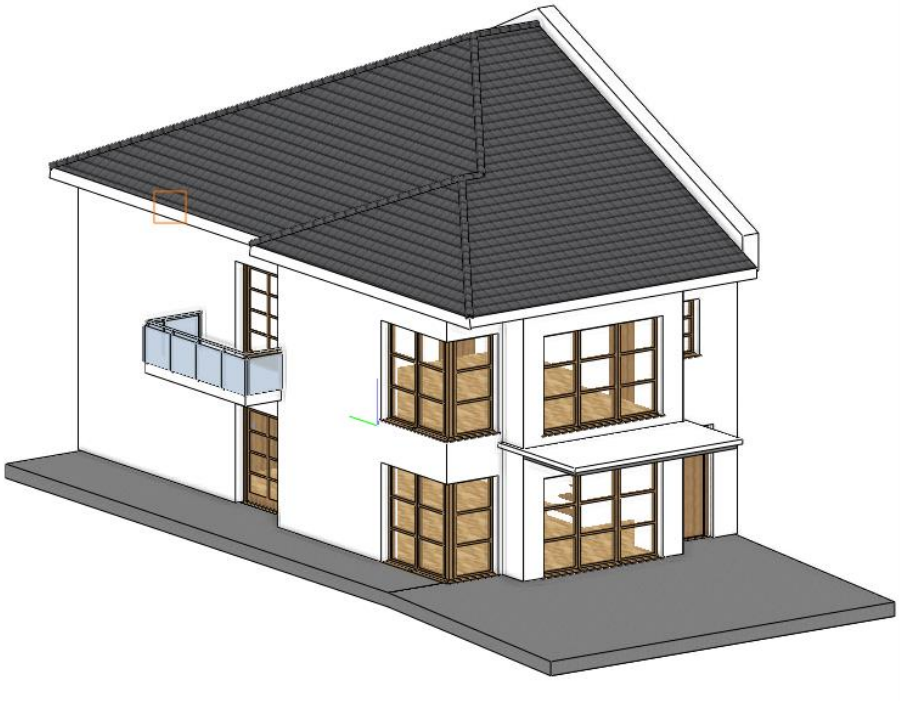
- To display the entire 3D model, press the 3D hammer icon without selecting anything in the 3D view.



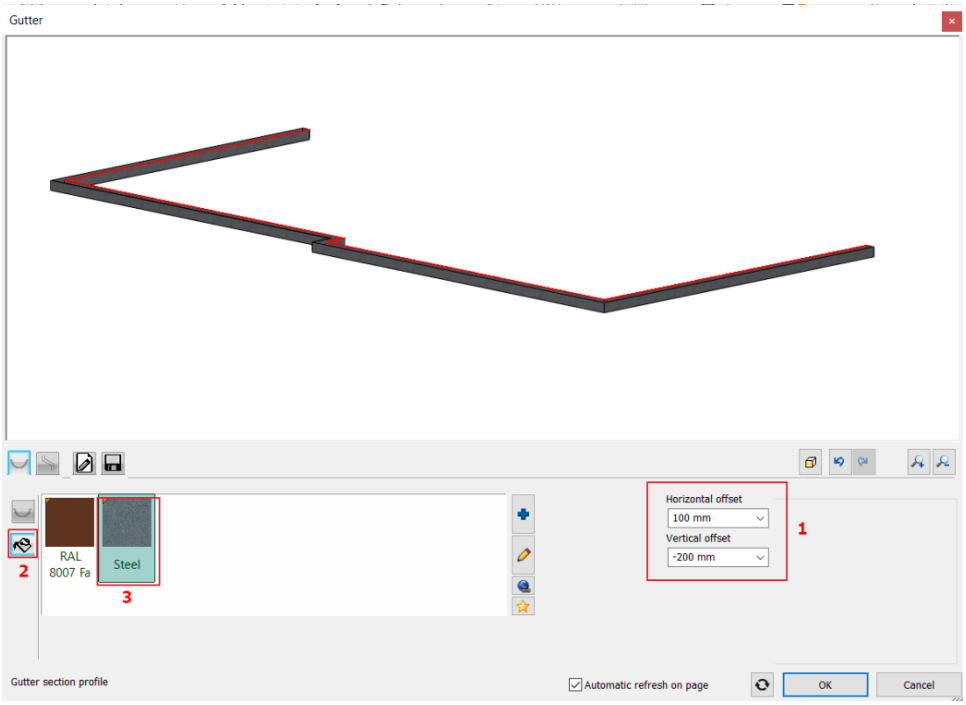
## 3.1.4. Creating a Gutter

To create a gutter, use the specialized gutter tool.

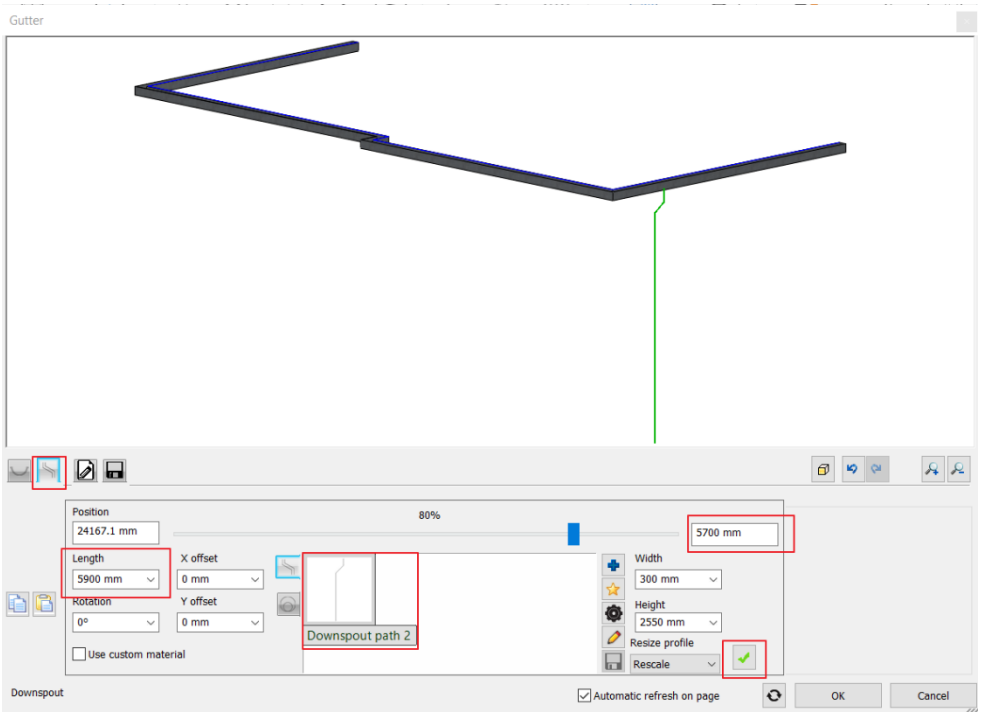
- Start the **Ribbon menu / Building / Roof / Gutter** tool.
- Click on the left edge of the roof in the 3D view.



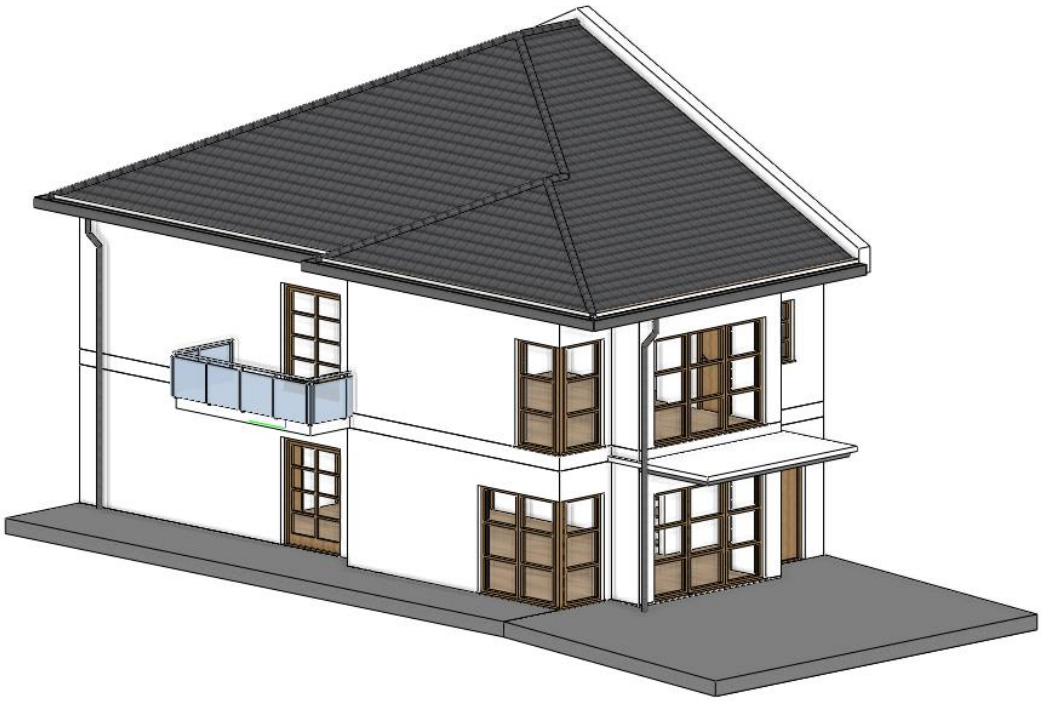
- In the appearing properties window, ensure that "Gutter **section p**rofile **2**" is set as the cross-sectional profile.
- Change the Horizontal offset to 100 mm and the Vertical offset to -200 mm. (1)
- Then, click on the paint bucket icon (2) and change the material to **Steel.** (3)



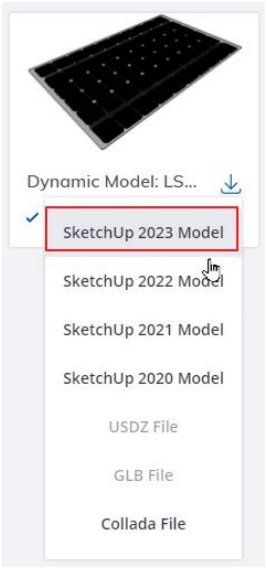

- Click on the second tab , which is for the **Downspout**. Ensure that **Downspout path 2** is selected.
- Change the **Position**'s right-hand value to **5700 mm**.
- Click the **green checkmark** to add the drainage to the gutter.
- Change the **Length** to **5900 mm**.




- To add the second downspout, use the **green plus sign**. This time, set the distance **from the left** to be **7800 mm**.
- To create it, click the **green checkmark**.



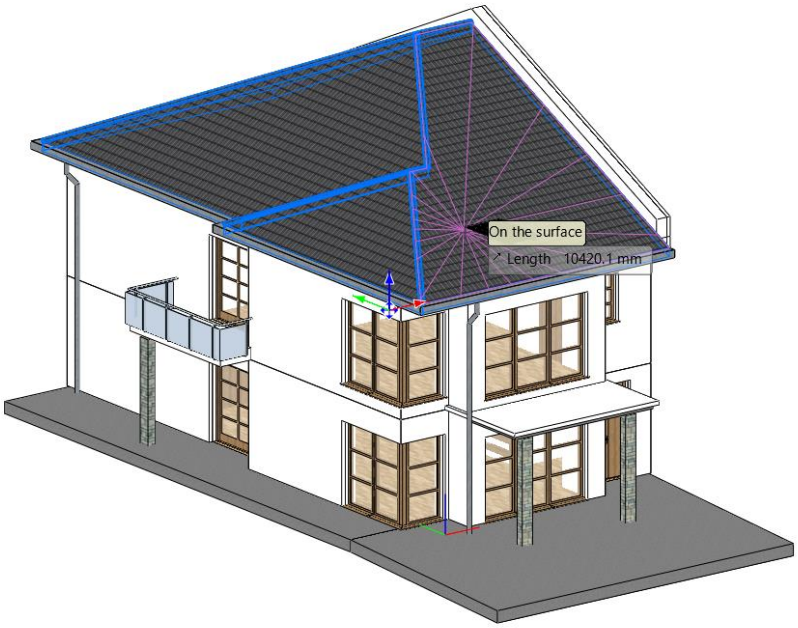
## 3.2. Placing Solar Panels



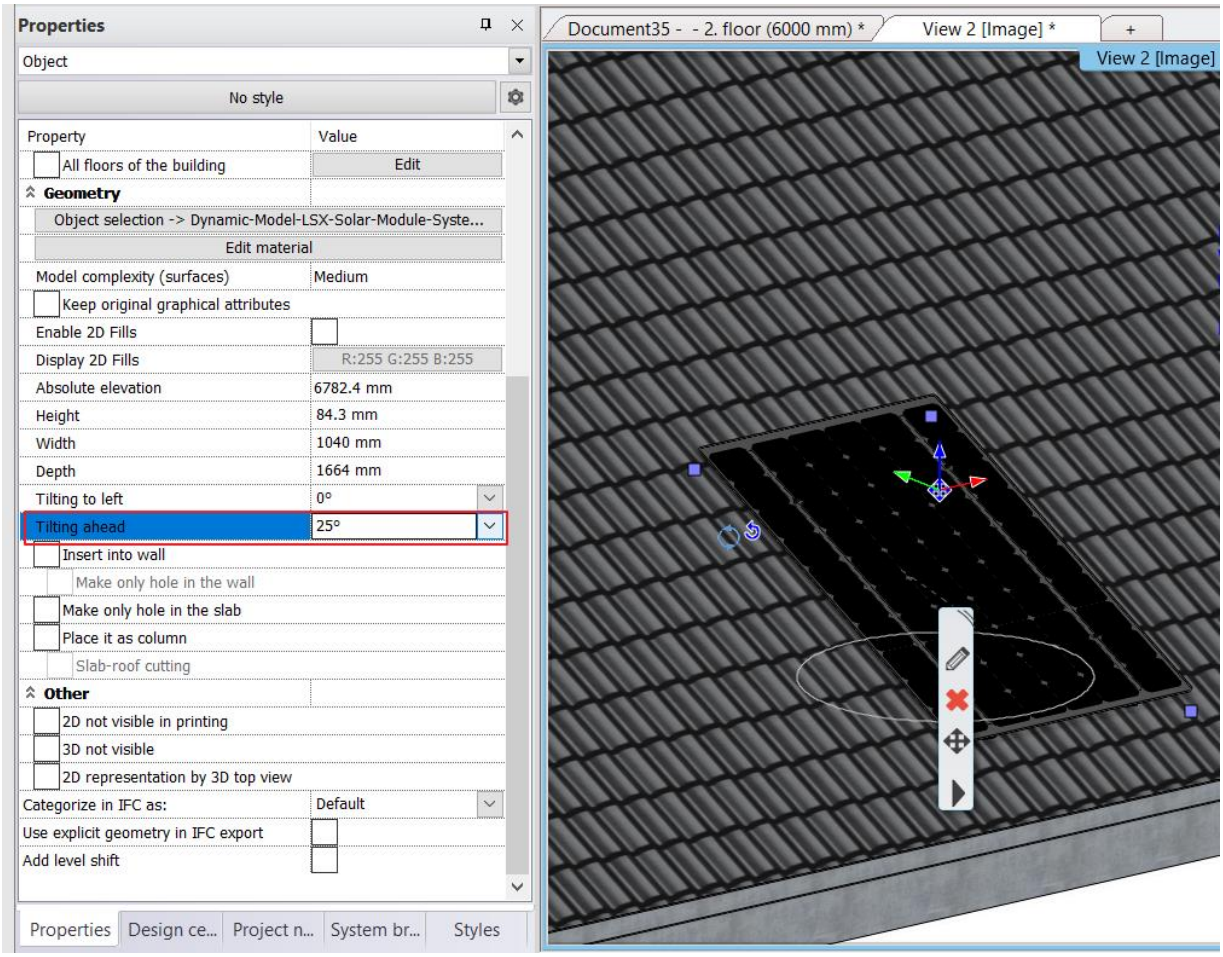

You can also place solar panels on the roof from the 3D Warehouse.

- Choose the **Ribbon menu / Interior / 3D Warehouse** command and use the **Direct Download** option. To download objects for free from the 3D Warehouse, you need to log in with your Trimble account.
- Find the "Dynamic-Model-LSX-Solar-Module-System-wLSX-Rail-SD-in-Landscape" solar panel, and download the model. Always download models that are compatible with your software version or older.

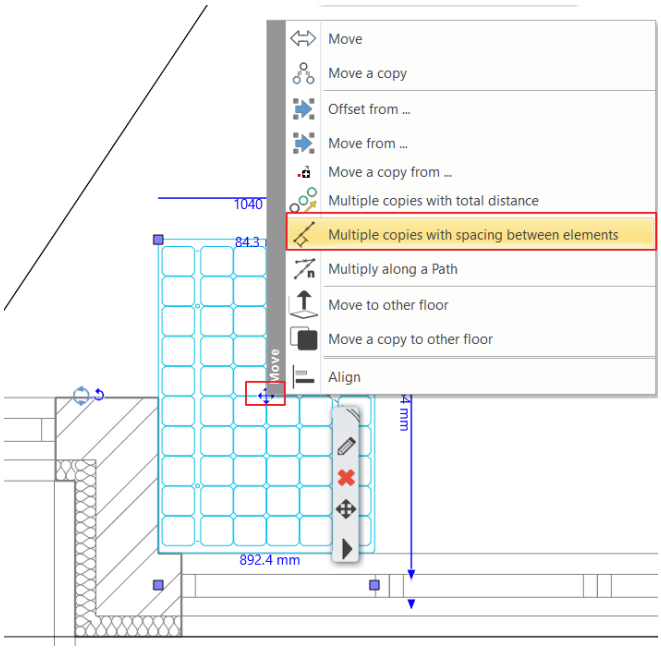
- In the 3D view, select the roof area above the ramp and place the object.



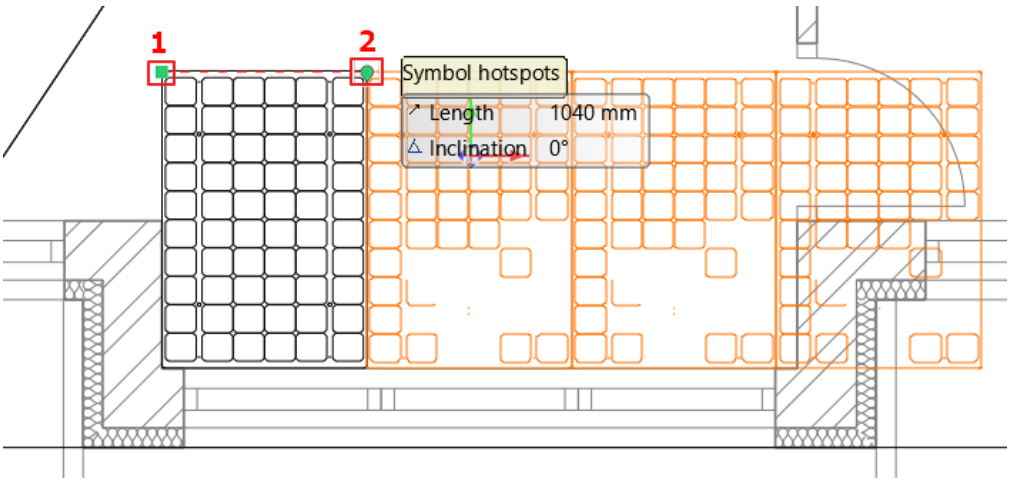

- Select the placed solar panel and change its tilt angle in the left-hand menu by entering a value of 25° for the "**Tilt ahead**" parameter.

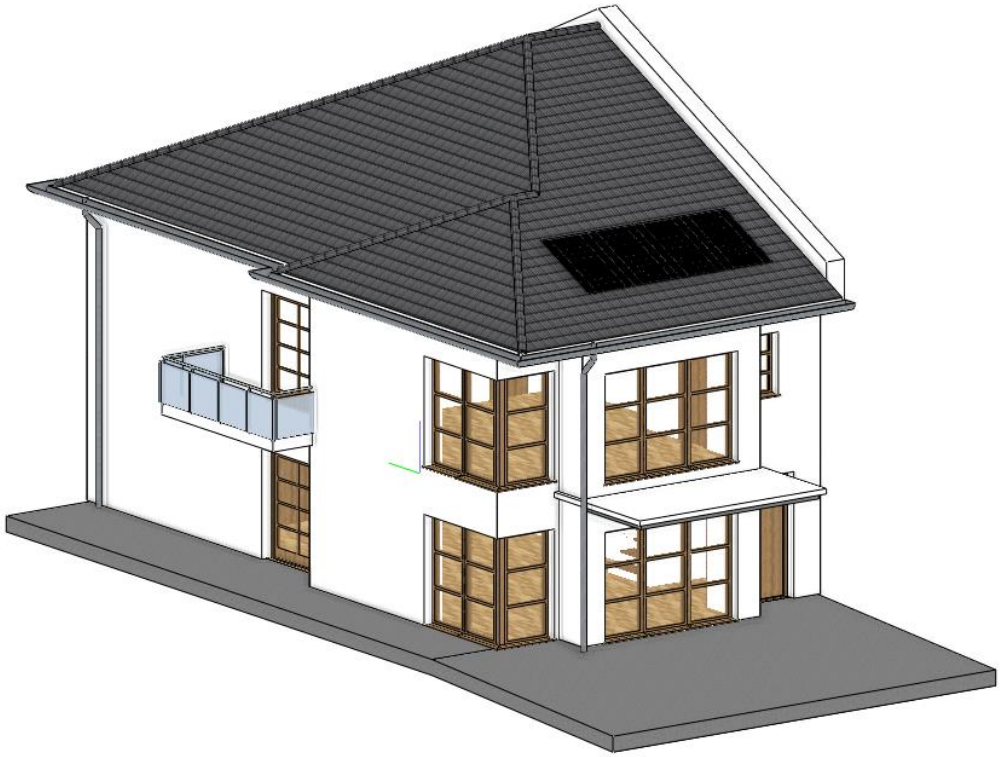



- In the floor plan view, select the solar panel, and use the **Move from** command to move it, aligning it with a corner of the wall. Select the bottom-left corner of the solar panel and align it with the wall corner.
- With the solar panel selected, choose the **Move** option, and then within that, select the **Multiple copies with spacing between elements** command.




- Enter the number of copies: 3, and then choose the top-left corner of the solar panel and align the copied elements with the right-side corner.



## 3.3. Columns

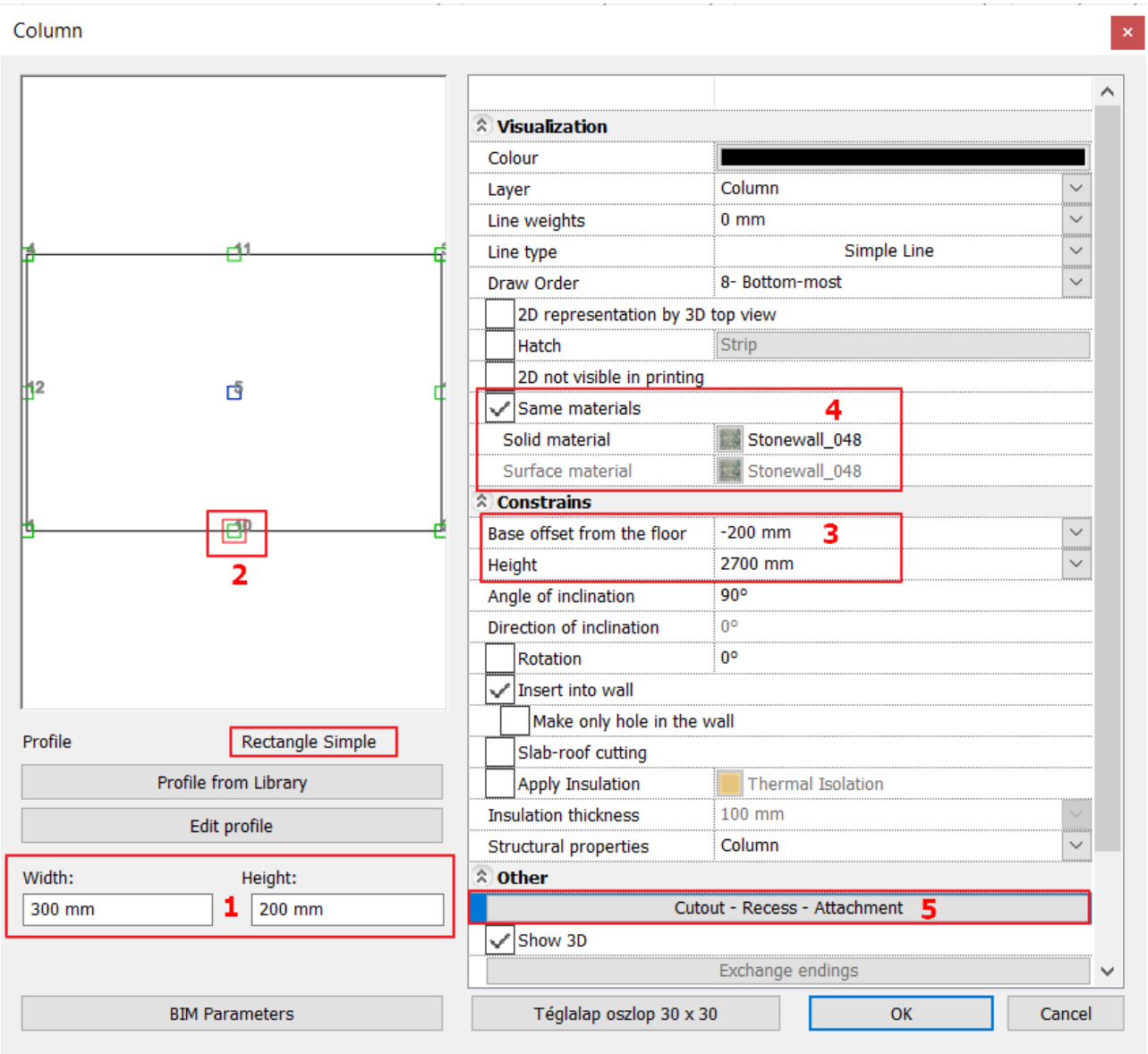
### 3.3.1. Placing Structural Columns

Before placing the columns, right-click on the **Ribbon menu / Building / Column** tool to configure its properties.

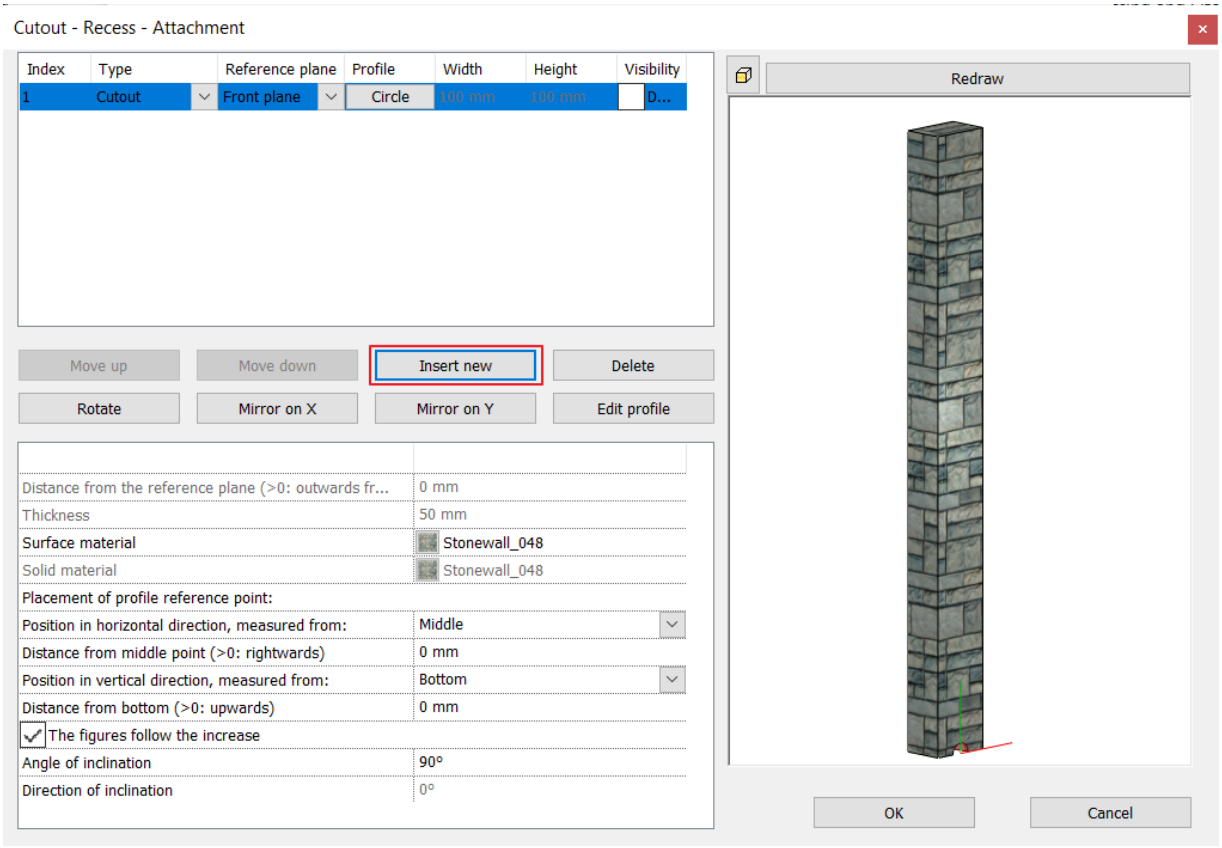
- Use the “Rectangle simple" profile. Set the height to 200 mm and the width to 300 mm.
- Choose the center-bottom point as the reference point.
- Set the height to 2700 mm and the relative height to -200 mm.
- Select "**Stonewall_048**" as the column's material from the Building, Masonry folder. Enable the Same Materials option to change the material for the surface as well.

Add an attachment to the top of the column.

- Click the **Cutout - Recess - Attachment** button in the column dialog box.

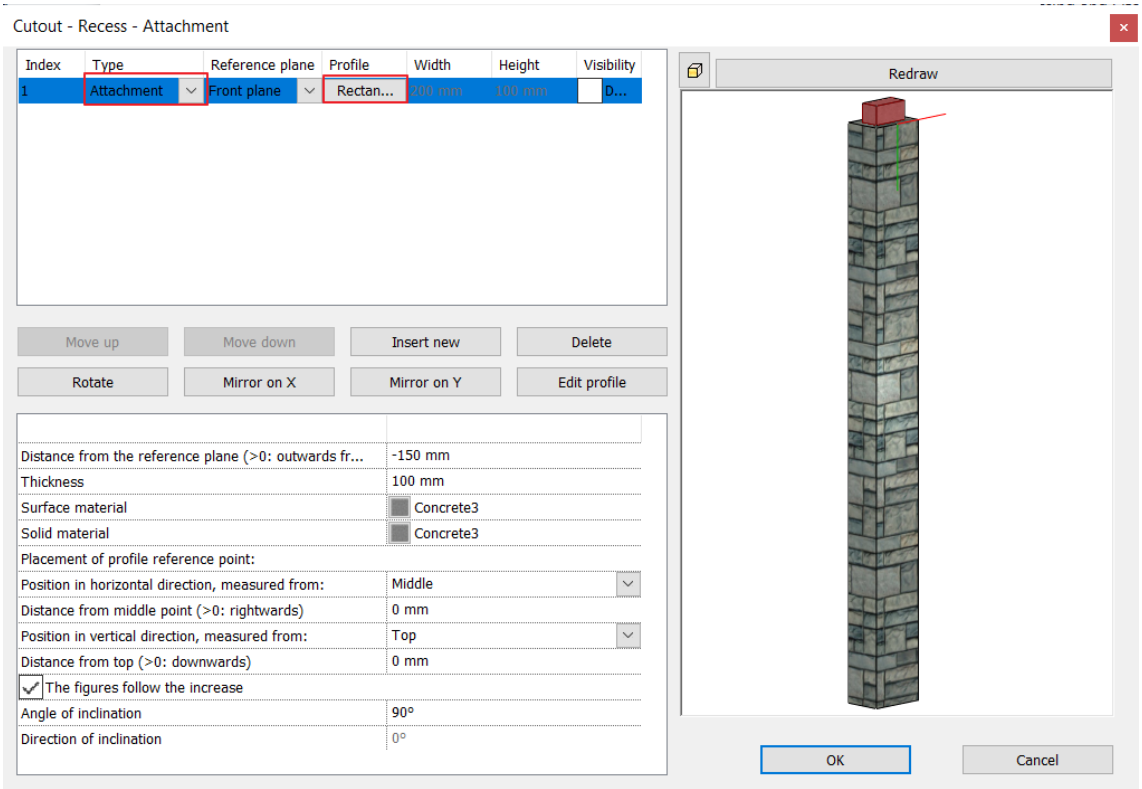



- Add a new element using the **Insert new** button.

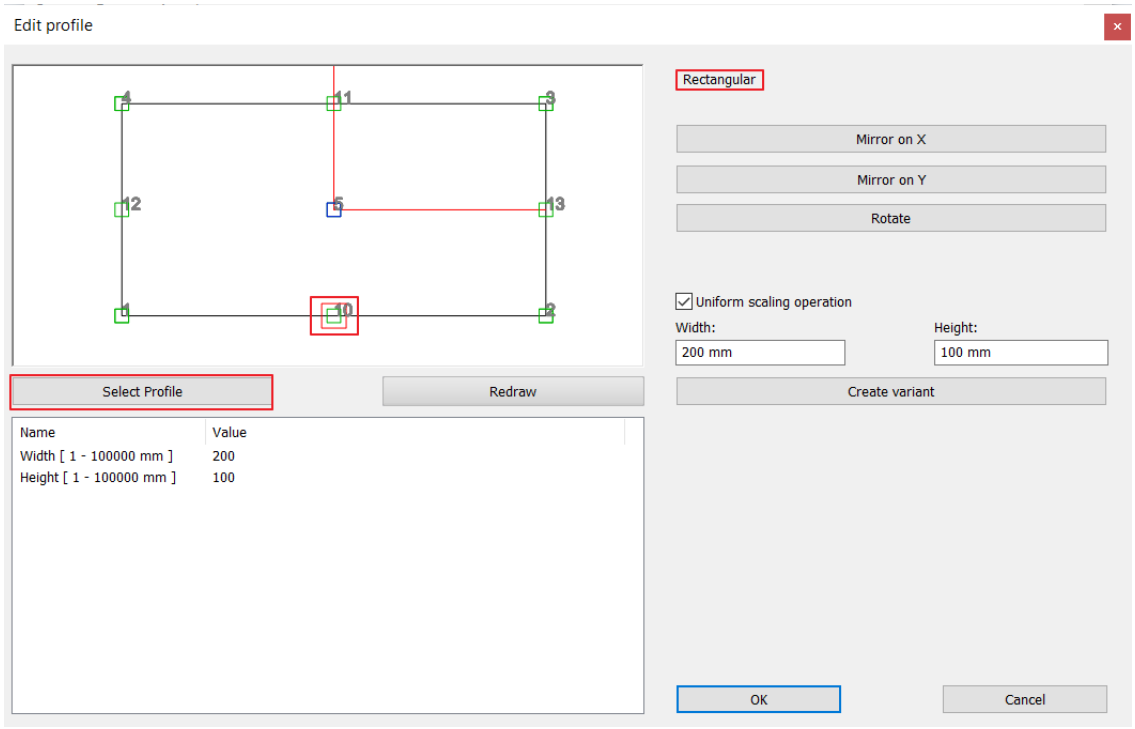



The element has been created as a recess with a circular profile. Let's modify this.

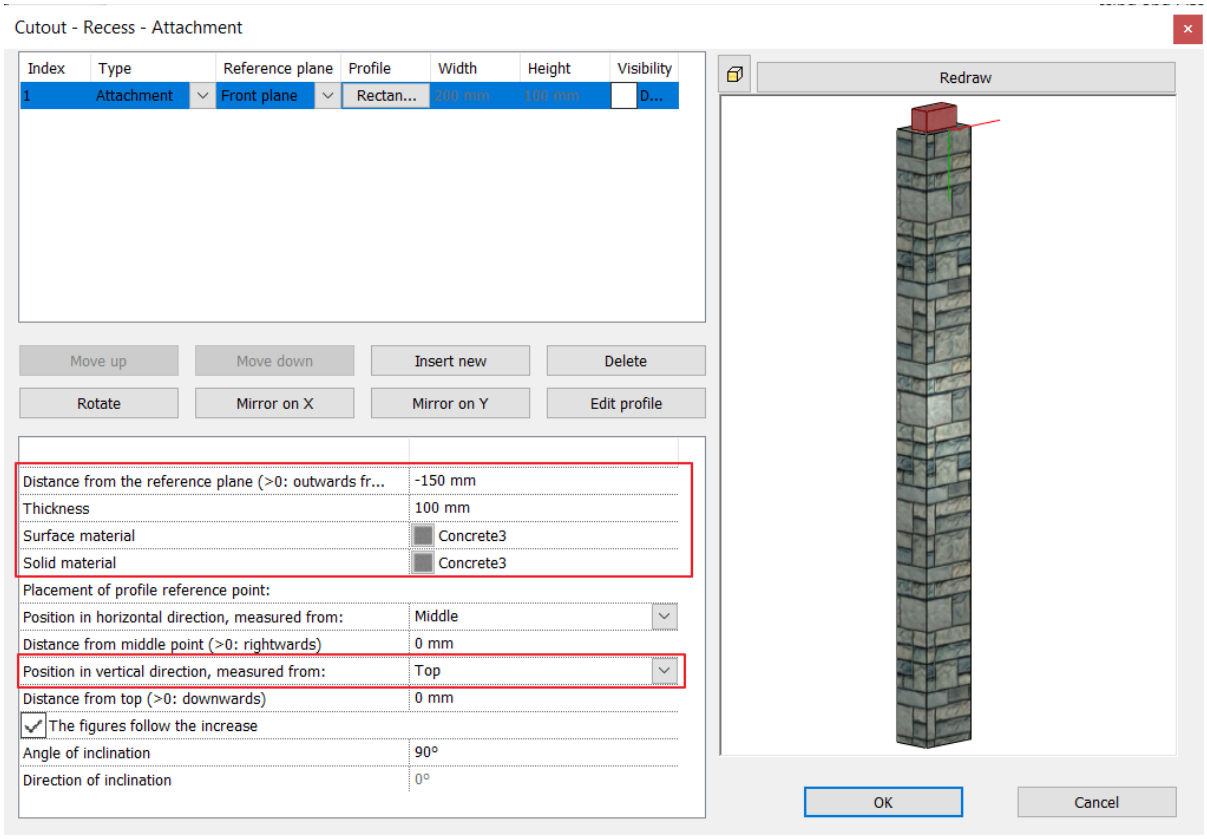
- Under **Type**, choose **Attachment**.



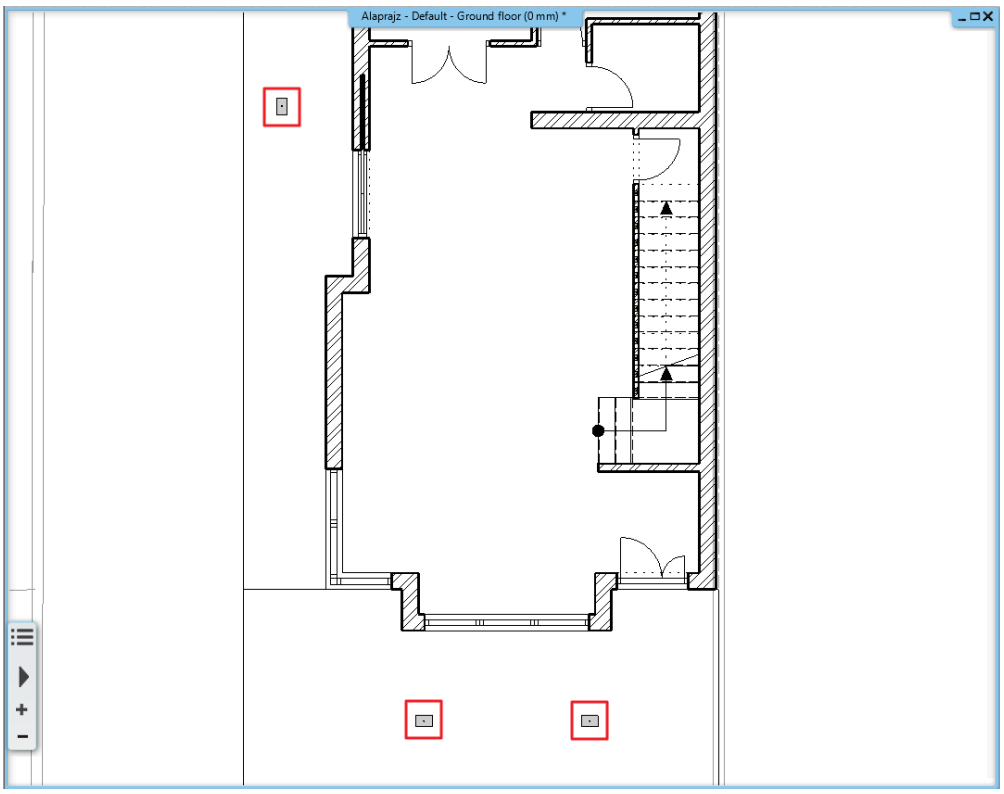

- Select **Rectangular** from the profile library and choose the bottom center point as the profile's reference point.



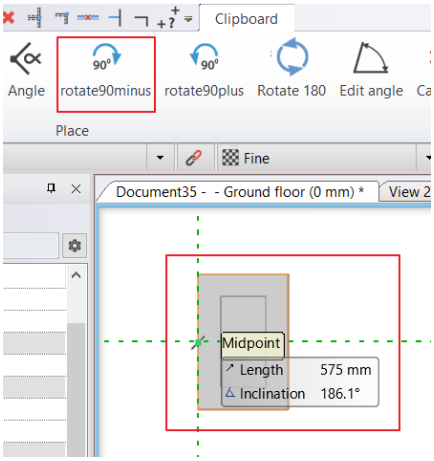

- Set the **Distance from the reference plane** to -150 mm and the thickness to 100 mm.
- Choose "Concrete 3" as the material.
- Select the **Top** option for the Position in the vertical direction, measured from setting.




- Place the columns as shown in the DWG drawing. Select the **Column** command.



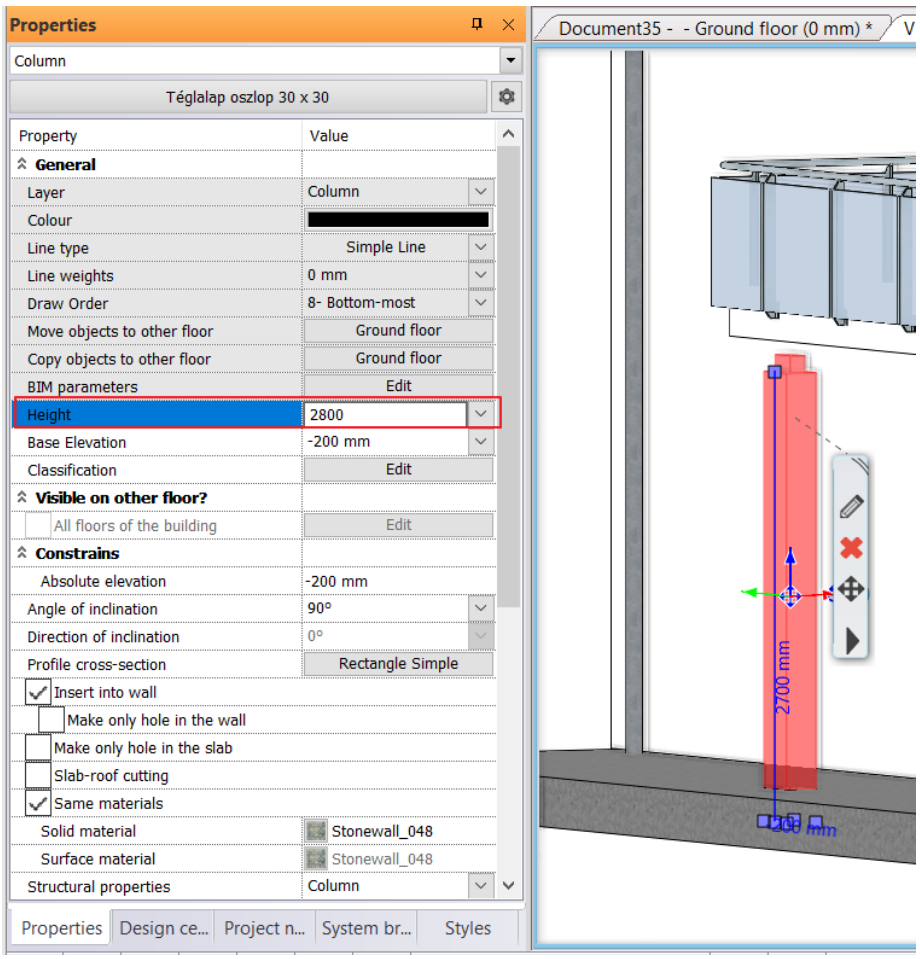

- To place the third column, select the Rotate -90° option.




- Activate the 3D view and zoom in on the column placed near the terrace with a railing.

It's evident that its height is not correct, so it needs adjustment.

- Modify the column's height to 2800 mm in the side properties menu.


Properties
Column
Téglalap oszlop 30 x 30
Property
Value
General
Layer
Column
Colour
Line type
Simple Line
Line weights
0 mm
Draw Order
8- Bottom-most
Move objects to other floor
Ground floor
Copy objects to other floor
Ground floor
BIM parameters
Edit
Height
2800
Base Elevation
-200 mm
Classification
Edit
Visible on other floor?
All floors of the building
Edit
Constrains
Absolute elevation
-200 mm
Angle of inclination
90°
Direction of inclination
0°
Profile cross-section
Rectangle Simple
Insert into wall
Make only hole in the wall
Make only hole in the slab
Slab-roof cutting
Same materials
Solid material
Stonewall_048
Surface material
Stonewall_048
Structural properties
Column
Properties
Design ce...
Project n...
System br...
Styles
Document35 - - Ground floor (0 mm) *
2700 mm

# Workshop 4:
# Documentation - Sections, Elevations and Callout

# 4. Workshop: Documentation - Sections, Elevations and Callout

In this workshop, we will focus on documentation. Below, we will learn how to create sections, elevations, and callout, as well as how to modify them.

Creating documentation is as important as the design itself. During this process, you can add descriptions, notes, dimensions to your drawings, and extract data for schedules or bill of materials in Microsoft Excel format. Finally, you can either print the drawings or generate digital PDF files from them.

ARCHLine.XP supports direct printing and the compilation of so-called printing sheets, ensuring high-level functionality, allowing you to organize content on virtual pages and generate multi-page PDF files.

Before we begin the documentation creation, please watch the tutorial video on Sections, Elevations, and Callout.

## 4.1. Meaning of Sections and Elevations

Sections, elevations, wall views, and callouts are fundamentally dynamic drawings. Dynamic drawings are linked to the building itself, allowing them to respond to changes.

### *Definition*

A **section** is a view created by cutting through the building along an imaginary plane. It illustrates the vertical dimensions of the building and architectural elements' layering that cannot be shown in the floor plan. The building section is derived from the building model and will be created as a New View related to the project. The program creates the section as a new 3D view perpendicular to the cutting plane. You can create any number of sections for your building.

The sectional view is entirely dynamic, tracking changes in the building model. You can work on a sectional view just like you would on a floor plan, selecting and modifying architectural elements. The section line is visible on the floor plan where it was created, but you can also configure it to be visible on all levels. The section line is represented by a dashed line with letters and arrows indicating the direction of the section view. You can replace the default symbol with your own.

If you move, rotate, or mirror the section line, the sectional view on the plan will update immediately. The **sectional view** allows you to represent elements through the cutting plane with or without hatching, with thin or thick contour lines. When creating the section line, you can set its depth and width. Resizing the cutting region allows you to control what appears in the Section view. Once created, you can manage sections in the Project Navigator.

### *Raster Images and Vector Drawings*

Sections and elevations can be created in two ways: as raster images and vector drawings.

**Raster images** are ideal for speeding up the design process and producing informative and versatile views. A raster view can be created in seconds. Raster views are highly customizable, as you can assign various visual representations, such as hidden line, X-ray, or true color. The size and quality of a raster image depend on its resolution. Higher resolution results in better quality. The drawback is that raster images cannot be scaled to larger physical sizes. Enlarging them can lead to reduced quality and blurriness. Raster images cannot be edited as vector drawings and are primarily recommended for creating working documentation during the design phase.

The advantage of **vector drawings** is accuracy. Vector views are created using geometric primitives like angles, lines, curves, and filled areas. They maintain their appearance regardless of size and can be printed at any scale without loss of quality. Vector drawings can be freely edited. The downside is that the computation time is significantly slower than for raster images, so vector drawings are recommended for final documentation.

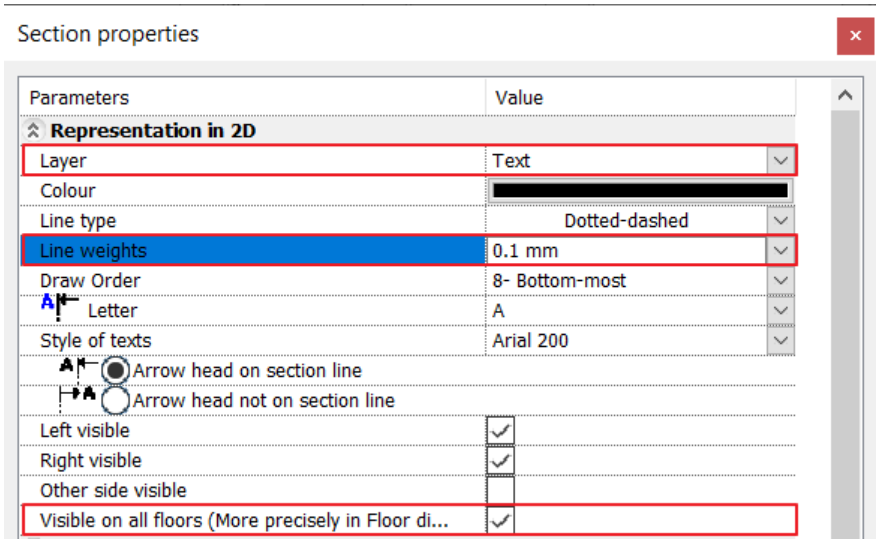
## 4.2. Sections

To define sections, initiate the **Ribbon Menu / Documentation / Section / Section Settings** command. In the dialog box that appears, you can configure the properties of section display on the floor plan and 3D view, as well as marker properties in 2D representation.

### *Image Representation Mode*

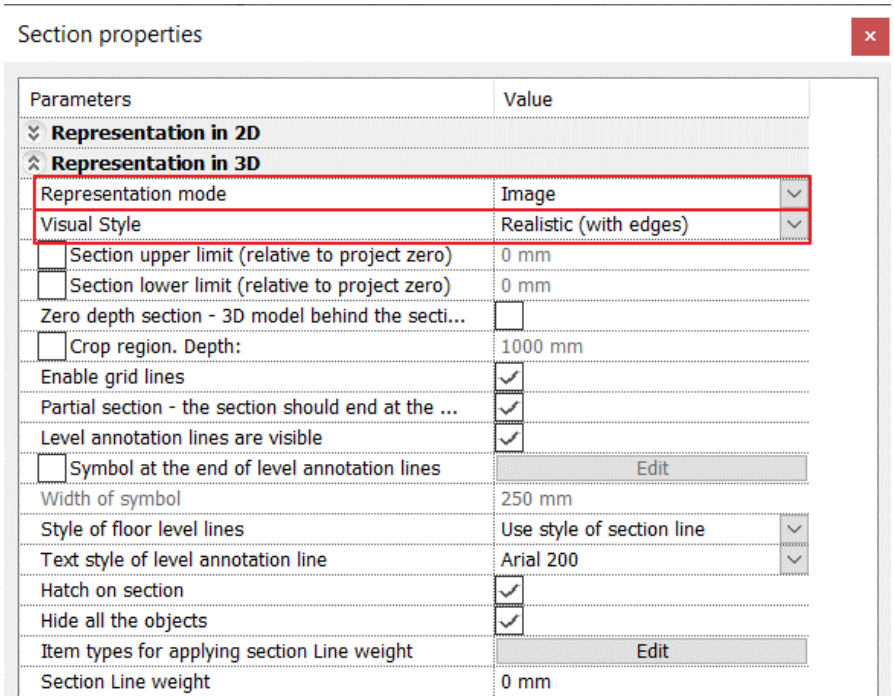
For **Representation in 2D**, you can configure properties that will be visible on the floor plan:

- Place the section on the **Text Layer**.
- Set the line weight to **0.1 mm**.
- Enable the option **Visible on all floors**, making them visible everywhere.

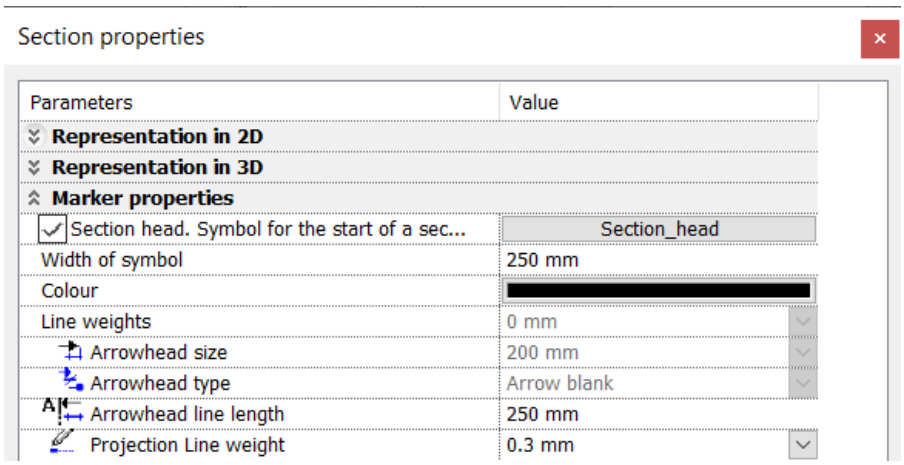



Let's review the **Representation in 3D** settings:

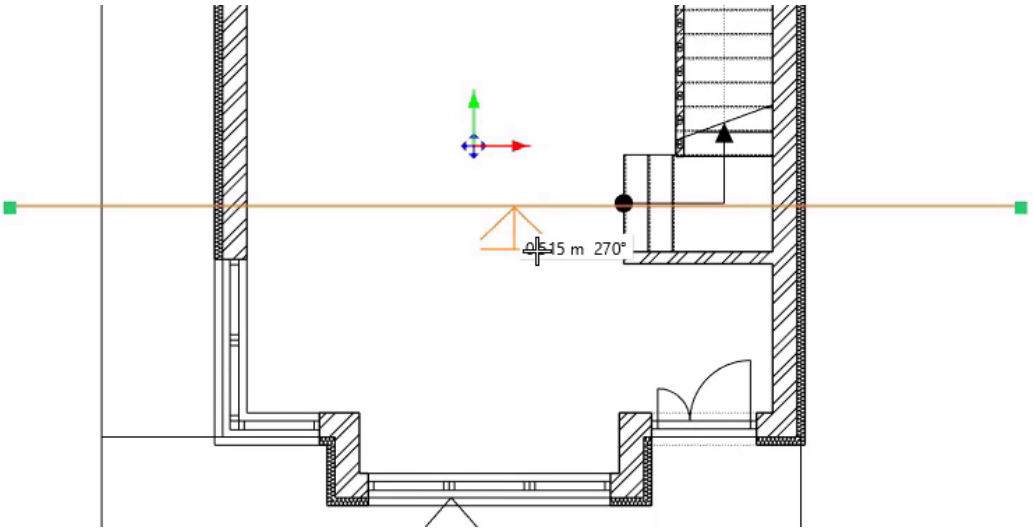
- Leave the representation mode as it is, as we want to create a **Raster image** section initially. Set the Visual Style to the following: **Realistic (with edges)**.



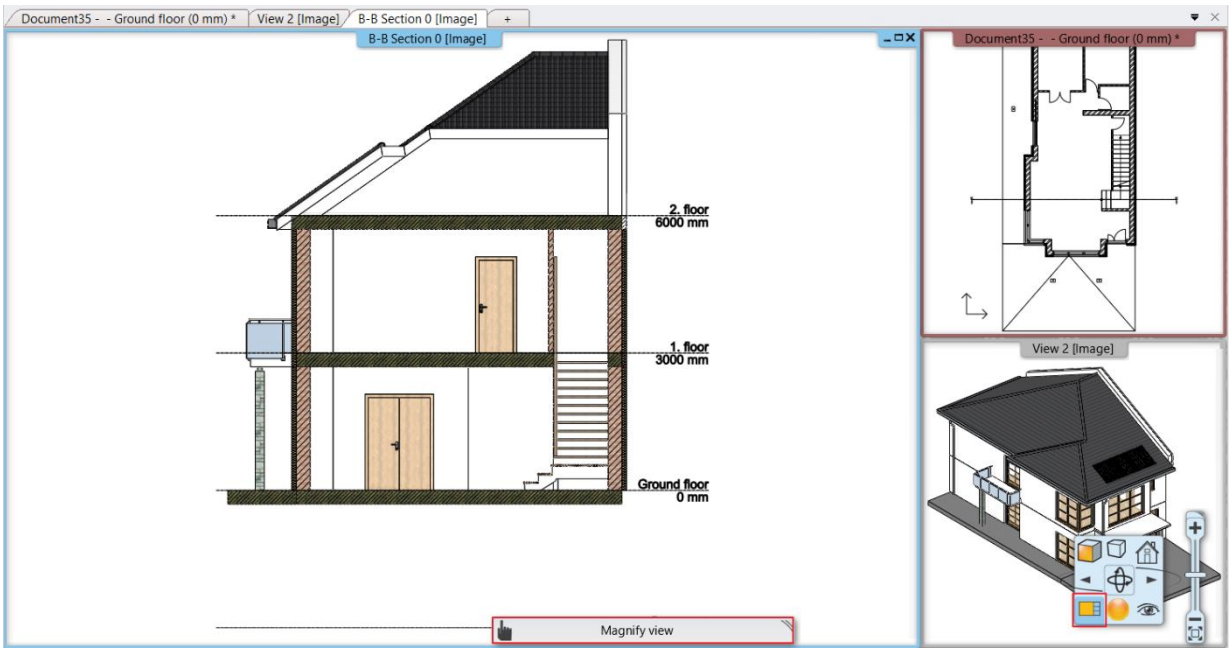

If necessary, you can configure the **Marker** properties; for now, we'll leave them as is.



- Close the dialog box by pressing the **OK** button and create a horizontal raster section using the Documentation - Section - Section command.
- Draw the section line by **clicking from the start point to the endpoint** with a horizontal line.
- Adjust the viewing direction by moving the mouse so that even the staircase is visible, then click to confirm.

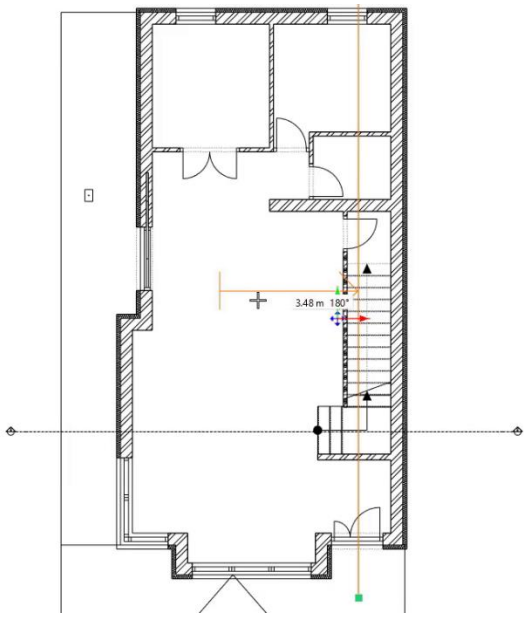



At this point, the program will create a completely separate window for this raster image section. You can place this window among the others using the "Magnify View" icon located in the lower left corner of the Navibar.



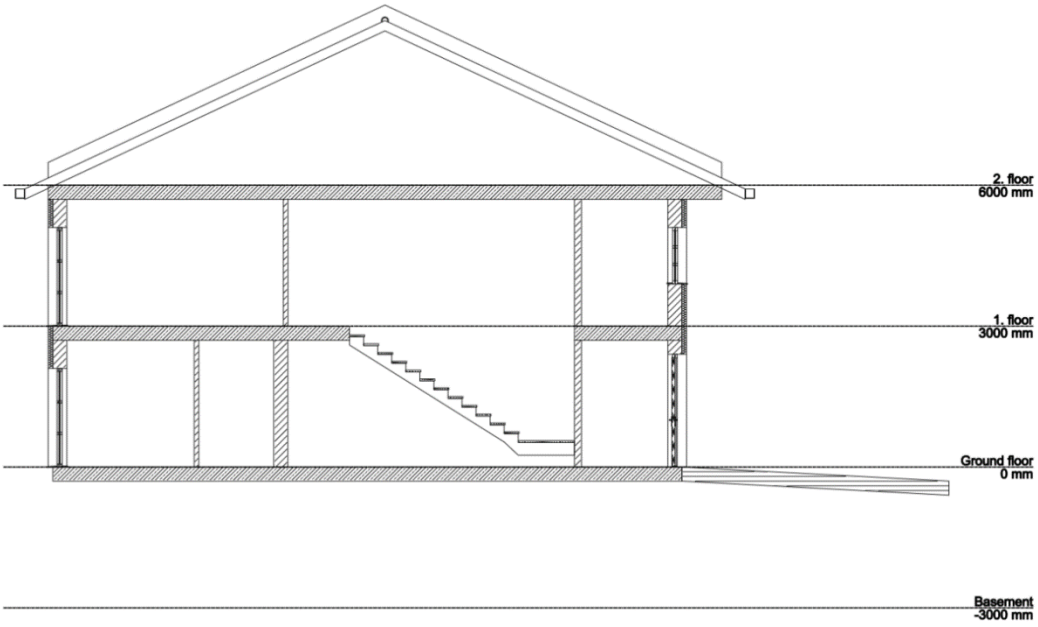

On this raster image section, you can see the colors, textures, and contour lines that the program automatically generated.

### *Vector Representation Mode*




Now let's create a vertical section as a vector drawing.

- Go back to **the Documentation - Section - Section Settings** command.
- In the *Representation in 3D*, change the Representation Mode to **Vector drawing**. Confirm with OK.
- Again, choose the **Section - Section** command, and draw the section line vertically, passing through the staircase and the two openings.
- Specify the viewing direction.
- The section is ready, place this window among the others as well.




As mentioned earlier, sections are linked to the model, including the section line. So, if you make any changes, the section will update accordingly.
You can turn off the automatic update feature, which can speed up your work. If it always updates automatically, it can slow down your workflow.

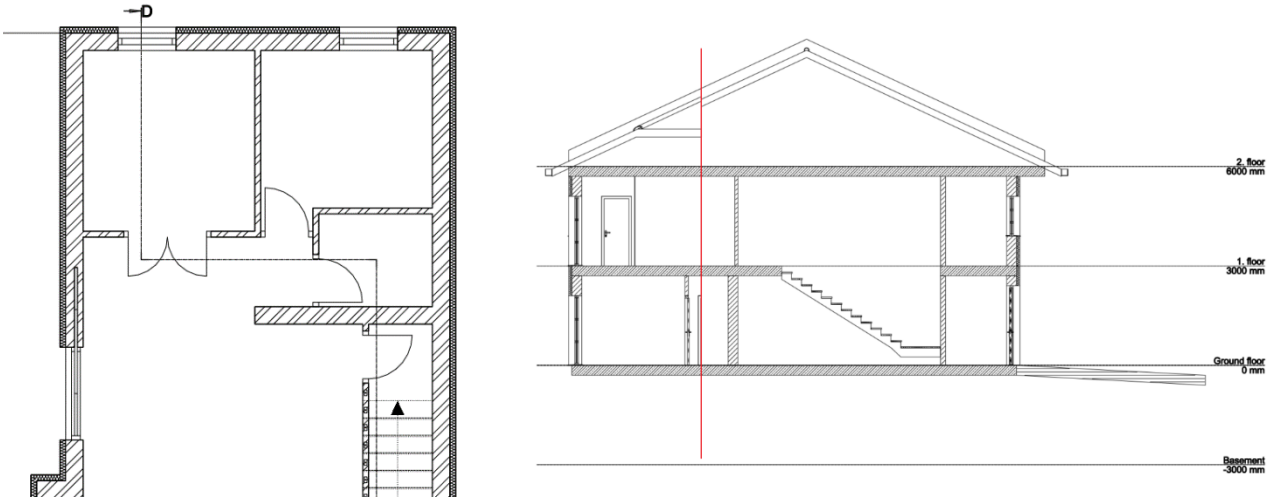
Here's how to disable it:

- Find it in the Settings, under the Graphics menu. Under the *Build 3D model section, disable the “Keep Section view of this project updated" option.

### *Segmented section*

You can create a segmented section using the **Documentation - Section - Segmented Section** command or modify an existing section. In this case, we'll go with the second option.

- Go back to the floor plan, select the section line, and choose the "Insert Node" option by clicking on the line.
- Click the line marker again, then select the **Offset** command.
- Accept with Enter. The program will ask if you want to update the section. Respond with "Yes." When you look at the newly created section, you will see that the segmented section has been created.

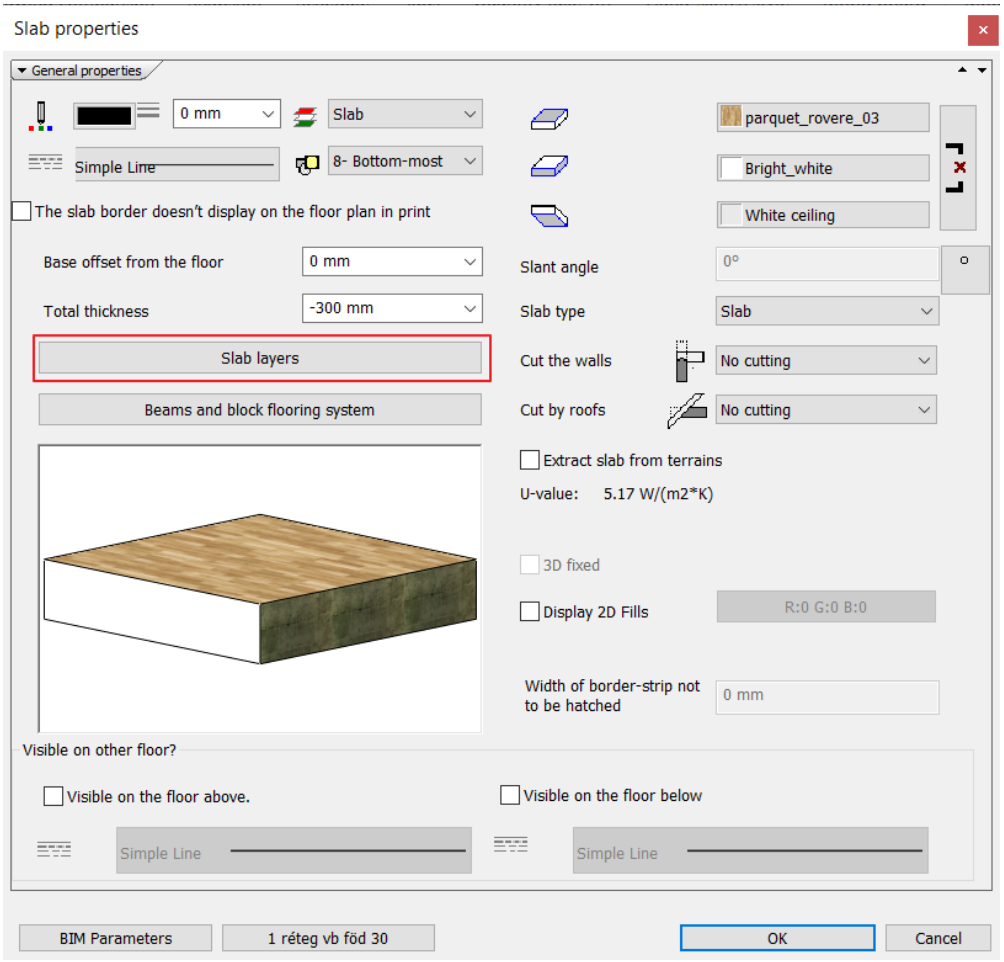



## 4.2.1. Hatching Patterns in Sections

There may be cases where you need to modify the hatching of sectioned walls, slabs, and other elements in your sections. These elements have internal materials that determine their appearance in your elevation views or sections. To represent a sectioned surface with different hatching patterns, you can do the following:

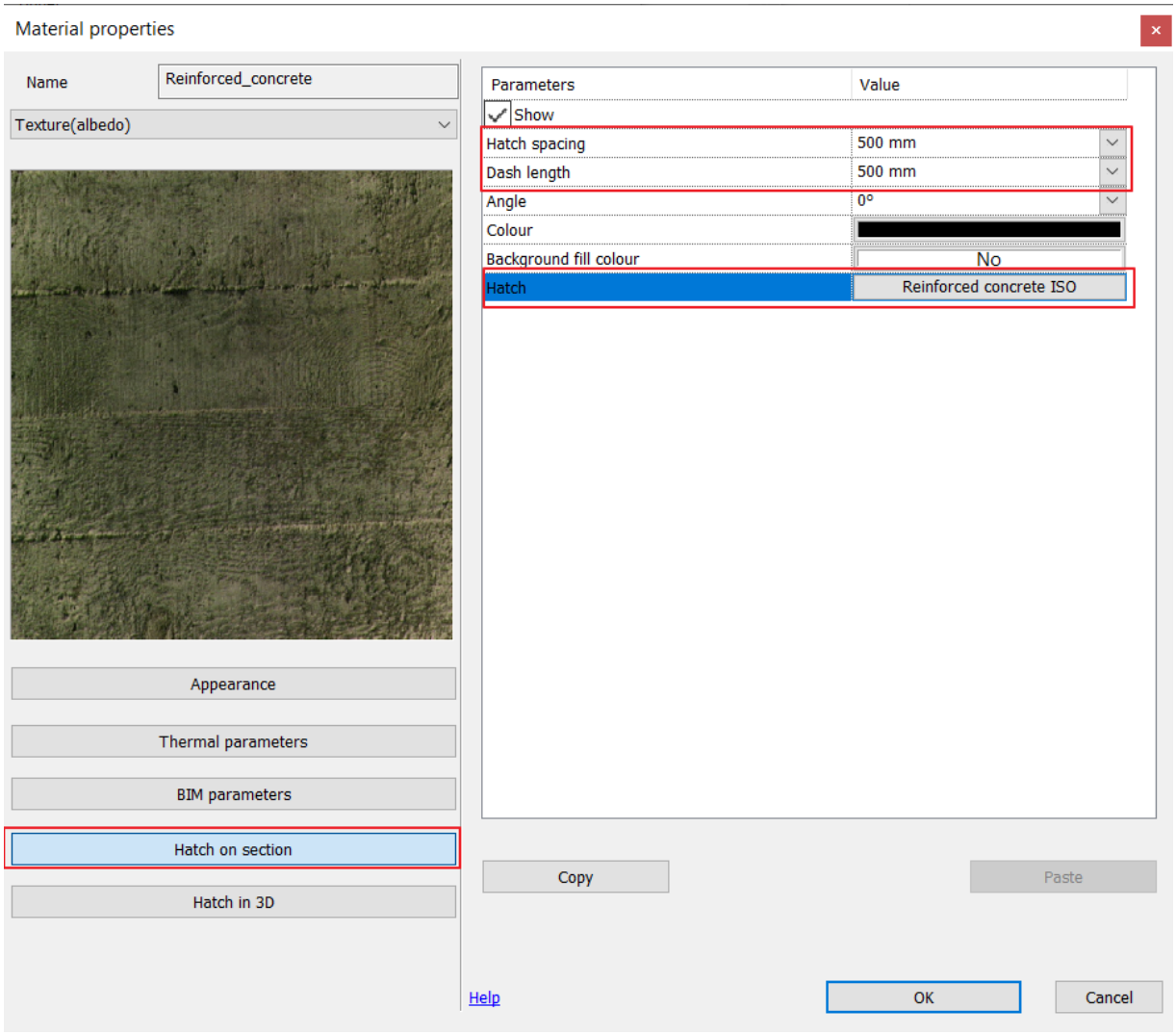
- Change the internal material to a different one with a different hatching pattern,
- Or modify the properties of the existing material to define a different hatching display for it.

Let's review this conceptual design and change the material properties of this slab.




- **Select the slab** and click the **Modify** button represented by the pencil icon to access its properties.
- In the displayed property window, click the "**Slab Layers**" button to bring up the properties of the slab layers in a new window.

- Click on the **Reinforced Concrete** material. This will open the material library, where you can either choose a new material or edit the properties of the current one.
- In the materials window, click the **gear** icon in the upper-right corner and select "**Edit Material**" from the list, while the reinforced concrete material is selected.
- Choose the "**Hatch on Section"** option.
- Click on the Hatch name.
- Select the **Reinforced concrete ISO** pattern.
- Change the **Hatch spacing and Dash length** values to **500 mm.**



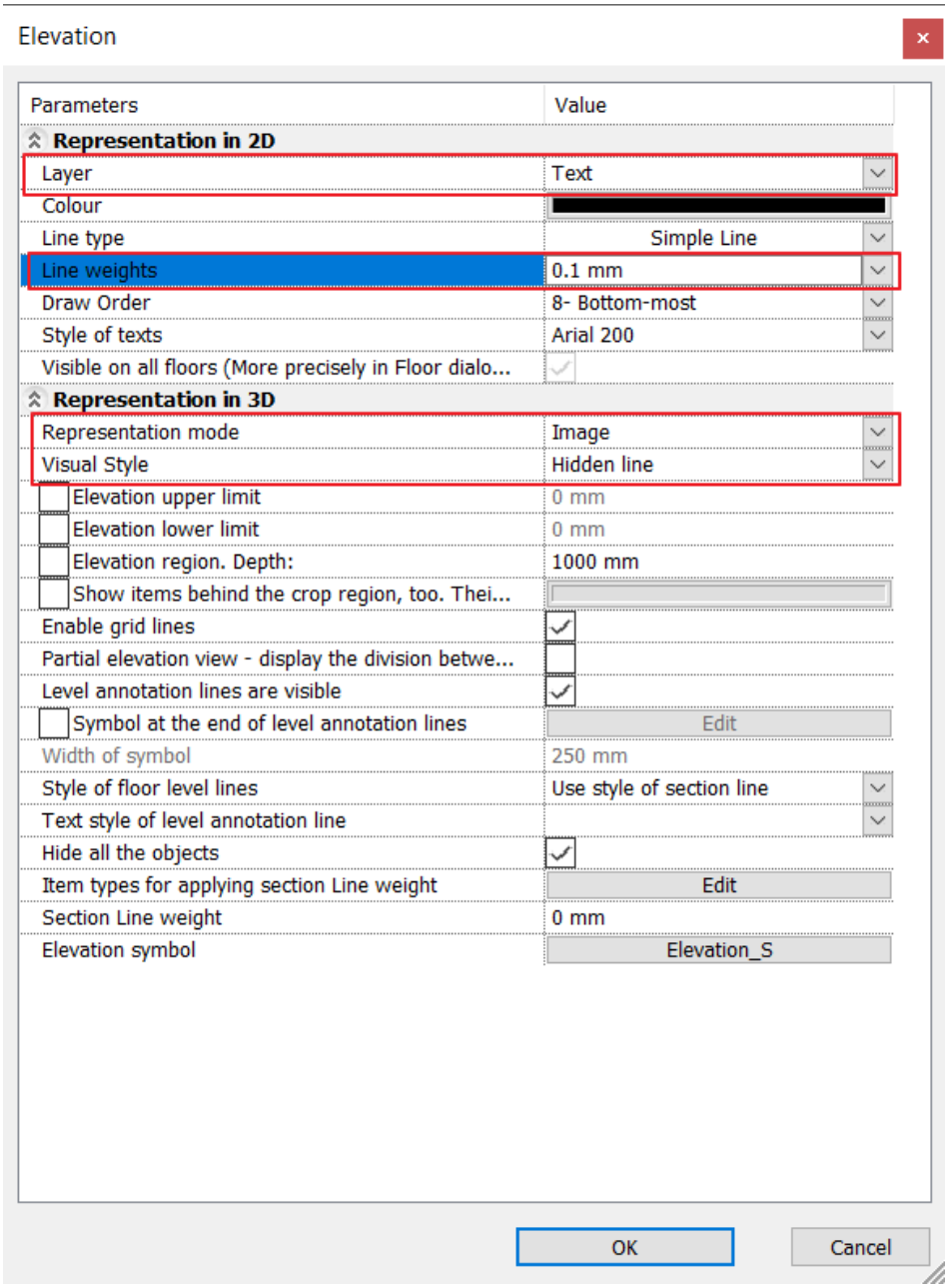

- Close the dialog boxes by pressing the **OK** button.
- The section will automatically update at this point. However, if you still don't see the correct hatching, you can rebuild the model with the 3D hammer tool.

# 4.3. Elevation Views

## 4.3.1. Image Representation Mode

Creating elevation views works in a similar way to creating sections.

- Click on the **Ribbon Menu / Documentation / Elevation View / Elevation Settings** button to configure the parameters!
- You'll notice that here the parameters are divided into two sections: *2D Representation and 3D Representation*, but you can adjust almost the same properties as in the case of sections.
- Under Layer, select the **Text Layer**.
- Set the **line weight** to **0.1 mm**.
- Set the Representation Mode to **Image** and the Visual Style to **Hidden Line**.
- Leave the other properties at their default settings.



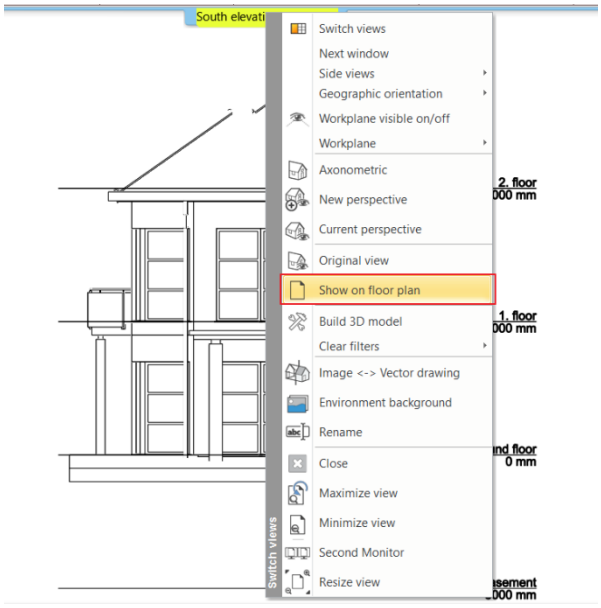

Click the OK button. Within the Elevation View command, you can create automatic elevations as well as create your custom ones using the New Elevation feature.

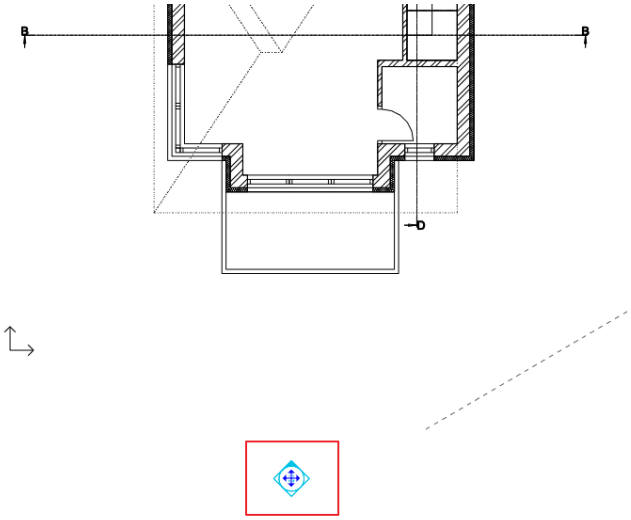
- Create the following elevations from the floor plan: **North, West, South** elevations. Place the newly created windows among the existing ones.

### *Modifying Elevation Representation*

- can modify the representation of elevations even after creation by clicking on the floor plan symbol.

If you can't find the floor plan symbol, you can easily locate it by clicking on the elevation window, then choosing the "**Show on the floor plan**" option. The program will then show you the location of that elevation on the floor plan.




Let's modify the representation of the West elevation.

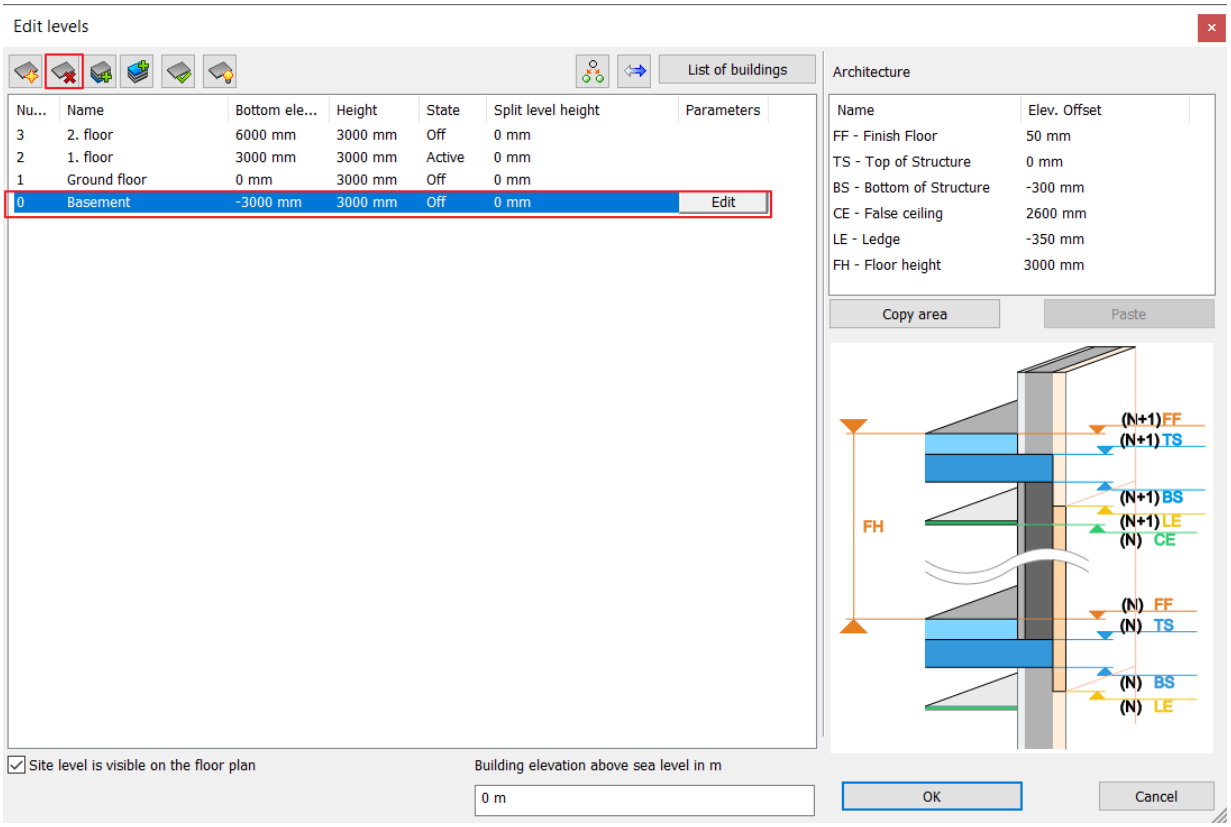
- Click on the West elevation on the floor plan, then choose the pencil symbol from the local menu.
- Set the *Visual Style* to the following: **Realistic (with edges).** Accept with OK.
- When prompted (Create Elevation view?), respond with **Yes**.

The Realistic (with edges) representation of the West elevation is now complete.

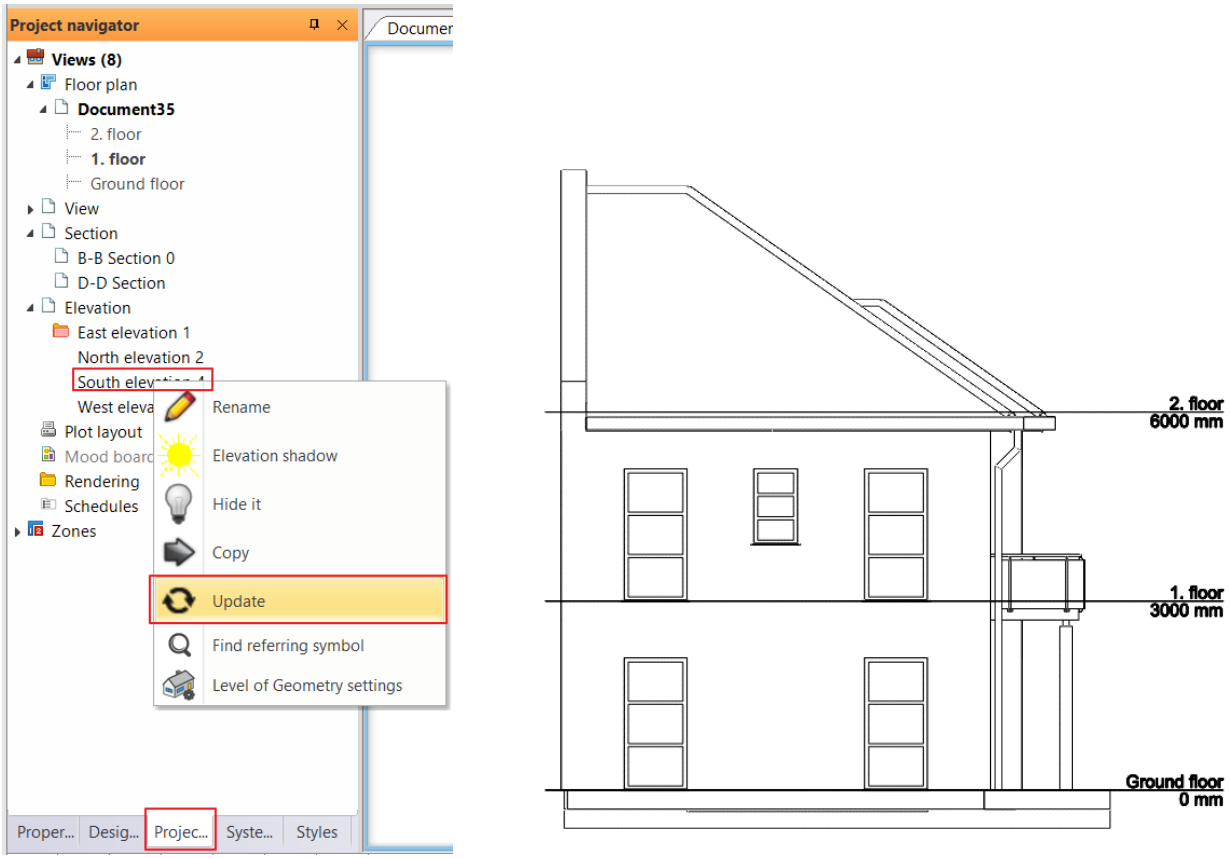
### *Deleting Unnecessary Floor*

In the floor lines, you can see that the basement level is visible, even though there is no basement in this building. Instead of manually deleting the level lines on each elevation, let's see how to delete the entire basement level.

- Switch to the floor plan, then click on the level manager.
- Select the basement level and delete it using the **Delete Floor** command. The program will warn you that there is no undo option after deletion; accept this.



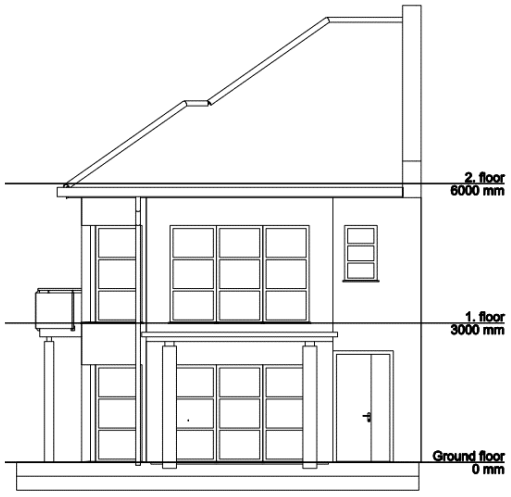

- On the left side in the Project Navigator, you'll find the sections and elevations. Here, you can simply right-click and update each elevation, which will immediately remove the unnecessary basement level lines.




## 4.3.2. Vector Representation Mode

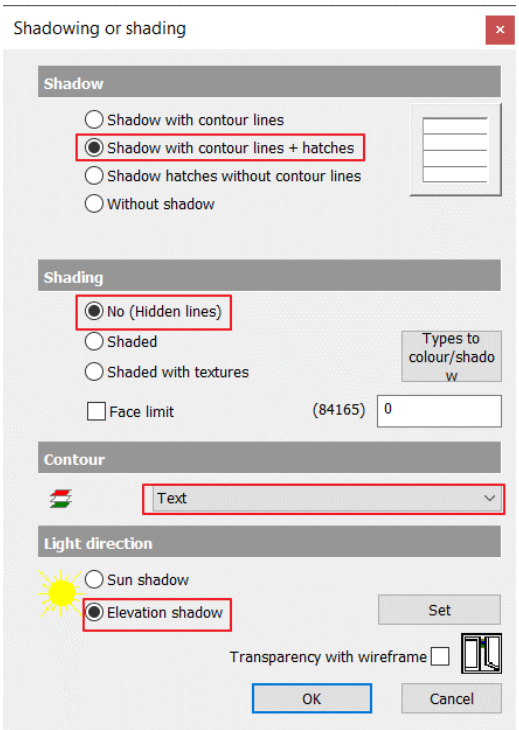
After the image representation mode, let's create an elevation using the vector representation mode!

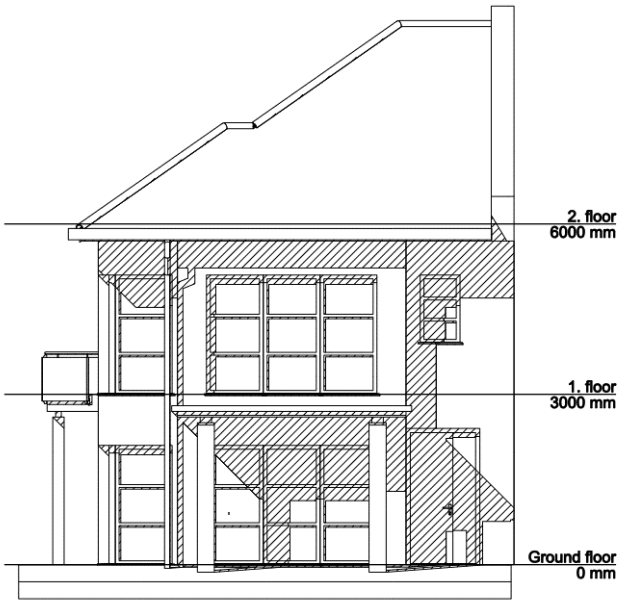
- Delete the already created South elevation. Select its symbol on the floor plan, then click Delete. The program will warn you that you're trying to delete a drawing from the project. Accept with OK.
- Let's recreate the South elevation!
- This time, in Elevation View - Elevation Settings, choose the **vector drawing representation** mode instead of the image representation mode.
- Use the Elevation View - South Elevation command to create the elevation again.




## 4.3.3. Creating Technical Shadows

- To display hatching and other technical shadows on the elevation, click on the **Shadowing or shading command** on the left side, under Properties.
- In the dialog box that appears, set the shadow display mode to "**Shadow with contour lines + hatches**" shading to "**No (Hidden Lines)**," and the light direction to **Elevation Shadow.**
- Also, place the contour on the **Text layer**. Accept with OK. The technical shading is now complete.



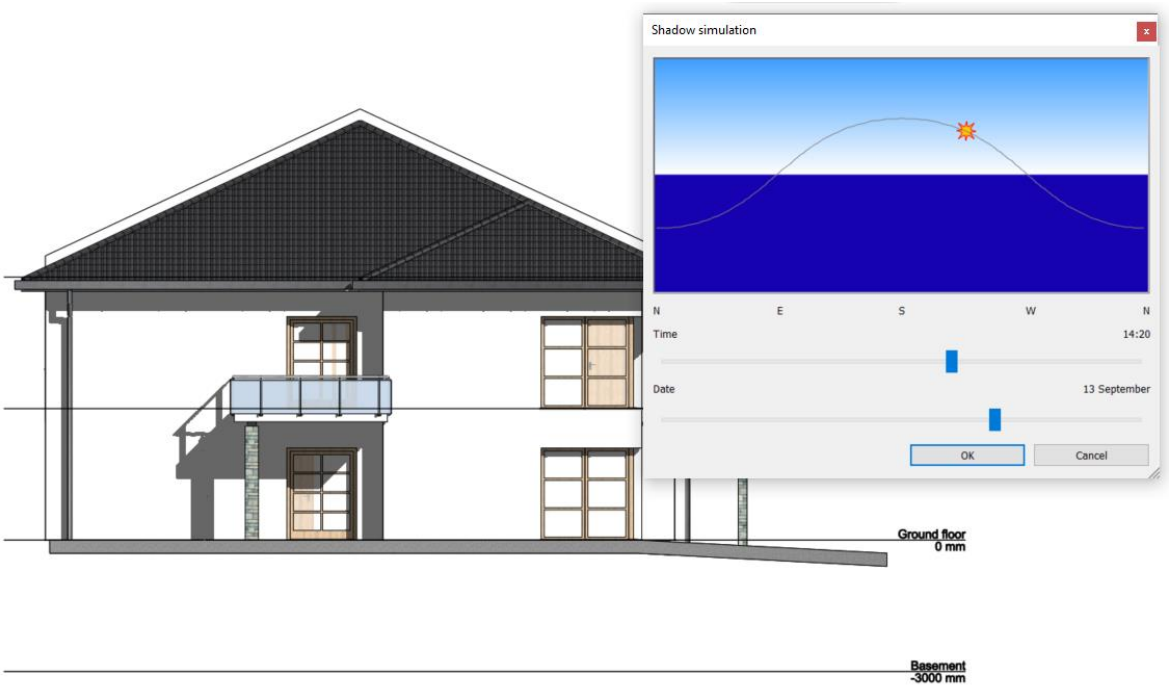




## 4.3.4. Creating Sun Shadows

Let's see how to create sun shadows on an elevation!

- Select the West elevation, then go to **View – Shadow – Shadow on/off**. This will create the shadow.

- If you want to display it for a different time of day, choose **View - Sun - Sun and Shadow Simulation**. Here, you can adjust the sun's direction using sliders. Accept with OK.

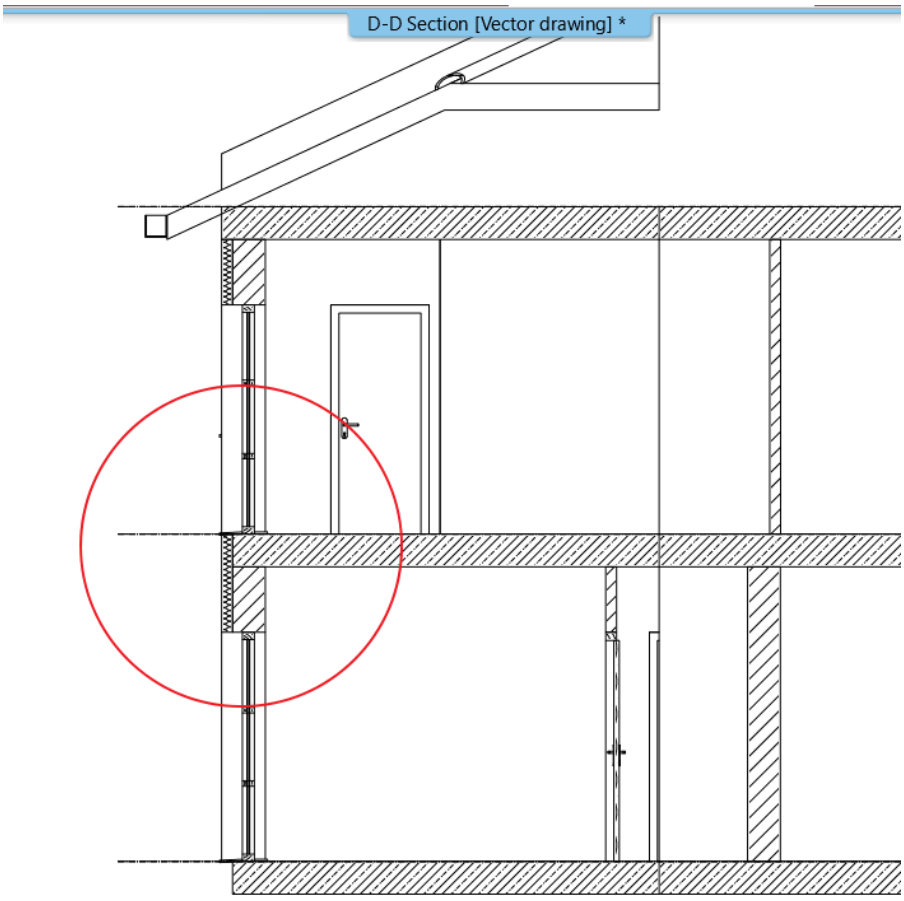



## 4.4. Callouts

Callouts are used to create detailed architectural details that demonstrate specific structural connections. Callout views can be added to floor plans, sections, or elevation views.

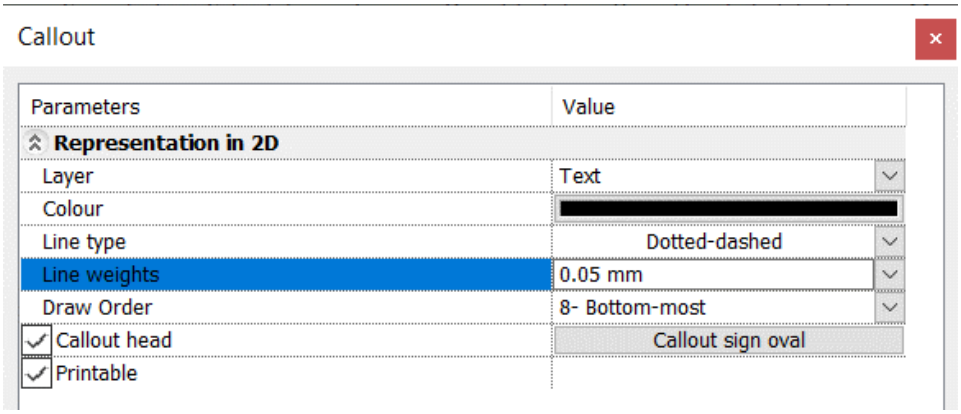
### *Placing a Callout*

We will now use the D-D longitudinal section, and we want to create a callout for the circled area.

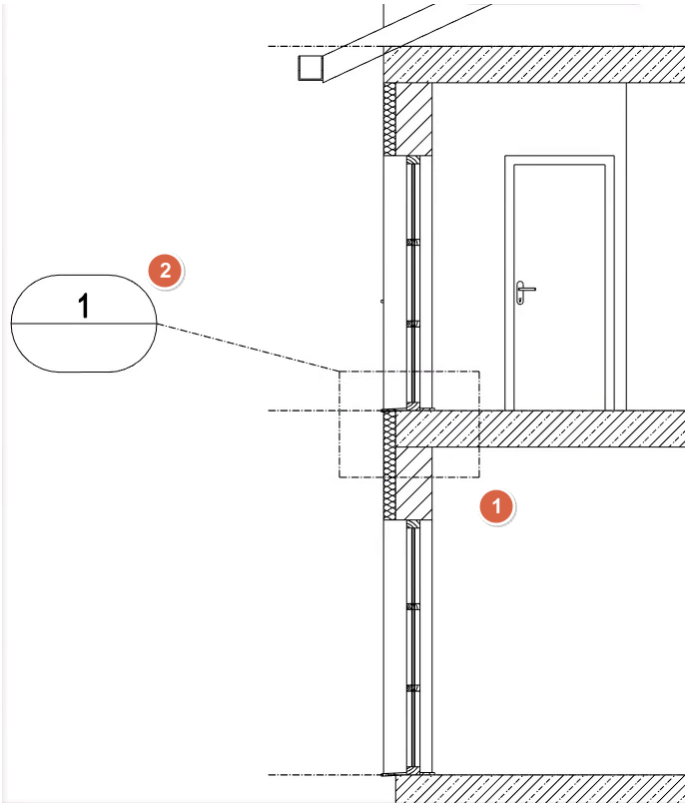


By clicking on the **Ribbon Menu / Documentation / Callout / Settings** option, let's configure the callout properties.

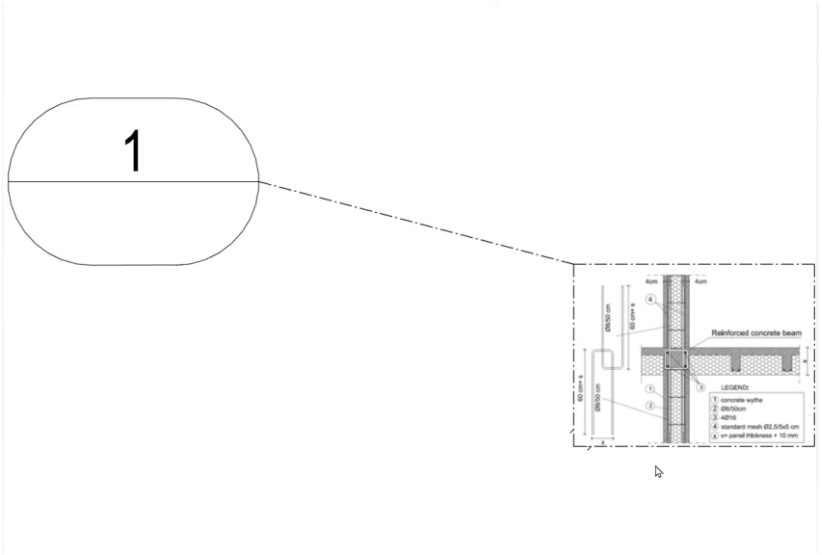
- Select the **Text layer** for the layer.
- Set the line weight to **0.05 mm.**
- You can also change the callout marker, but for now, let's keep the default oval. Accept with OK.




- Draw the Callout using the Callout - Rectangle tool.
- First, place the rectangle on the area to be called out, then position its marker.

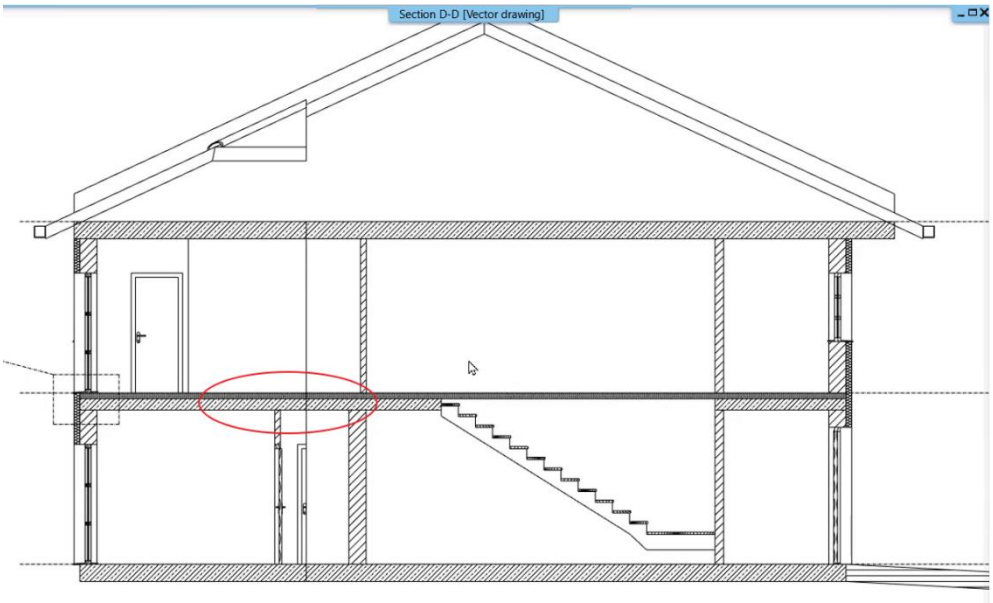



- The program has created the callout in a completely separate window, which can be inserted among the other windows in the usual way.
- Callouts maintain a continuous live connection with the original content, but in the ARCHLine.XP 2024 version, there is an option to replace the content of the callout with a PDF or DWG file.
- To do this, click on the callout, then select "**Callout Content - Import Raster Image**" from the local menu.
- Browse and select the file you want to use from your computer; for this project, use this one: *ARCHLine.XP Draw - 2024 – lesson_4*, select the png file and click OK to load it.



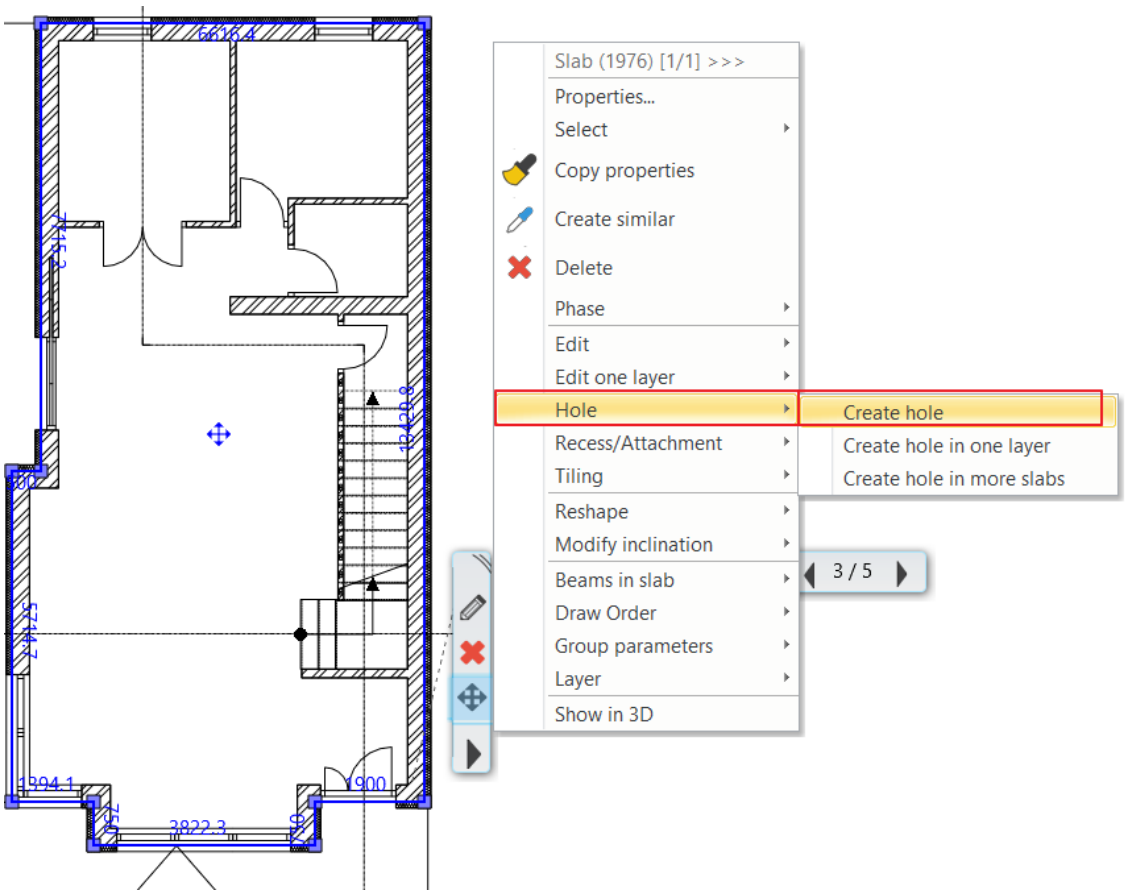

### *Modifying the Slab Structure*

- Go back to the D-D longitudinal section.
- Click on the slab, then the pencil icon, and select the "**Slab Layers**" command.
- Click on the green + icon to create a new layer.
- Change their thickness: the upper layer should be **-100 mm,** and the lower one should be **-200 mm**.
- For the upper layer, select "**Prefab Concrete**" as the material, then change its hatch in the section.
- Click on the gear icon and choose the "**Edit Material**" command, then change the hatch to **Concrete ISO**. Accept all windows with OK.
- Rebuild the view using the 3D hammer, and you will see that the layered slab has been created.

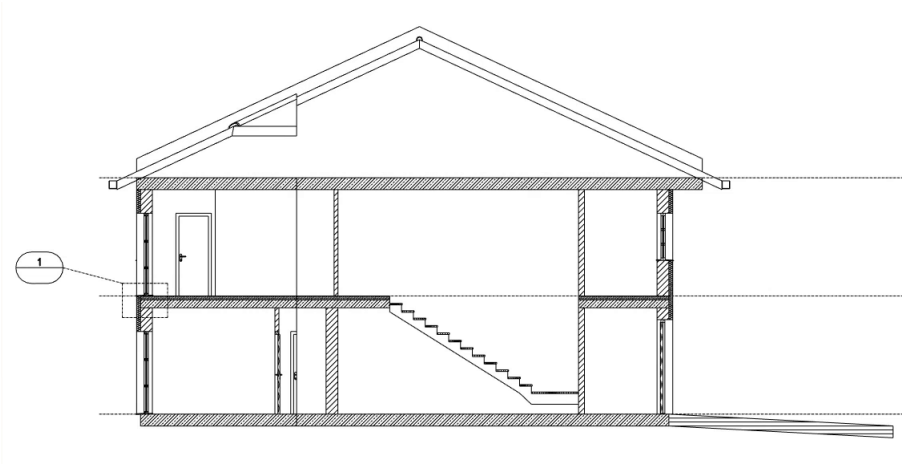



However, it appears that the hole in the slab has disappeared, so we need to recreate it on the floor plan.

- Switch to the floor plan view, then select the slab.
- From the local menu, choose the "Hole – Create hole" command, then draw the hole with a rectangle above the stair structure.
- Exit the command by pressing Enter.




- Go back to the D-D section and rebuild the 3D model. The floor hole should now be correctly displayed.



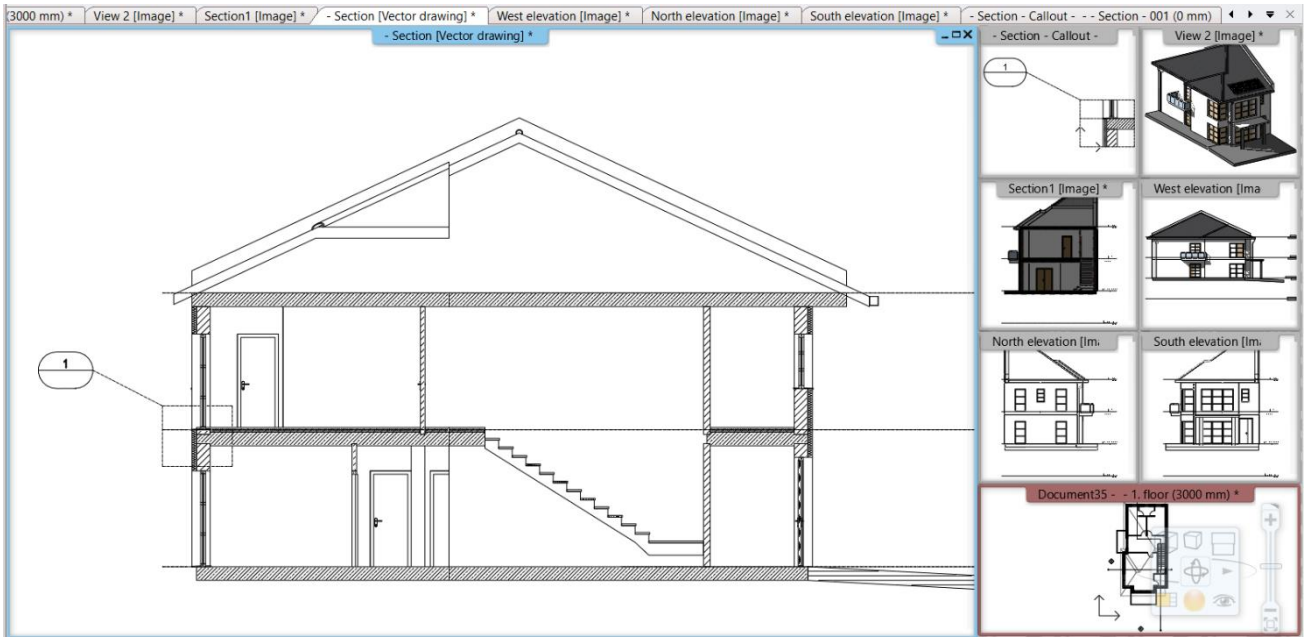
### *Modifying the Connection Between Walls and Slab*

We want to adjust the connection so that it aligns with the top of the load-bearing layer of the walls.

- Make the floor plan active, and click on the level manager.
- In the top-right corner, you can adjust these heights, set the following:
- Finish Floor Level: 0 mm,
- Top of Structure: -100 mm,
- Bottom of Structure: -300 mm.
- Accept with OK.

In the D-D section, you can see that the slab has shifted down because of its relative height of -100 mm. We need to reset this to the correct height.

- Click on the slab, then the pencil icon.
- It's visible that the slab's base offset is – 100 mm. Go to the editing, and adjust it to align the Bottom Bound with the Finish Floor Level. Accept with OK.
- Rebuild the model. You're now done with the modifications.


(3000 mm) *
View 2 [Image] *
Section1 [Image] *
- Section [Vector drawing] *
West elevation [Image] *
North elevation [Image] *
South elevation [Image] *
- Section - Callout - - - Section - 001 (0 mm)
- Section [Vector drawing] *
1
- Section - Callout -
View 2 [Image] *
Section1 [Image] *
West elevation [Ima
North elevation [Im
South elevation [Im
Document35 - - 1. floor (3000 mm) *

# Workshop 5: Dimensioning, Detailing, Schedules and Project Phases

# 5. Workshop: Dimensioning, Detailing, Schedules and Project Phases

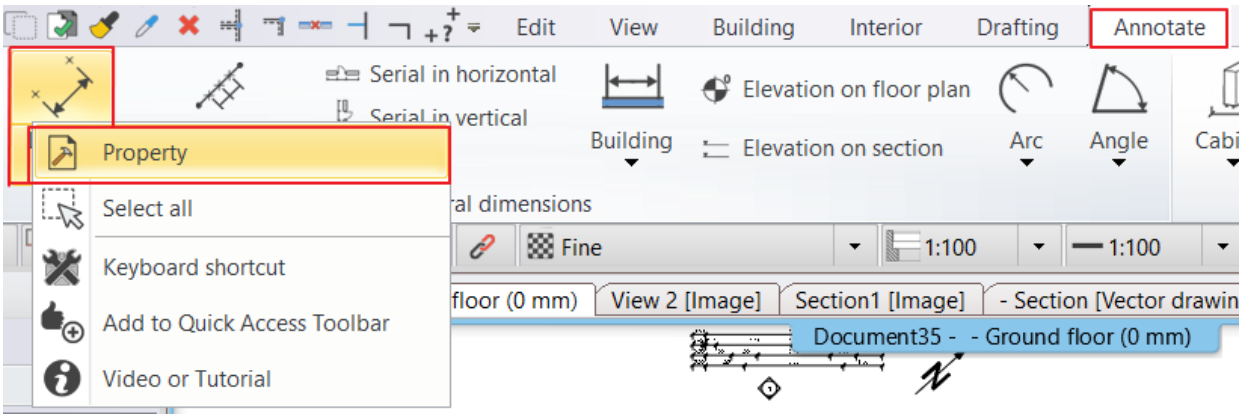
In this workshop, we will continue with the documentation process. We will focus on dimensioning and labeling to make the documentation more readable and comprehensible.

Before we begin the next workshop, please watch the tutorial video Dimensioning, Detailing, Schedules and Project Phases.

## 5.1. Properties of Dimensioning

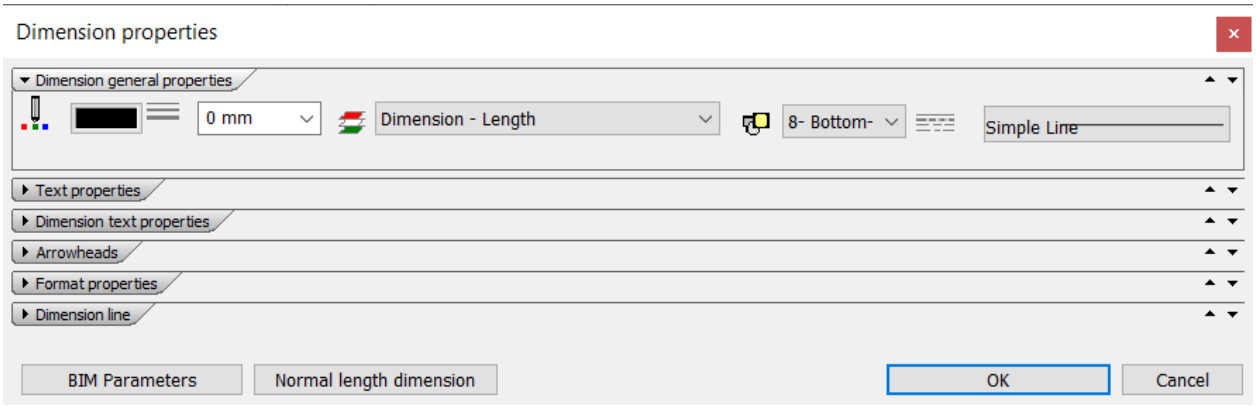
We will be dimensioning the floor plan, the windows and doors on it, as well as the sections and elevations that have been created.
To ensure that the dimensions are prepared correctly, we need to adjust their properties. This can be done by accessing the **Ribbon / Annotate / Properties** menu or by right-clicking on various dimensioning commands.

- Right-click on the **Ribbon / Annotate / Length** command and access its properties.



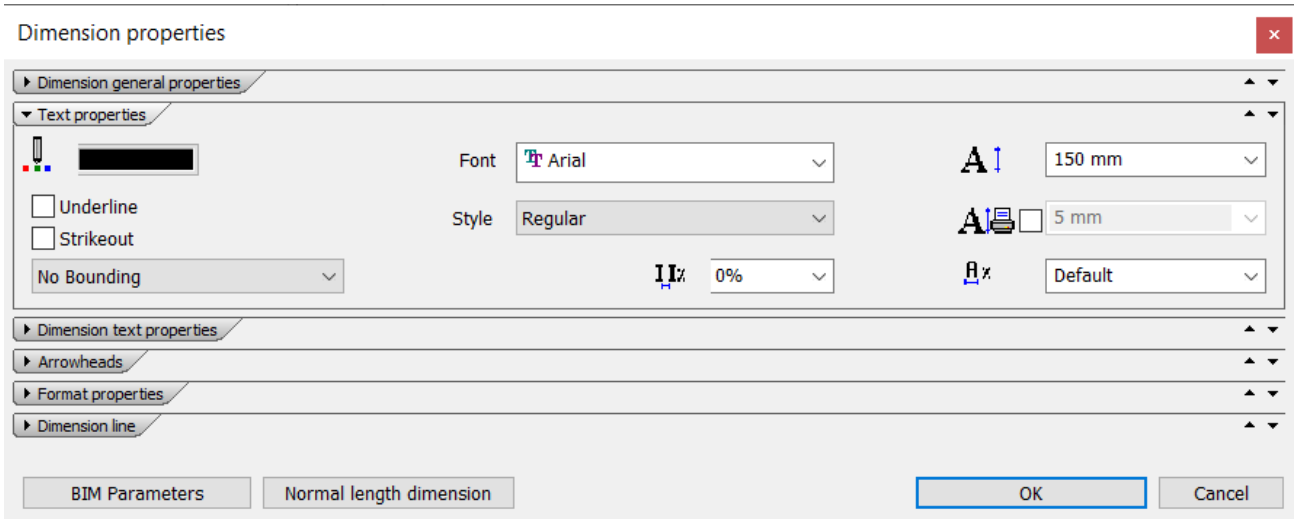

### *Dimension general properties*

In this section, we can configure the color, line type, and weight with which the dimensions appear, as well as the layer to which they belong.



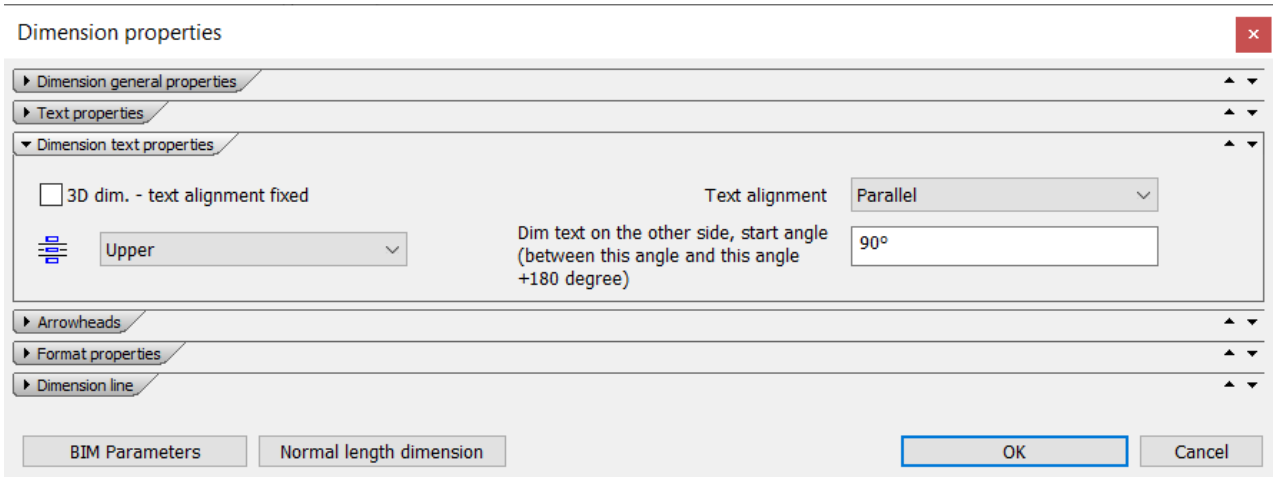

### *Text properties*

Here, you can set the properties of the text associated with the dimensions, such as font type, size, color, as well as select from various other formatting options.



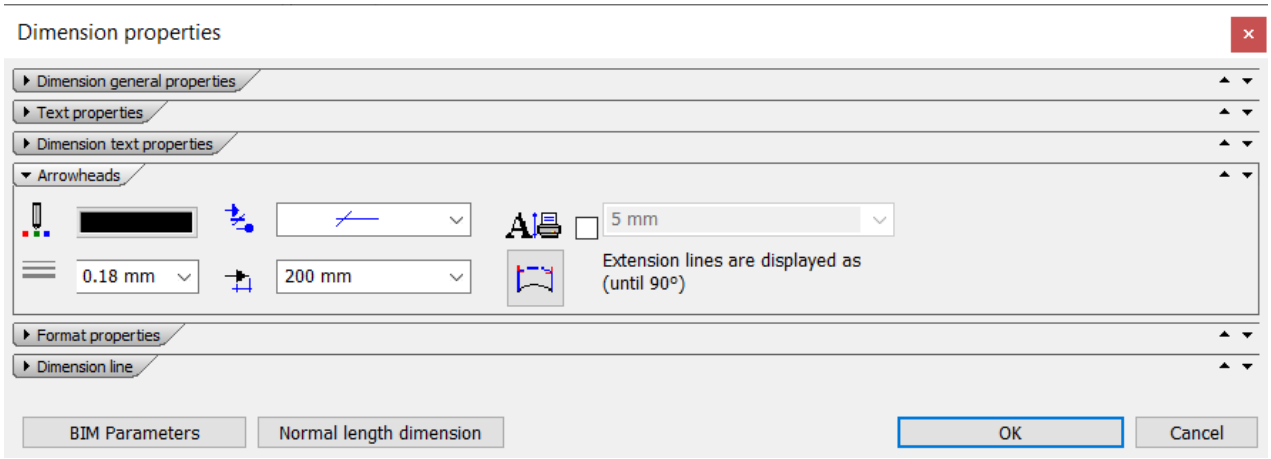

### *Dimension Text Properties*

Here, you can set the position of the dimension text with respect to the dimension line.



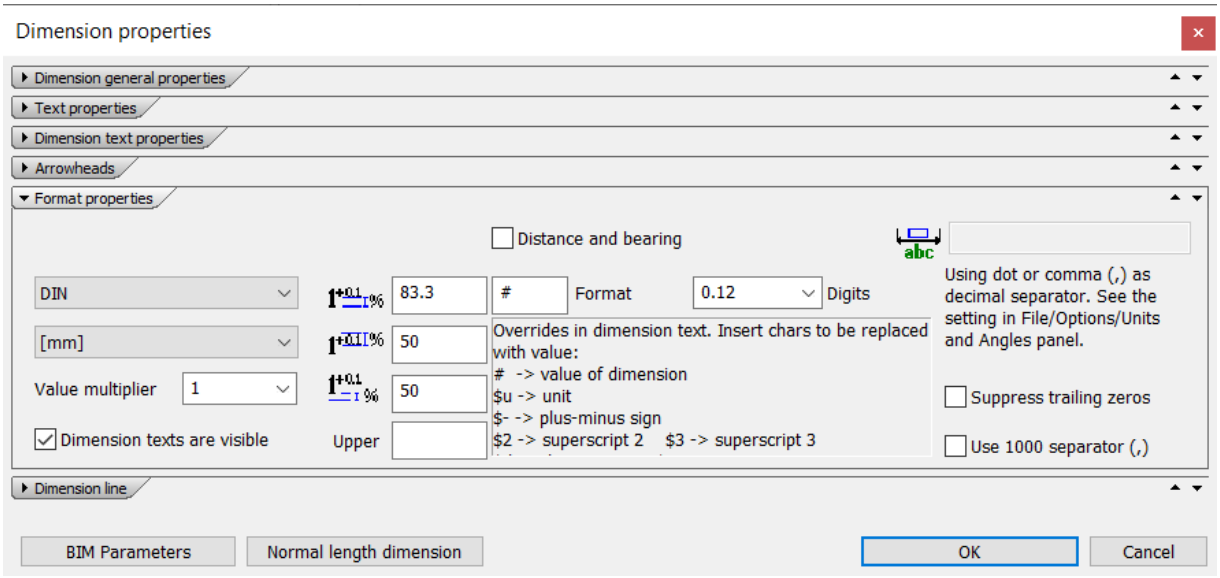

### *Arrowhead*

On this tab, you have the option to modify the symbol of the arrowhead, as well as change its size and color.



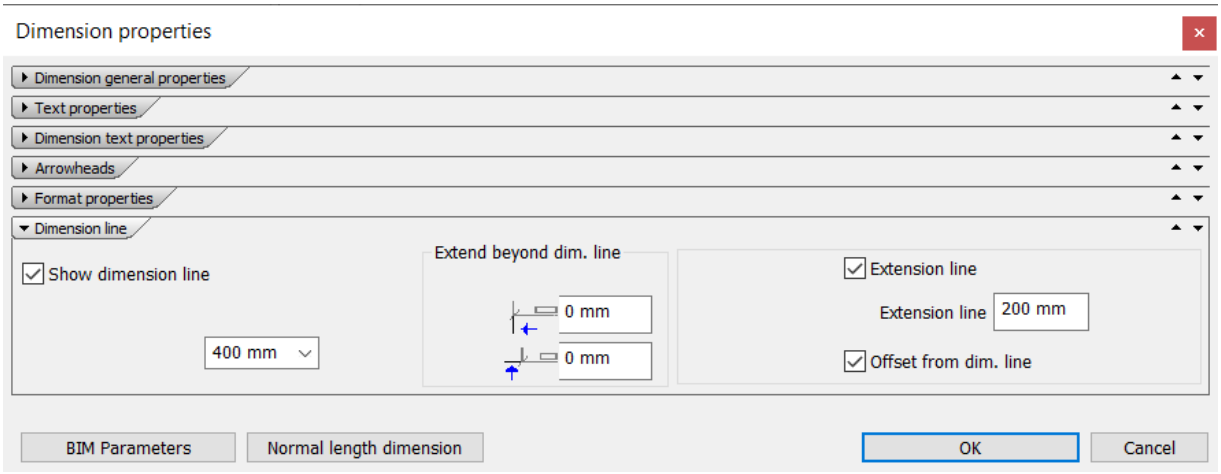

### *Format properties*

You can select the standard according to which you want to dimension and modify the display of decimal points.




### *Dimension Line*

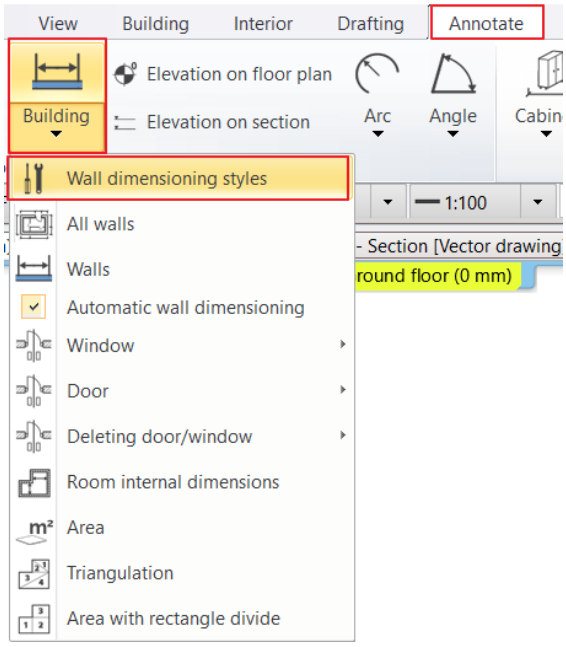
Finally, on the Dimension Line tab, you can set the extension lines for the dimension, toggle extension lines on or off, and specify their distance from each other.



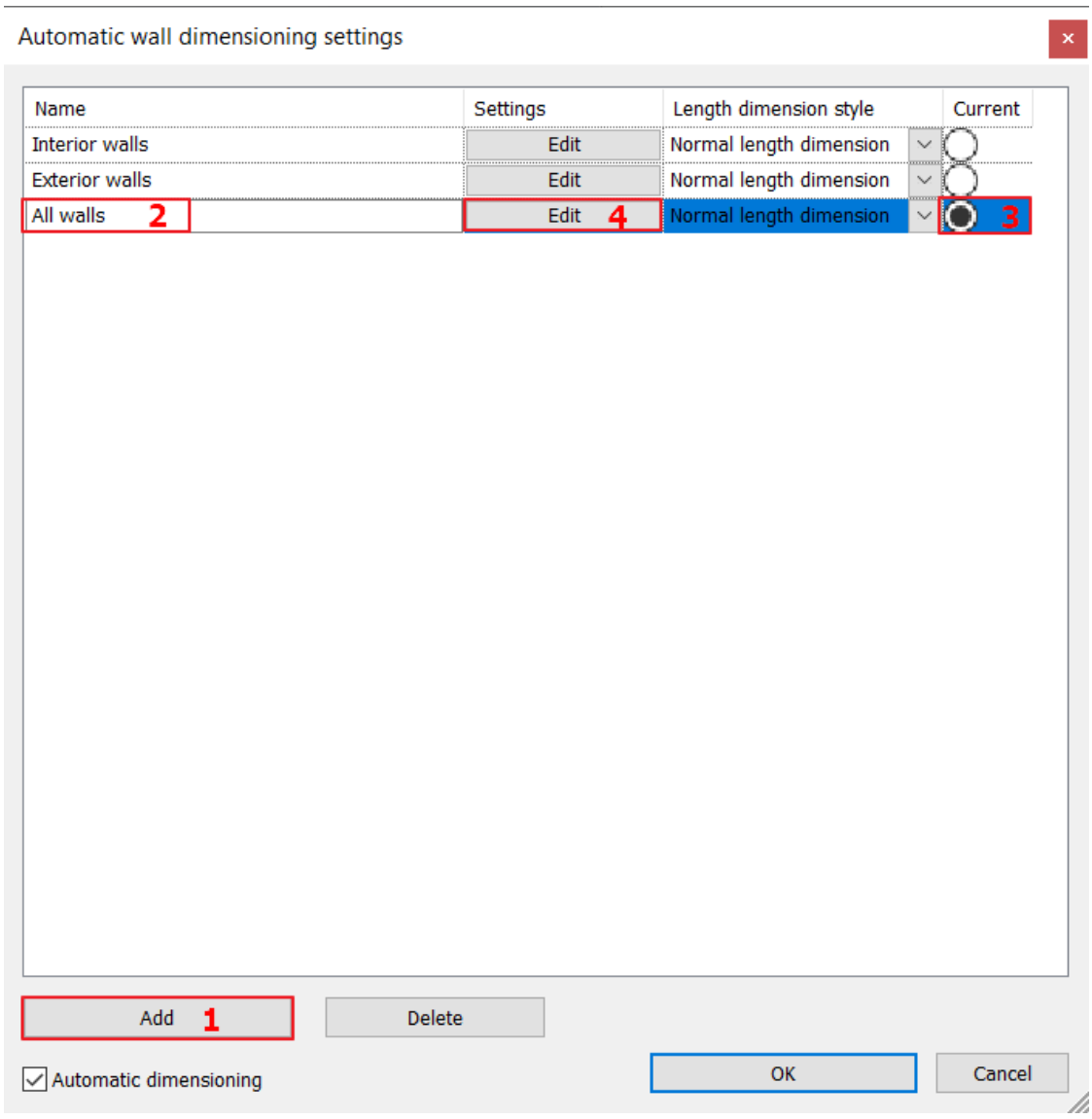

## 5.2. Walls dimensioning

The first dimensions we place will be for the walls. The program allows us to dimension all the walls at once. For this, we need to set which dimensions should be displayed.

- Start the **Ribbon / Annotate / Building / Wall Dimensioning Styles** command.



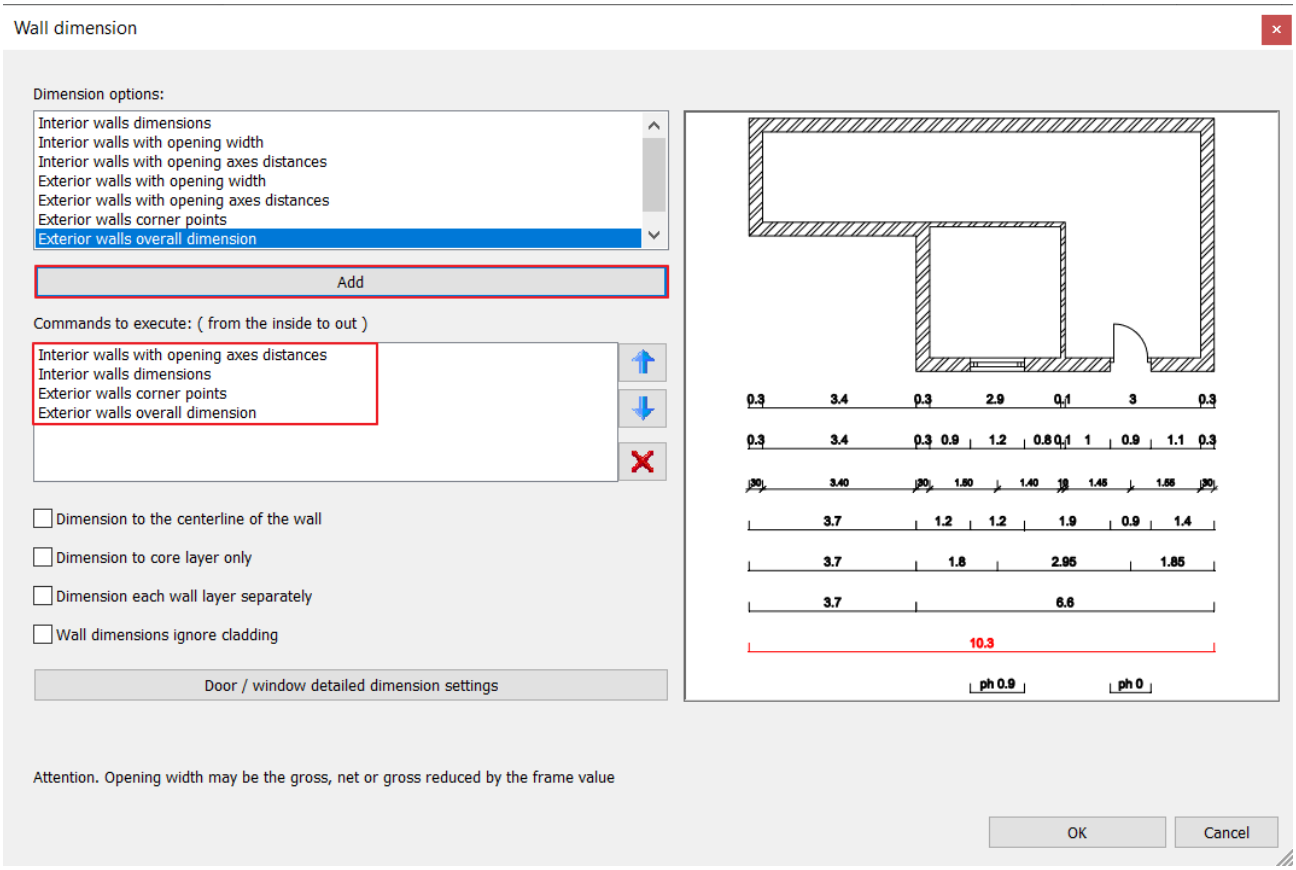

In the dialog box that appears, add a custom style using the **Add** button. Rename it to "All walls" and set this style as the current one. Click the **Edit** button.



Clicking through the dimensioning options, the diagram shows what dimensions will be displayed and how the program will mark them.

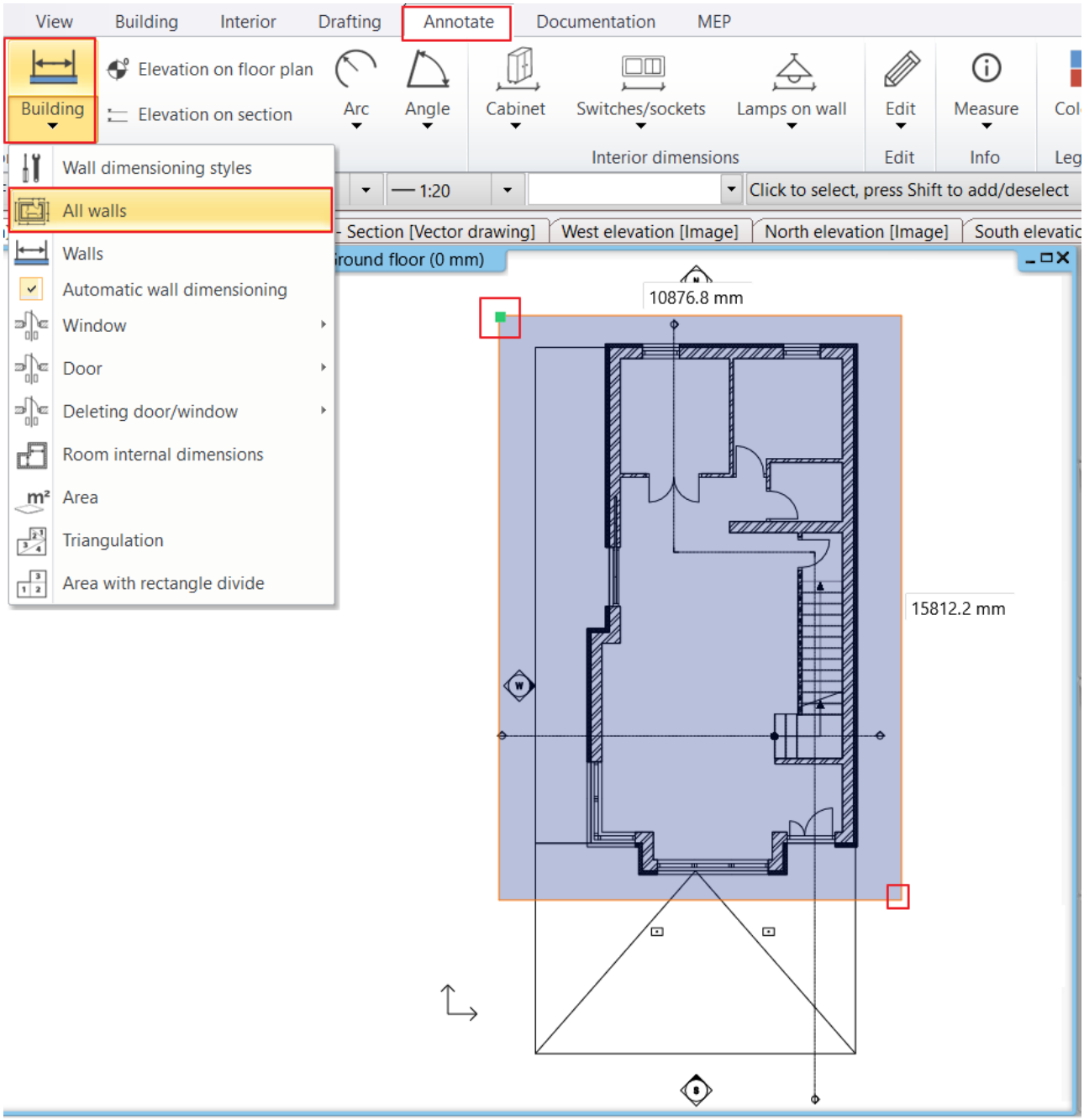
- Select the following dimensioning options in order from the list, and add them to the style by clicking the Add button:

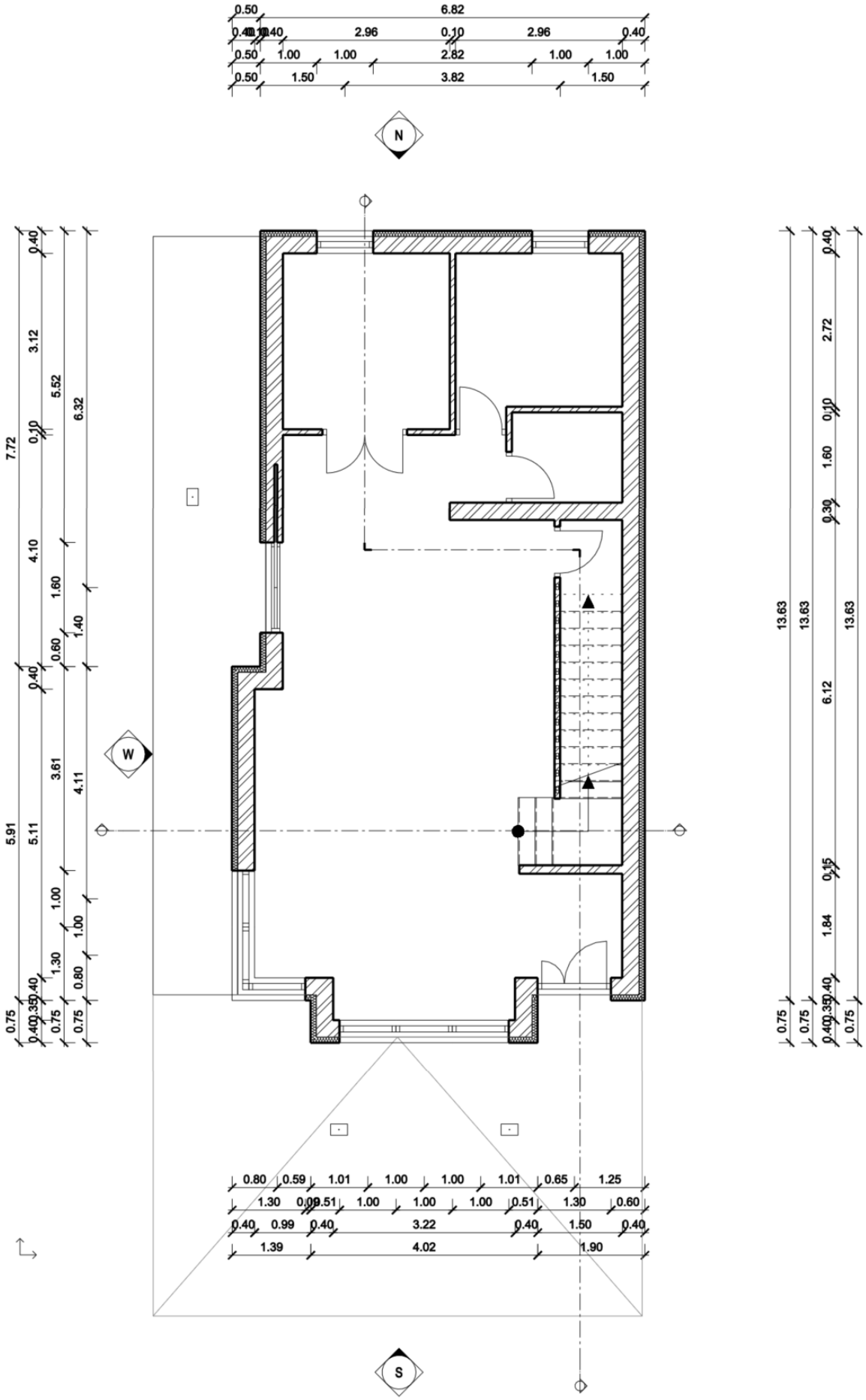
  Interior walls with opening axes distances,
  Interior walls dimensions,
  Exterior walls corner points,
  Exterior walls overall dimension.



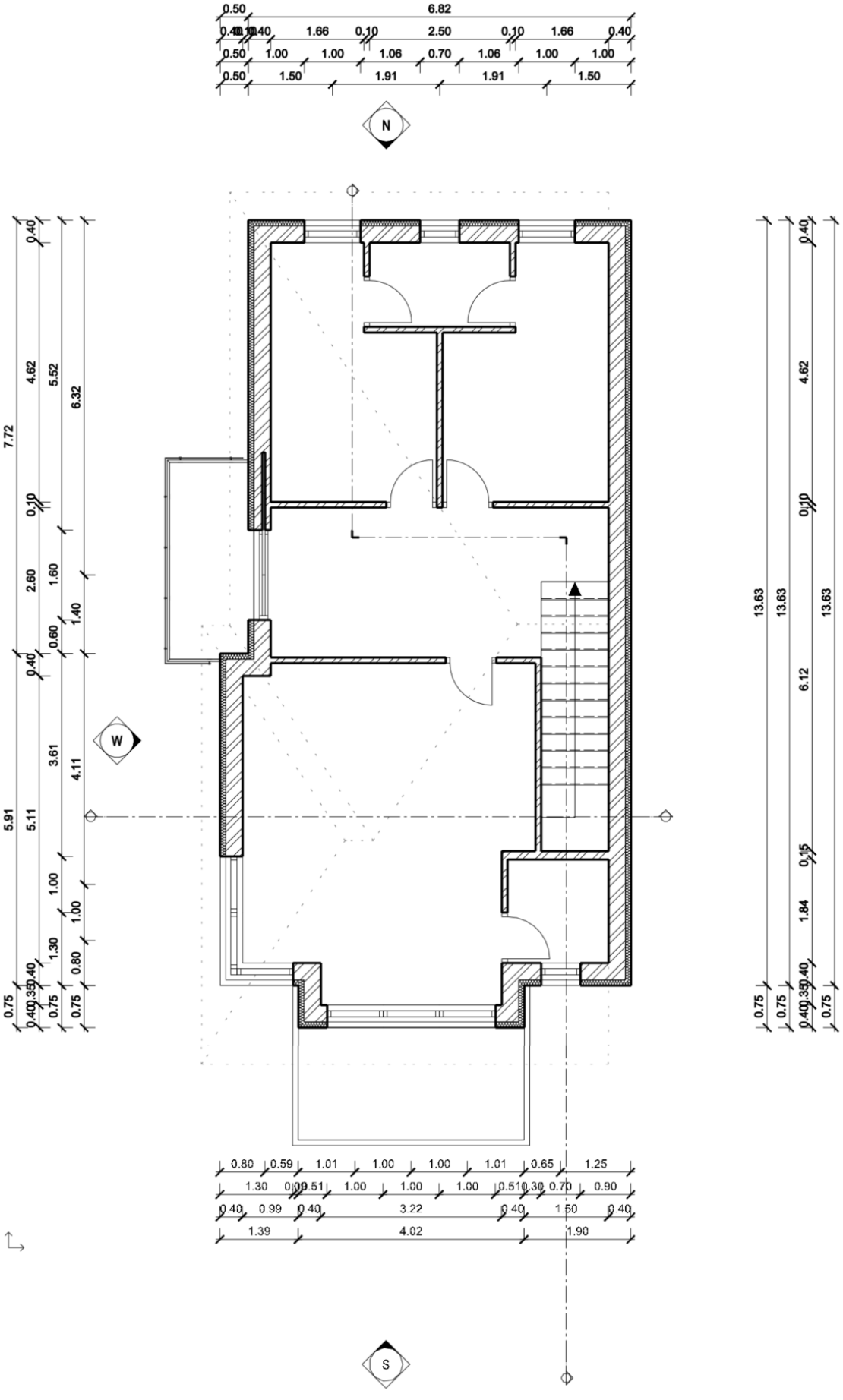

In the "Door / window detailed dimension settings" menu, you can modify the properties of window and door dimensioning, for example, whether to display the sill height or consider built-in details. Since we are currently displaying only the distances between axes, there is no need to modify these settings.

- Accept the settings in both dialog boxes by clicking OK.
- Select **the Ribbon / Annotate / Building / All walls** command. You will now create the dimensions with the created and activated wall dimensioning style.
- Select the floor plan with a rectangle and accept it with Enter. With the next click, determine where the innermost dimension line should be placed. Position the dimensions so that they do not overlap with the placed elevation and section marks.


View
Building
Interior
Drafting
Annotate
Documentation
MEP
Building
Elevation on floor plan
Elevation on section
Arc
Angle
Cabinet
Switches/sockets
Lamps on wall
Interior dimensions
Edit
Measure
Edit
Info
Wall dimensioning styles
All walls
Walls
Automatic wall dimensioning
Window
Door
Deleting door/window
Room internal dimensions
Area
Triangulation
Area with rectangle divide
1:20
Click to select, press Shift to add/deselect
Section [Vector drawing]
West elevation [Image]
North elevation [Image]
South elevatic
ground floor (0 mm)
10876.8 mm
15812.2 mm


N
W
S
6.82
2.96
0.10
2.96
0.40
2.82
3.82
1.50
7.72
5.91
5.52
6.32
4.10
3.61
4.11
5.11
13.63
2.72
1.60
6.12
1.84
0.80
0.59
1.01
1.00
0.65
1.25
1.30
0.51
0.60
0.99
3.22
1.50
1.39
4.02
1.90

- Switch to the 1st floor and create the dimensions there as well.



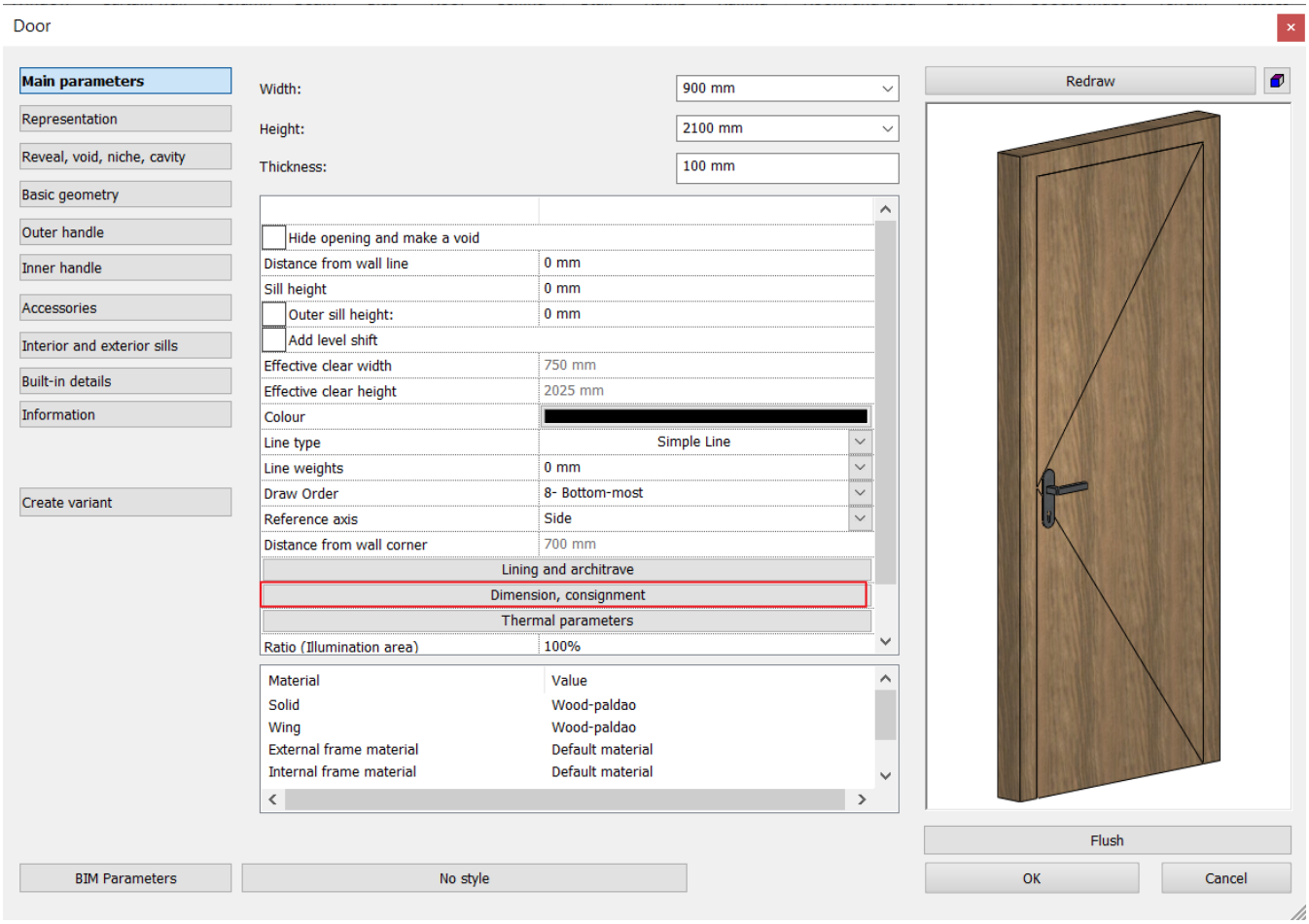
## 5.3. Dimensioning of Openings

The next dimensioning, we will create will be for the openings. Let's first examine its default settings.

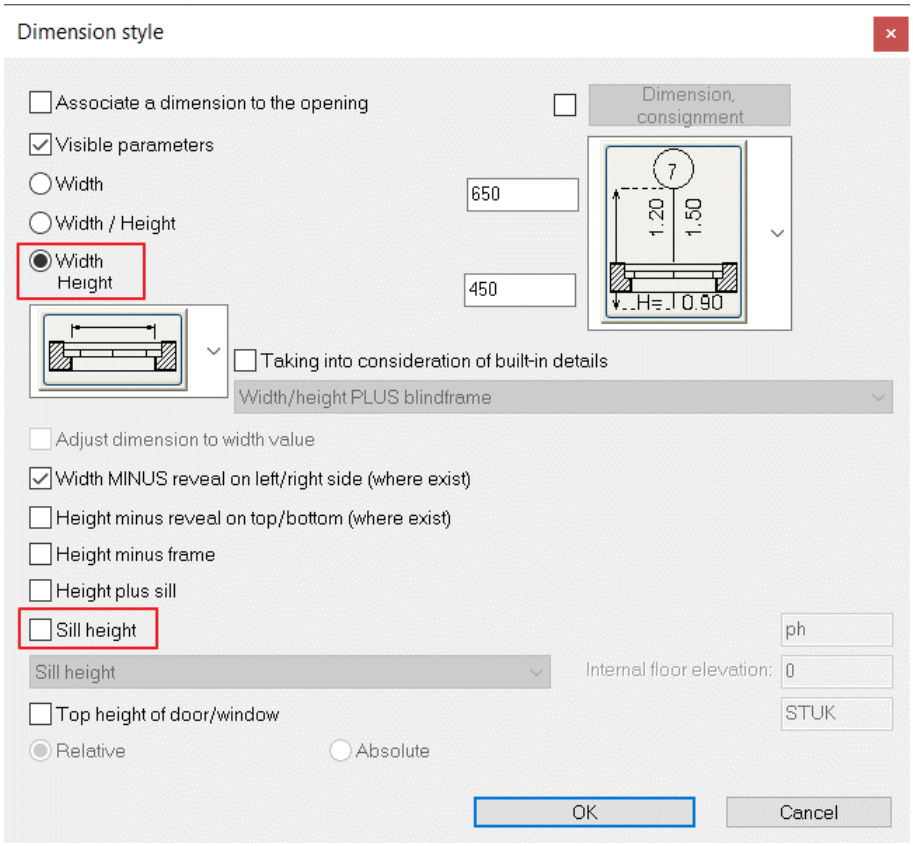
- Select the **Ribbon / Building / Properties / Opening / Door, then Window** command.

  Let's start with the door.

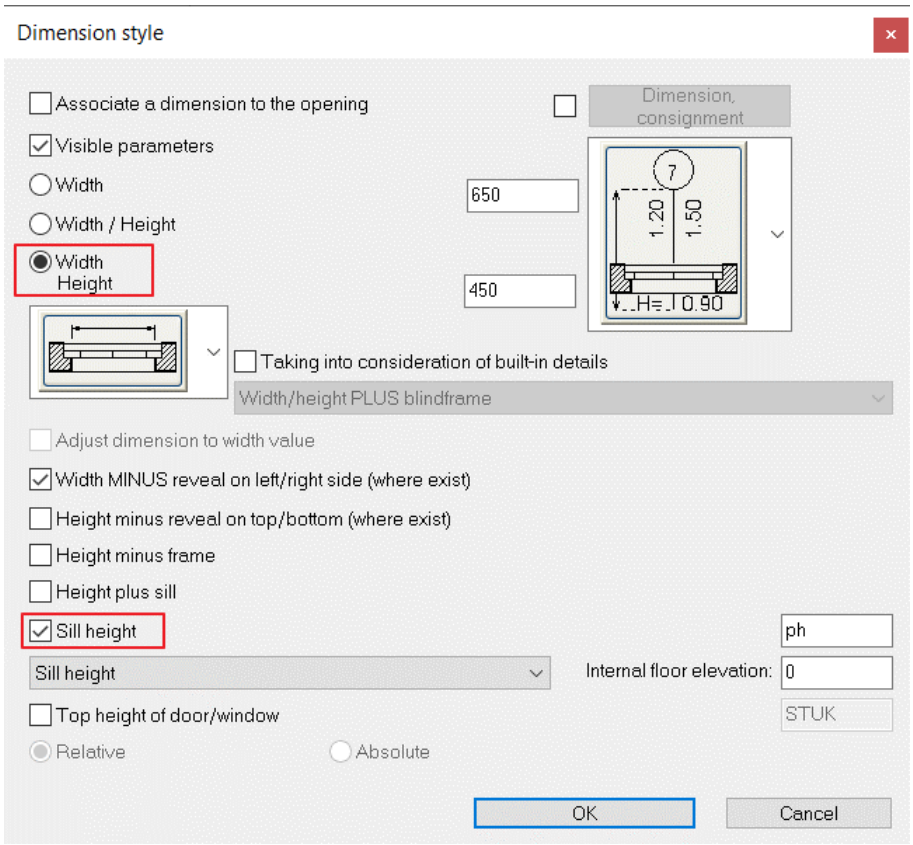
- Choose the Dimension, consignment menu.




- Select the Width Height option to see both values on one dimension line, and make sure that the Sill height is turned off.

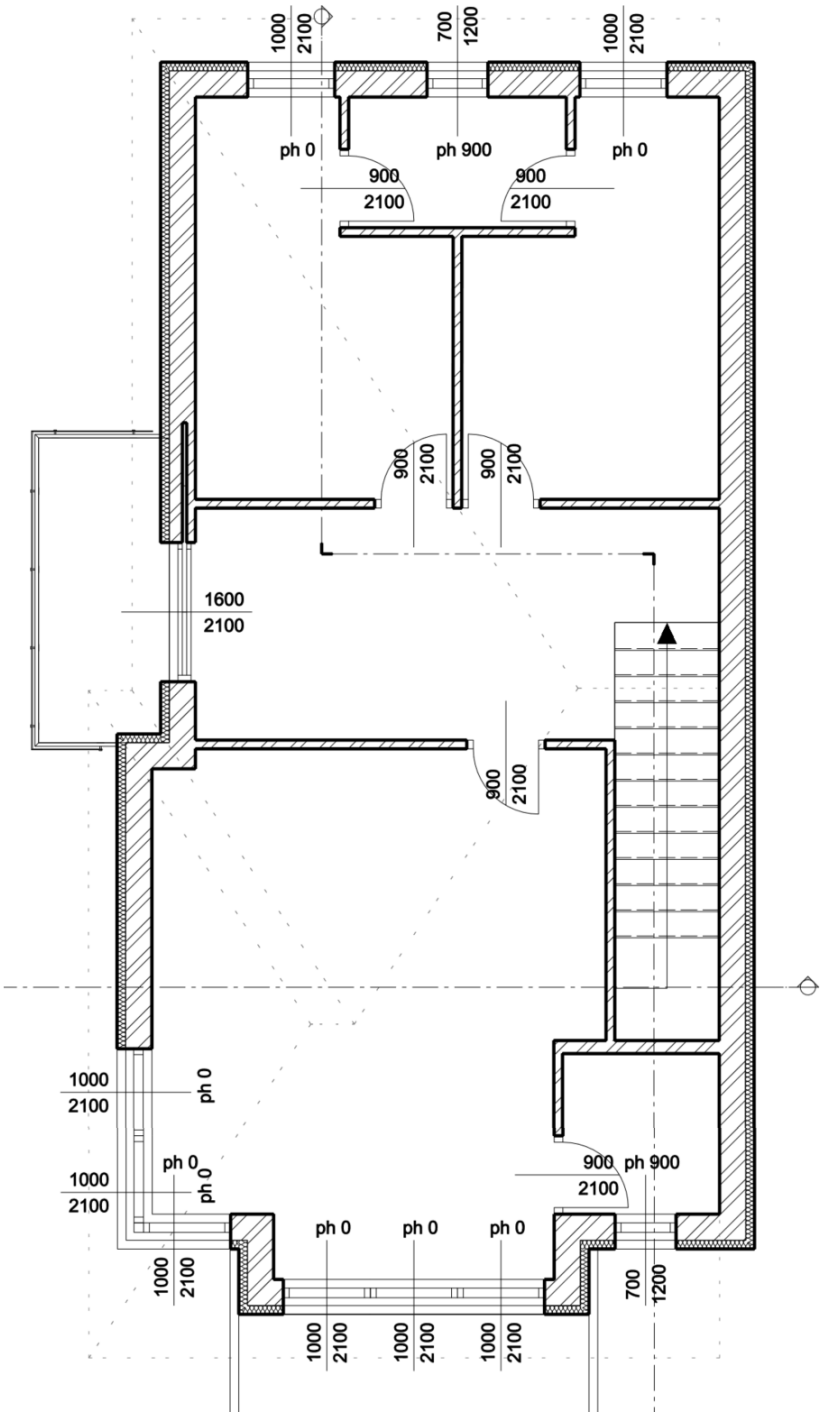



- Go to the properties of the Window, and select the Dimension, consignment menu here as well.
- Also, make sure the Width Height option is active here, and enable the display of Sill height. Accept it with OK. In the dialog box, we have the option to modify the marking of the sill height.



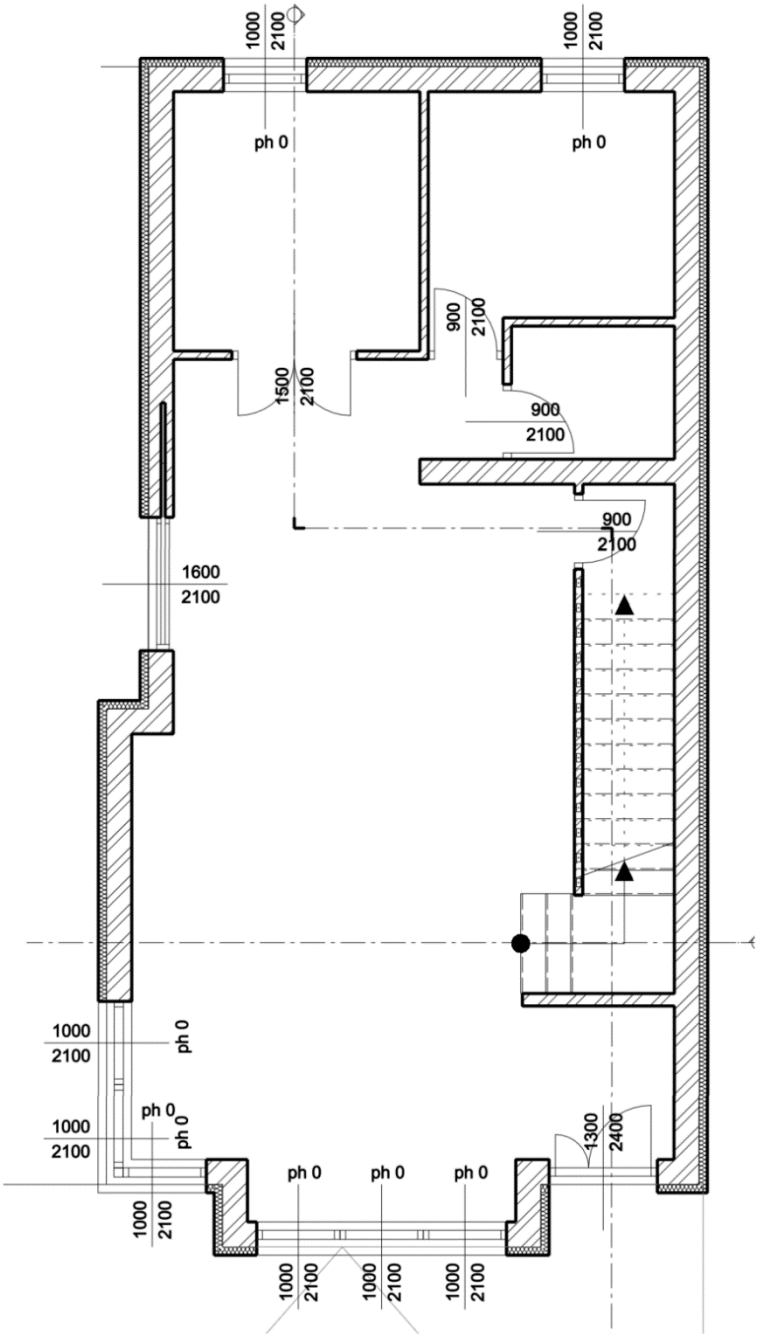
- Select the **Ribbon / Annotate / Building / Window / All command**, then the **Ribbon / Annotate / Building / Door / All command.**

  This will dimension all the openings.




You can place the dimensioning of the openings in different positions as well. By selecting the Ribbon / Annotate / Building / Window or Door / Selection command, and clicking on the inner or outer side of the opening, you can move the dimensioning. By clicking on the arrows next to the dimension value, you can move it along the dimension line or freely.

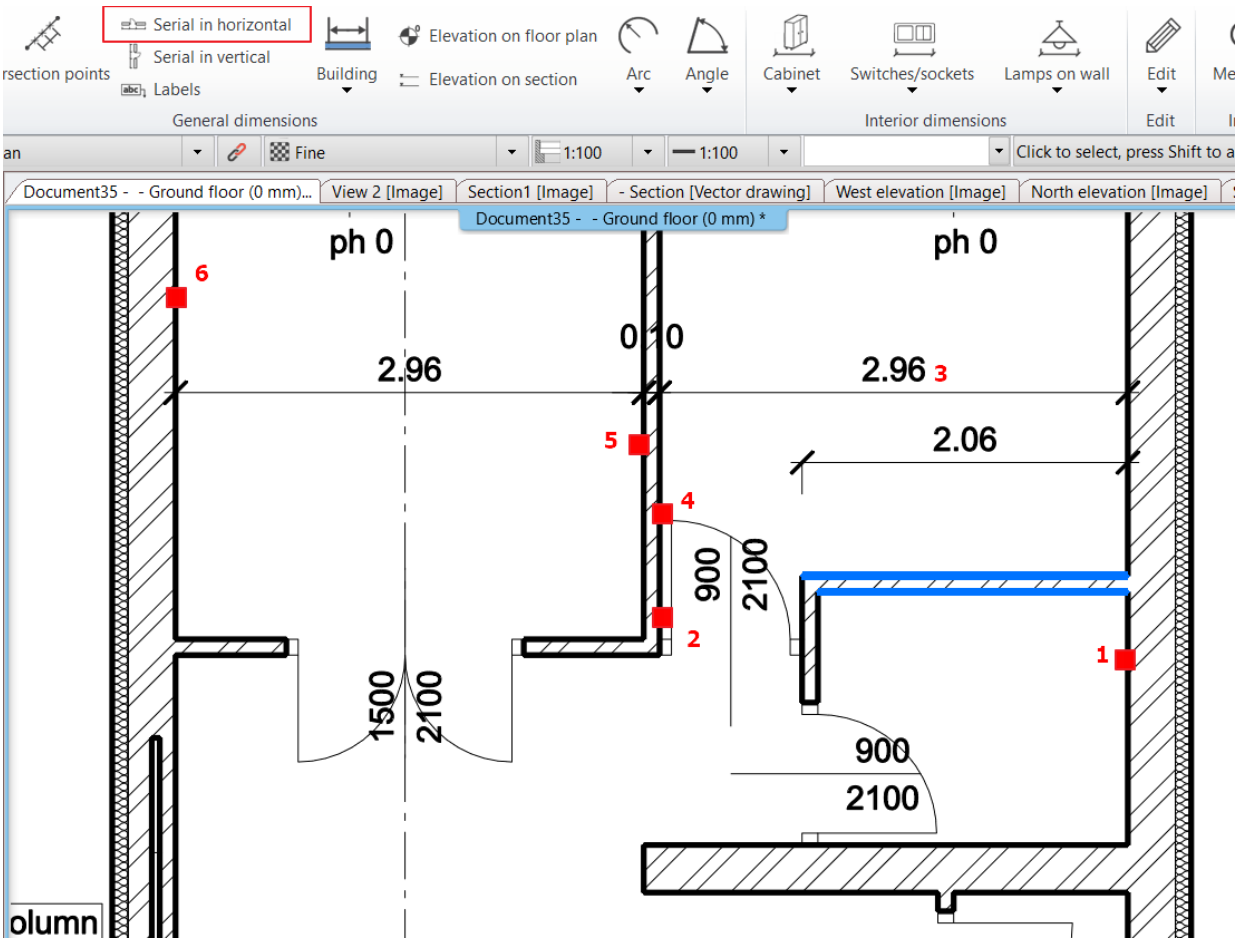
- Go to the Ground floor and create the dimensions for the openings there as well.




There is also an option for custom dimensioning using the **Ribbon / Annotate / Length** command.

With Horizontal and Vertical series dimensioning, you can dimension partition walls that are not connected to the main walls.

- Select the Serial in horizontal command, then enter the distance you want to dimension with the first two clicks, and place the dimensioning. It is not necessary to make the next clicks in a straight line; the program will place the dimensions horizontally in a line.




The dimensions will follow any changes made on the drawing. You can add new ones or delete existing ones. Later, you can also group the dimensions if you need to modify the positioning of the dimensioning.

## 5.4. Room and Area

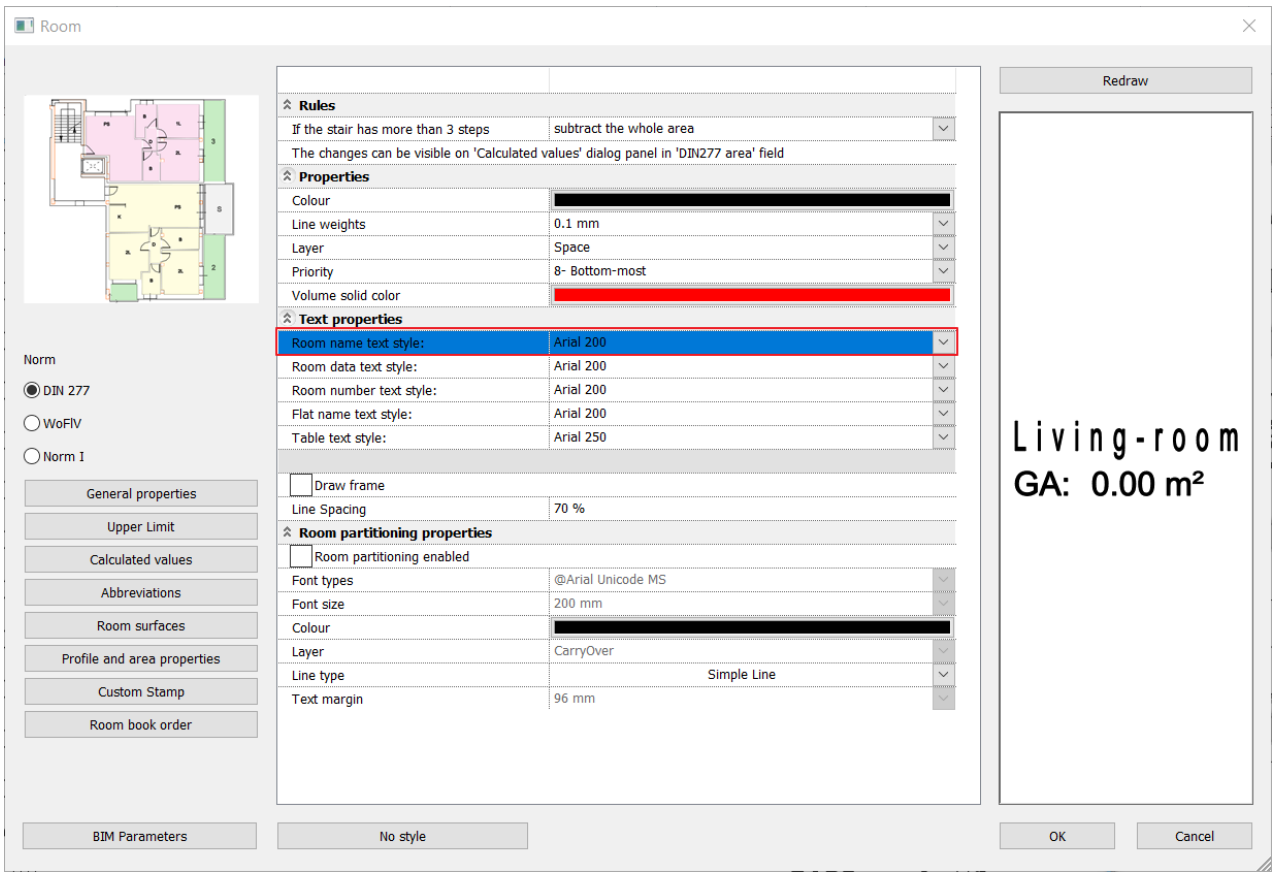
Further important information about the rooms in the floor plan can be displayed using the **Room and area** tool. By default, the room name and area are automatically displayed. The content and appearance of the room stamp can be customized to meet specific requirements.

There are three methods to determine the area of a room in the floor plan.

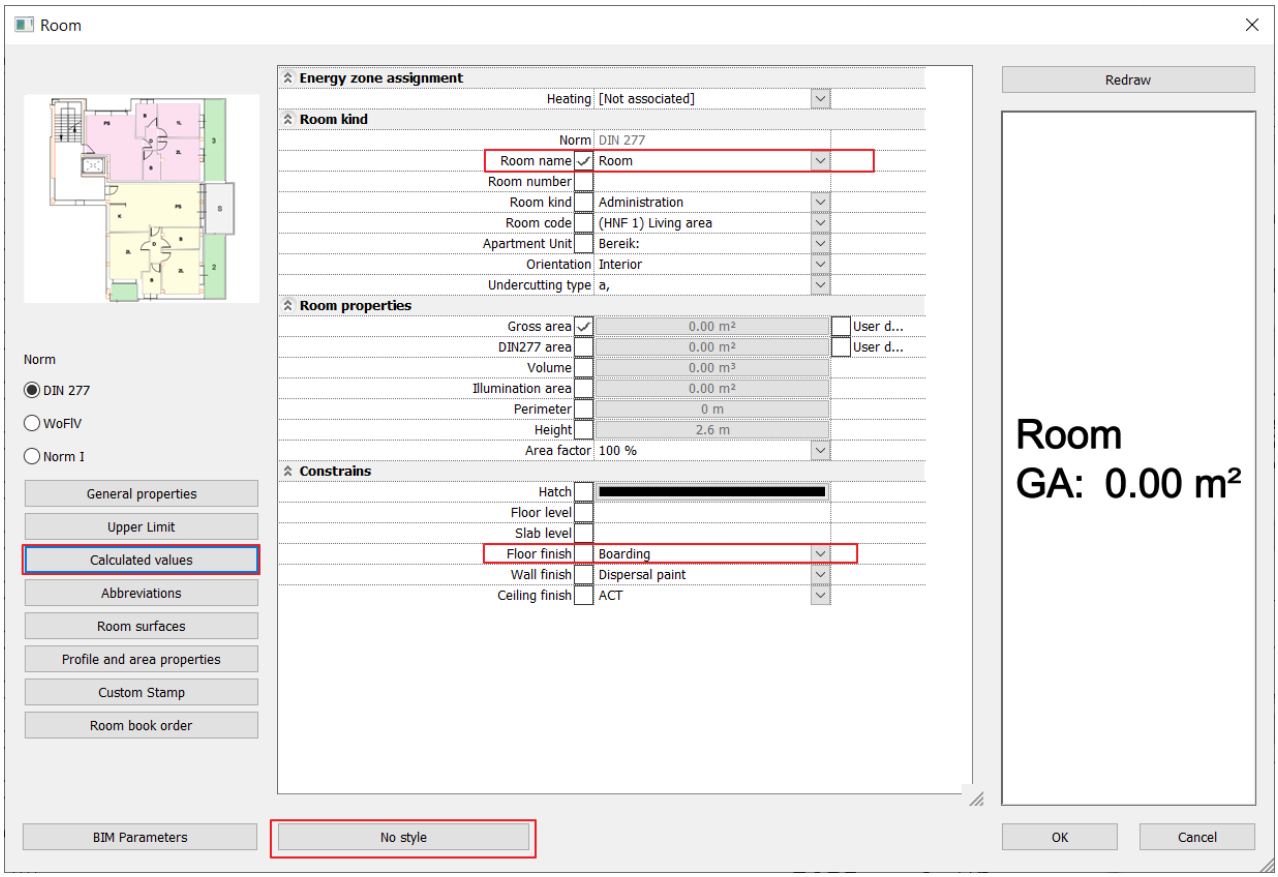
- Automatically, or
- By clicking within the enclosed boundary lines formed by walls, (Room by walls) or
- By manually drawing a polygon-shaped outline. (Room by polygon)

### 5.4.1. Room and area properties

- Right-click on the **Ribbon / Building / Room and area** command and access its properties.
- On the **General Properties** tab, set the Room Name text style to Arial 200.




- On the **Calculated values** tab, change the Room Name from "Living-room" to "Room". Remove the checkmark from the Floor finish to ensure that the stamp does not contain this information.



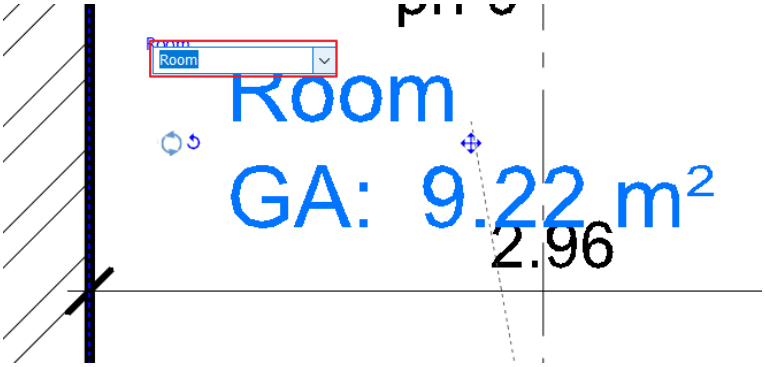

- Save the room stamp as a new style by clicking on "No style". Select the "New" option and save it as "Room Stamp". Click OK to accept, then activate it and close the dialog with OK.

## 5.4.2. Room and area: Automatic placement tool

- Use the **Ribbon / Building / Room and area / Automatic placement** command.

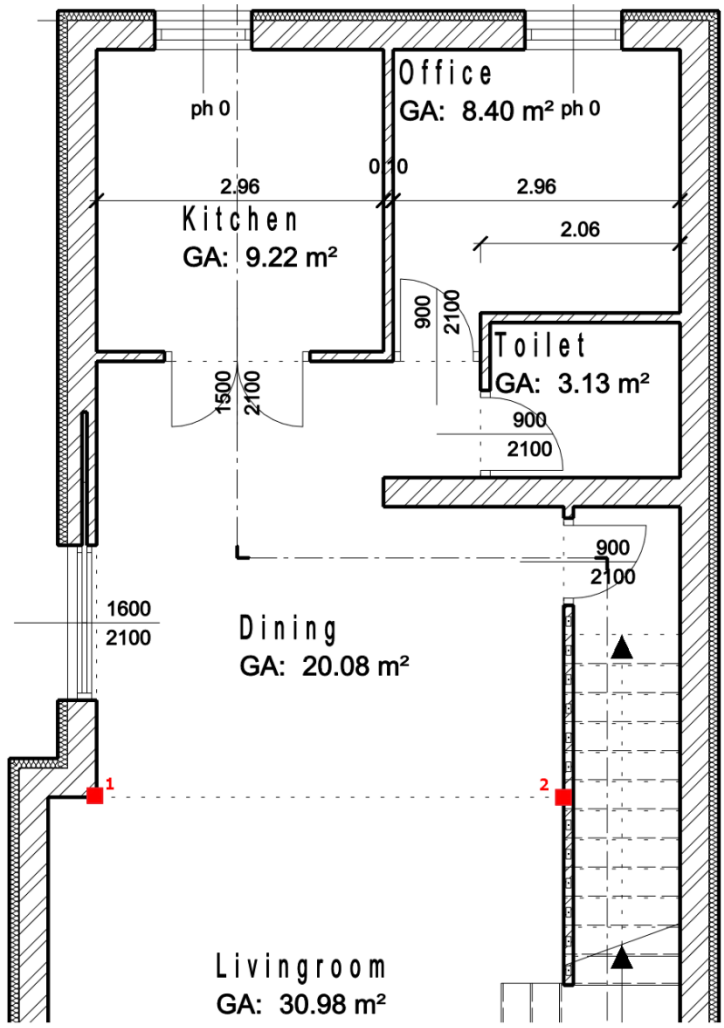
  The program will automatically create room stamps for the rooms in the floor plan and display the number of stamps created. The stamps can be modified and moved even after placement.

- Move the room stamps so that they are clearly visible and do not collide with walls or dimension lines. Modify the names of the stamps. Click on the stamp, then click on the blue marker to edit, or select the name from the dropdown list. From top to bottom and left to right, the rooms are: Kitchen, Office, WC, and the area under the stairs is a Storage.

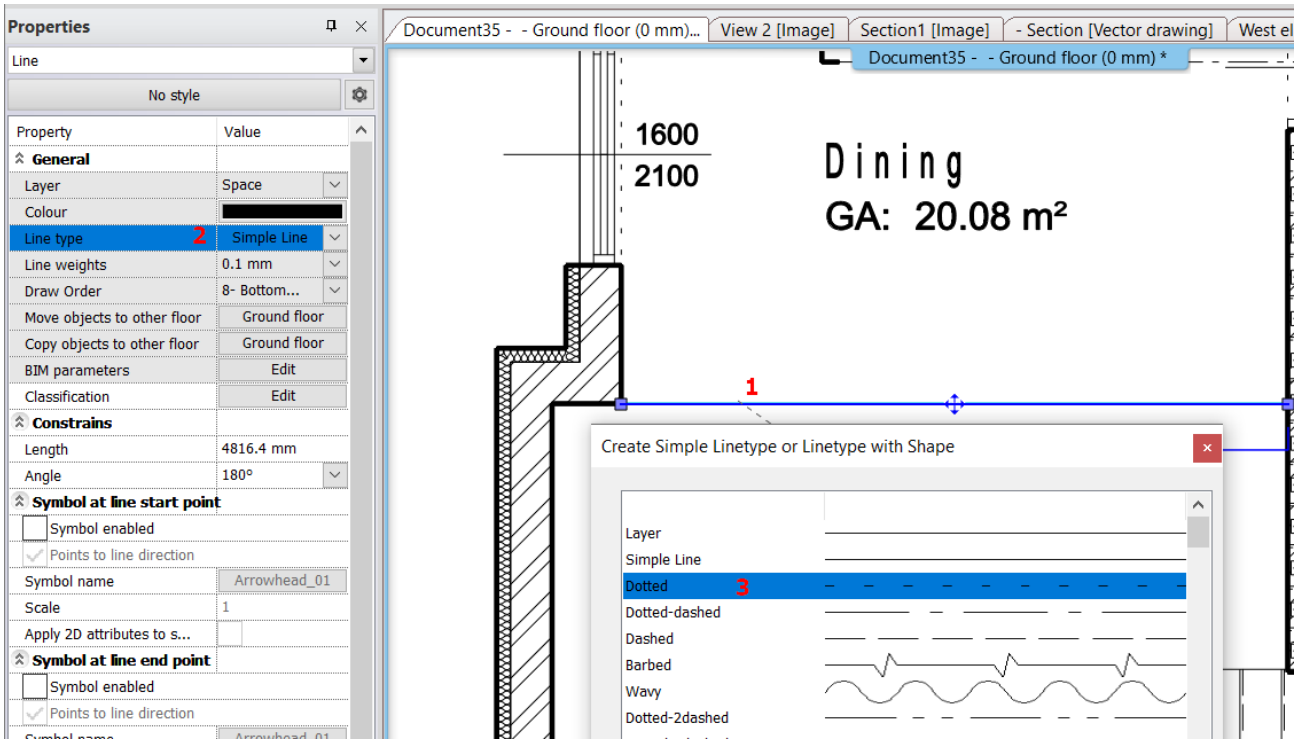



  The largest room will be the living and dining area. Since the two functions are not separated by walls, the program has created only one stamp here. However, we can delineate different functions without walls using room separation lines.

- Select **the Ribbon / Building / Room and area / Room Separation Line (pseudo-wall)** command. Draw a horizontal line starting from the corner of the wall recess, then press Enter. Move the created stamps and rename them as Dining room and Living room.




- Click on the room separation line, then modify the line type to dashed.

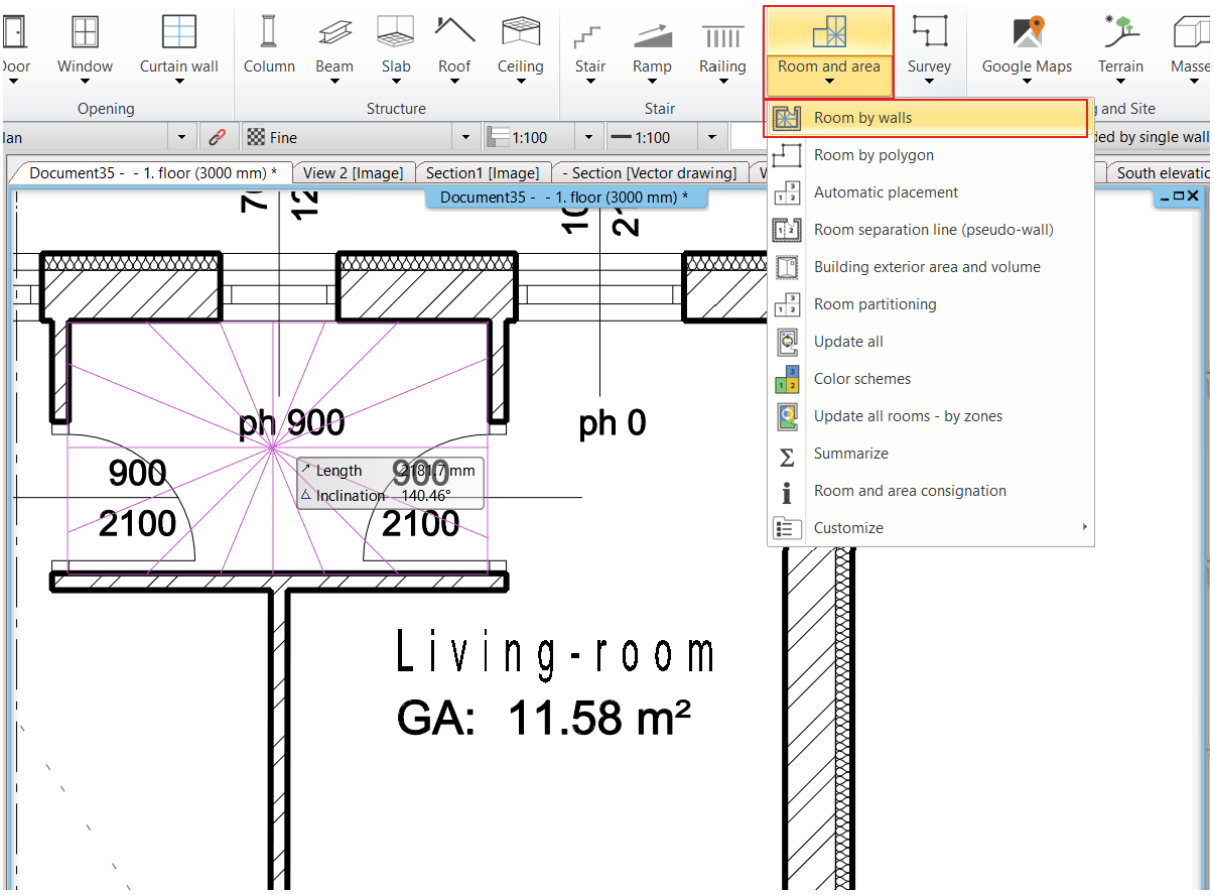


## 5.4.3. Room by walls tool

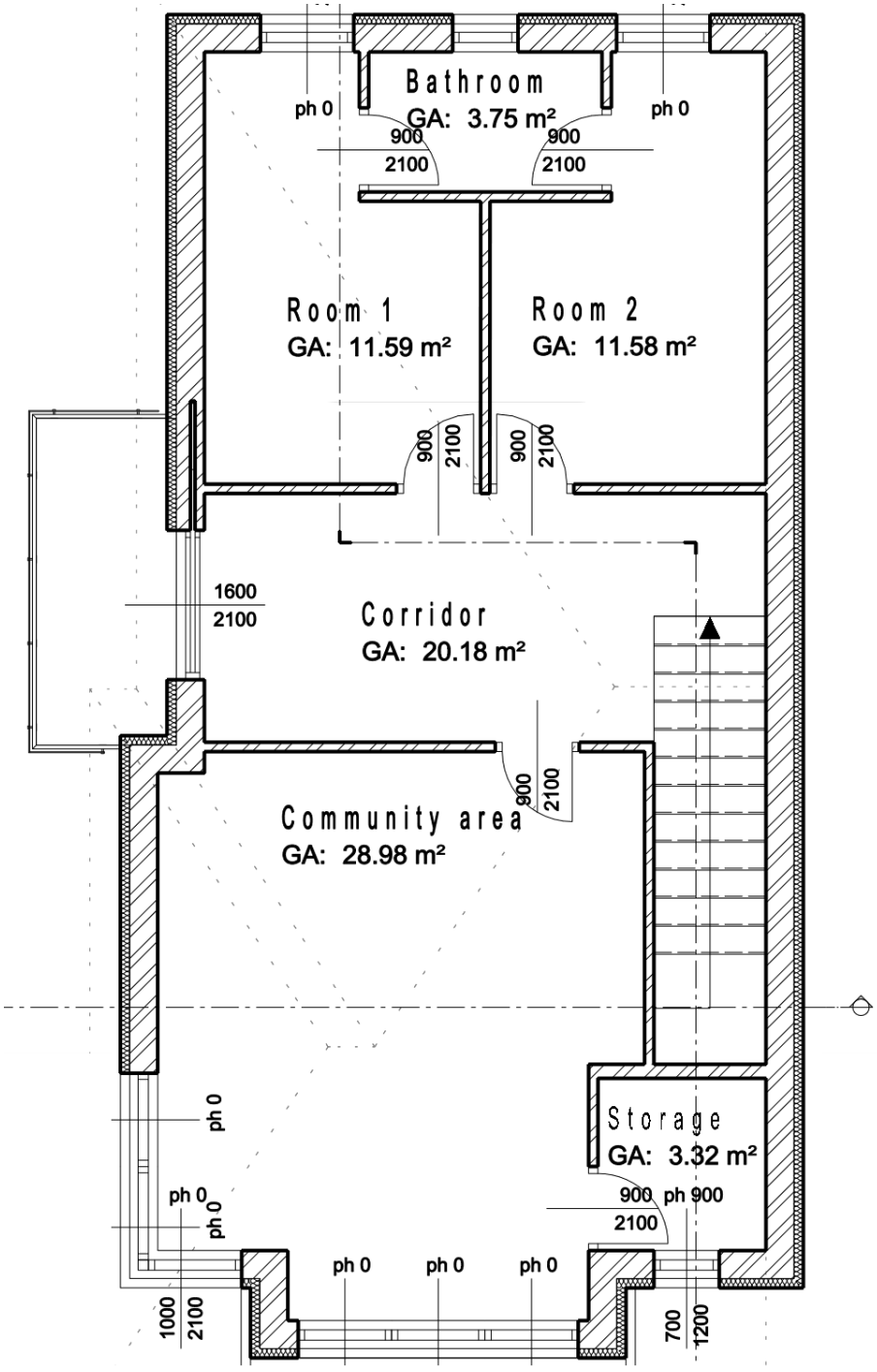
If the room is bounded by walls, it is advisable to use the **Room by Walls** command. This command automatically creates a room stamp along the enclosed boundary formed by walls when we click within the enclosed area. There is no need to draw the outline of the walls. This means that the room stamp is connected to the walls, so any changes made to the walls will be reflected in the calculations.

- Switch to the 1st floor.

- Select the **Ribbon / Building / Room and area / Room by Walls** command.
- Click within the enclosed area surrounded by walls. The room stamp will be placed.



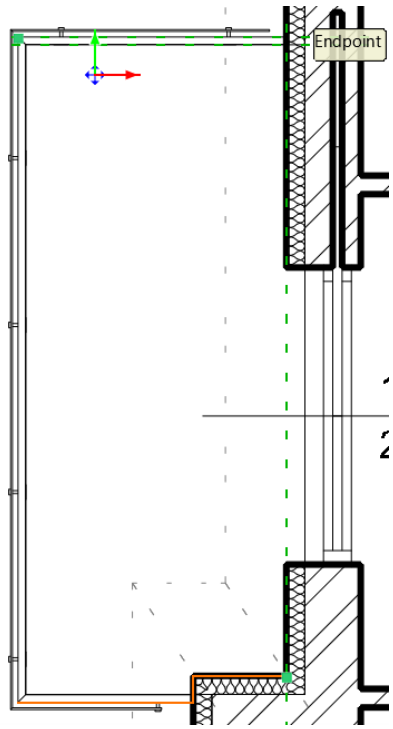

- Move the stamps and rename them according to the picture.



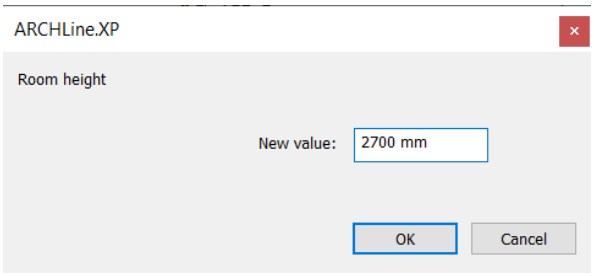

## 5.4.4. „Room by polygon" - tool

This function is used when we want to measure areas that are not bounded by walls (e.g., terrace, balcony, garden).

- Select the **Ribbon / Building / Room and area / Room by polygon** command.
- Draw the contour of the terrace along the outline of the slab.




- Then, enter the room height in the dialog box that appears.

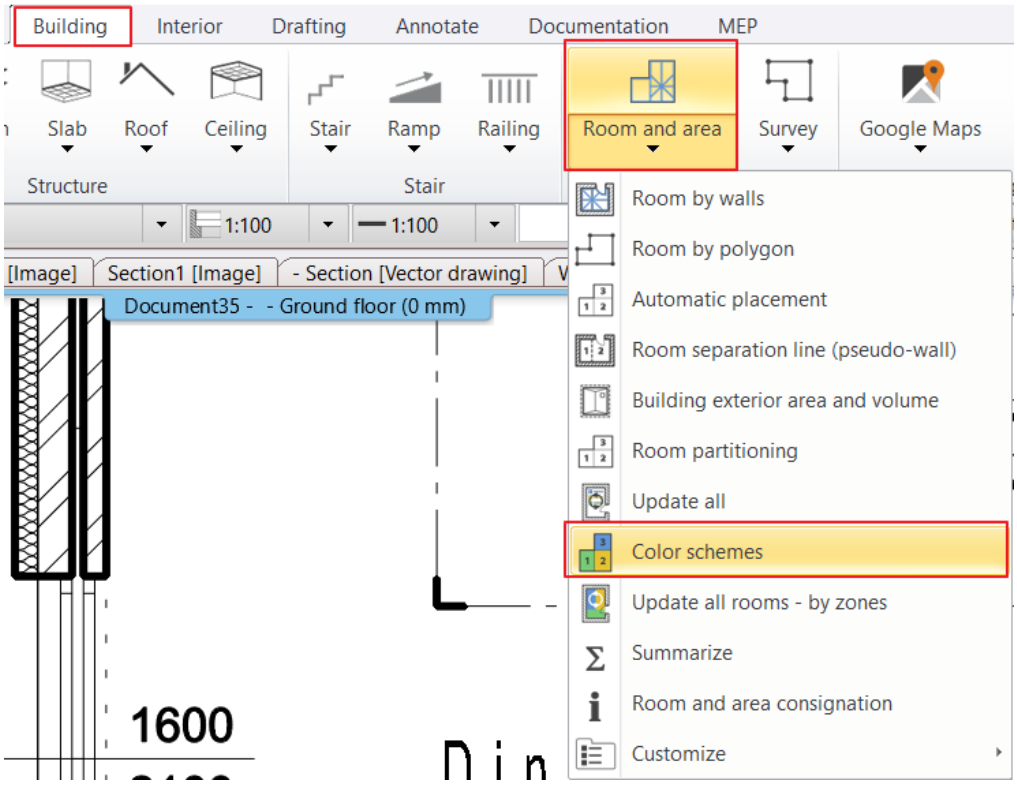



- The room stamp has been created, which can be modified later as described earlier. Change the label to Balcony.

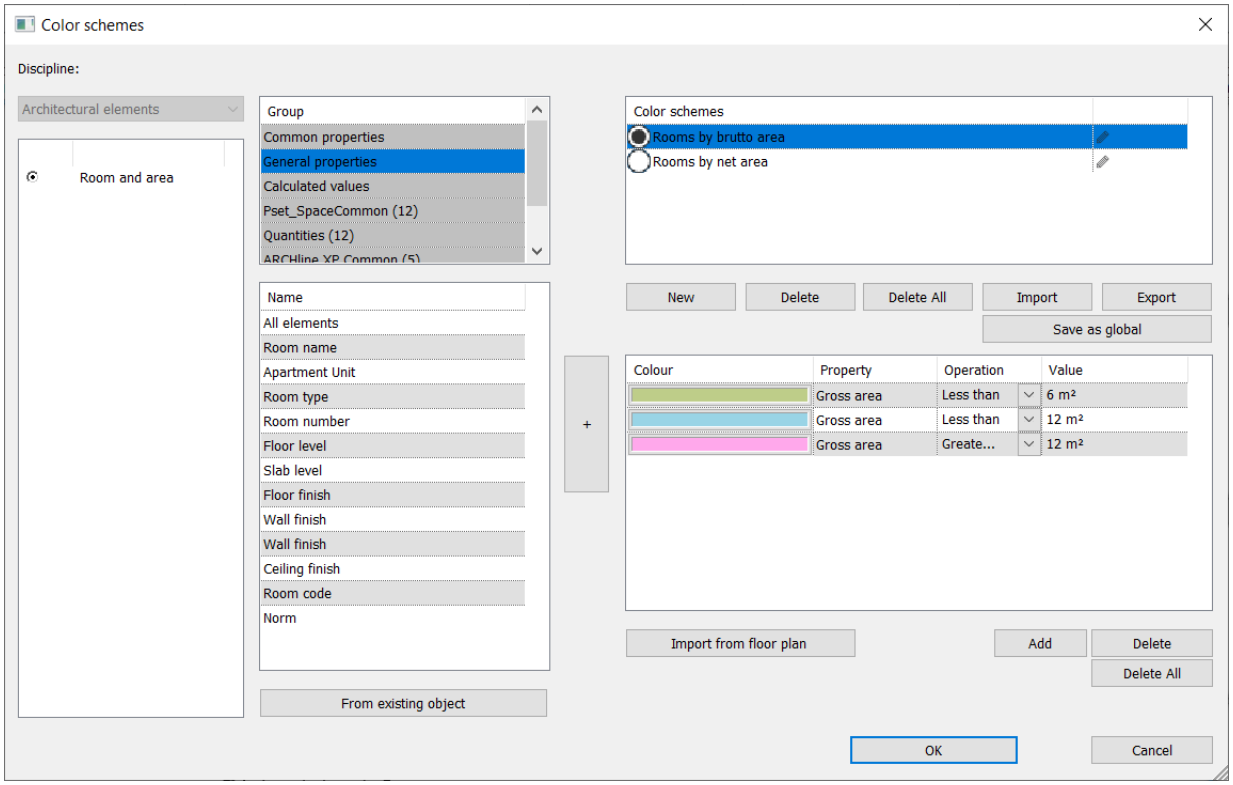
## 5.5. Color Schemes

The Color Scheme is a graphical override method that serves to display group of elements or rooms based on any of their properties and present the contents of your project in an understandable way. A Color Scheme is based on an element type and its property and assigned value. The color schemes according to the properties are templates that can be saved, so by changing the templates, the model can be presented according to different aspects.

- Select the Ribbon Menu / Building / Room and area / Color Schemes command.

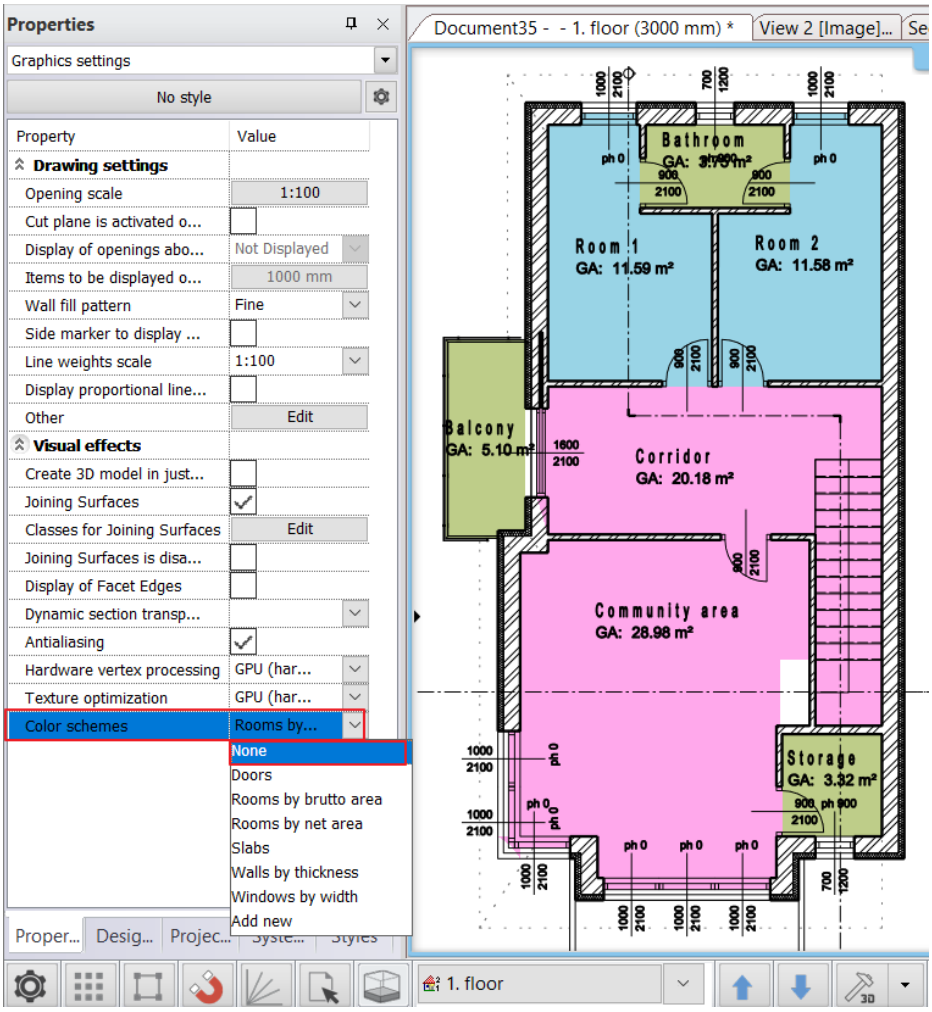



In the appearing dialogue, the grouping and display based on the gross floor area are already prepared. We can modify the values and colors associated with the color schemes, and it is also possible to create a custom color scheme.




- Accept the dialogue with OK, so the program automatically creates the color scheme.

  In the properties menu, we can switch between color schemes, and we can also deactivate it by selecting the None option.

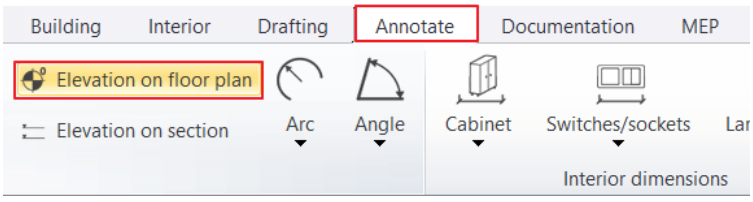


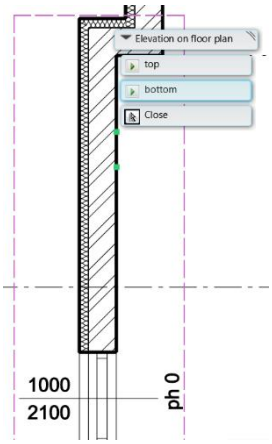

- Disable the color scheme.

## 5.6. Elevation on floor plan

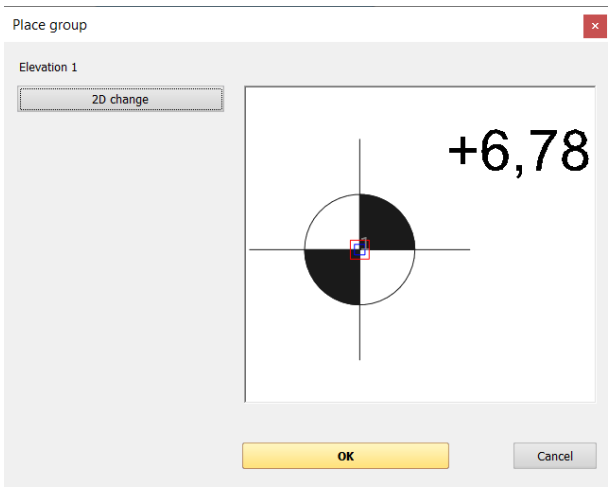
We can place an elevation point on the ground floor plan.

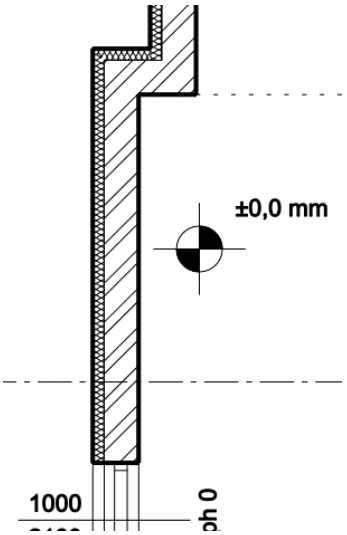
- Select the Ribbon Menu / Annotate / Elevation on floor plan command.




- Select one of the exterior walls, then click on its interior line. At this point, the program will query the elevation.
- First, we need to select an element. From the floating menu appearing in the upper right corner of the screen, we can choose the appropriate keyword based on which we want to measure the elevation. Now select the "**Bottom**" option.
- The dialogue box appears with the initial height, which can be changed if necessary. Set this to **0**.
- Click **OK** to proceed.
- In the appearing dialogue box, you can change the symbol of the elevation point. Choose "**Elevation 1**."




- Place the symbol with a single click near the entrance.

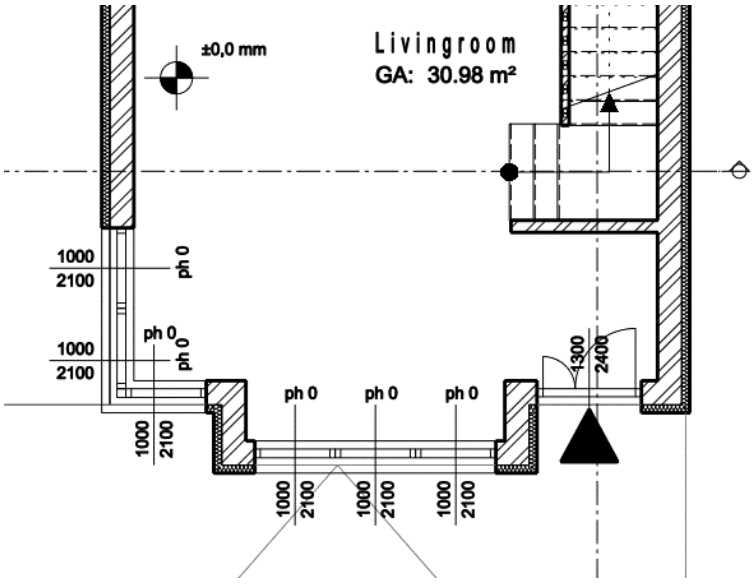
  The symbol was created as a group. By clicking on the symbol, you can modify the value by choosing the "Edit Group" option from the local menu, or you can also mark the 2D group with a different icon. To exit, click on any element of the group, then select the “Close Group" option from the local menu.

## 5.7. Symbols

Other symbols exist that may be needed on the floor plan during the design process, such as the entrance or the indication of the north direction. Most symbols can be found in the **Design Center / Building / Group / Signs** category. Place them on the floor plan using the drag-and-drop method.

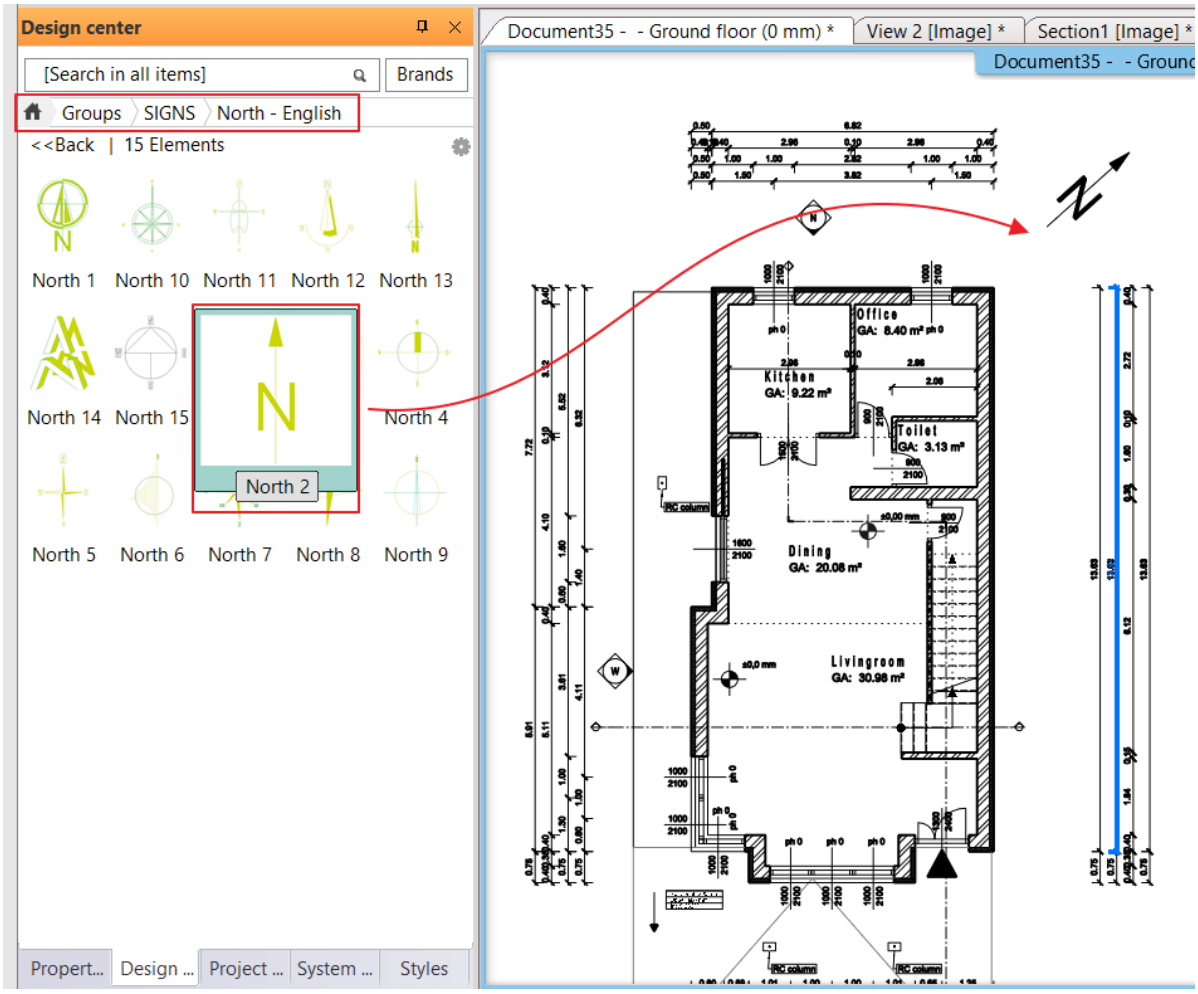
### *Entrance symbol*

- Select Arrow 01 from the **Design Center / Building / Group / Signs / Arrows** category and place it in front of the entrance.
- You can modify its size in two ways. By clicking on the symbol, you can use the "Scale Group" option from the local menu, or by selecting the symbol, you can change the width and height values in the left properties menu.

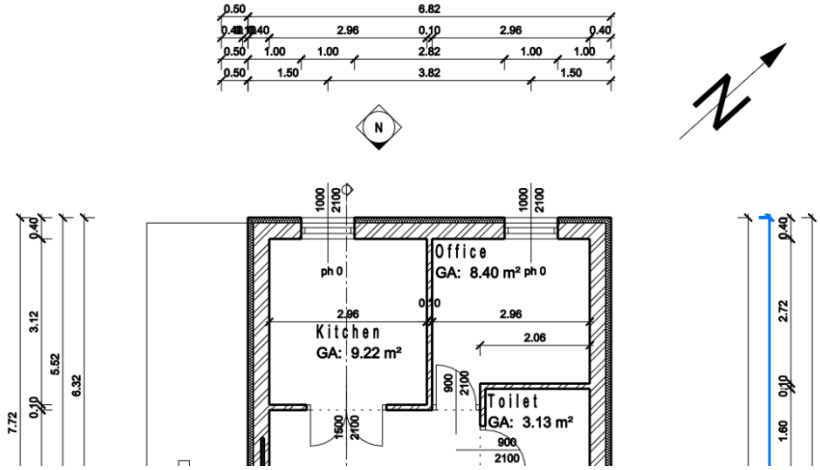



### *Symbol for the North Direction*

- First, find the **Design Center / Building / Group / Signs / North – English** category and select one of the north symbols, then click and drag it on the floor plan. Click to place it in the right position.




- To modify the position of the symbol already placed earlier, first select it. The movement and rotation markers will then become available. Other properties can be changed in the Properties panel appearing on the left side.

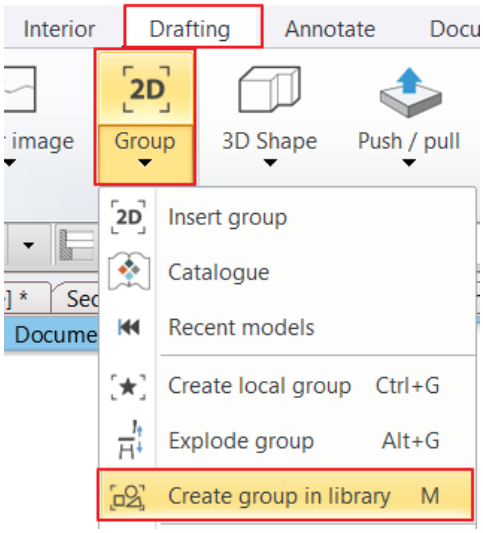



In the project, the symbol for the North Direction will automatically align with the previously set north direction.

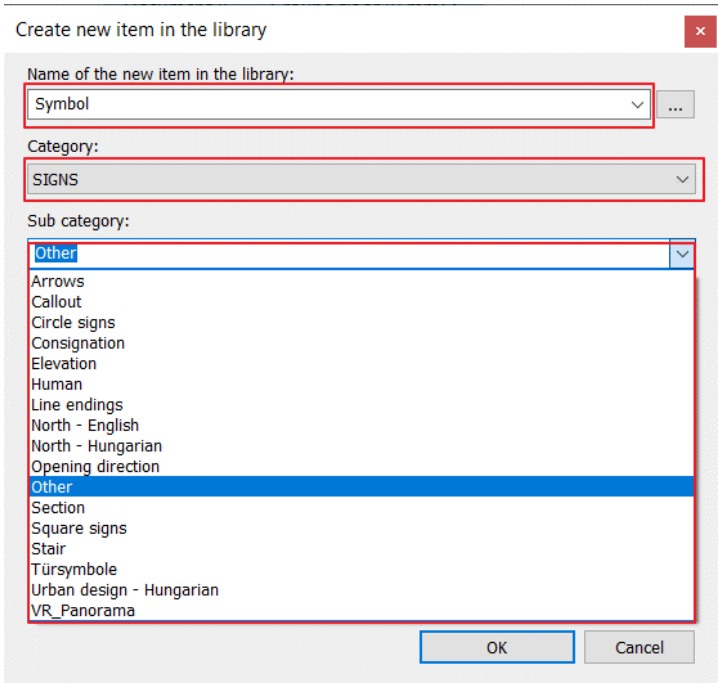
### *Useful Tip: How to create new symbols?*

While this tutorial does not delve into the detailed process of creating new symbols, if you need a custom symbol during the design process, this brief guide can be helpful.

- Draw the new symbol in the 2D window using lines, polygons, and text with the help of the Ribbon Menu / Drafting tools.
- the **Ribbon Menu / Drafting / Group / Create Group in library** command. This command allows the new symbol to be accessible and usable even when working on other projects.

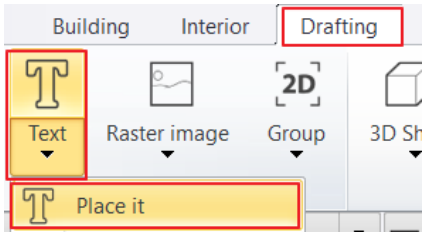



- Select all the elements of the new symbol, then press **ENTER**.
- Set the reference point of the symbol. You can add as many reference points as necessary. Press **ENTER** when you are done adding the reference points.
- Name the new symbol and categorize it. You can choose a subcategory from the appearing list or type in a new designation.




## 5.8. Placing text

- In the architectural floor plan, you can place texts using the **Ribbon Menu / Drafting / Text / Place it** command.
- In the appearing "**Text actuals**" dialogue box, type in the desired text, such as "Ground Floor", then press the **OK** button.

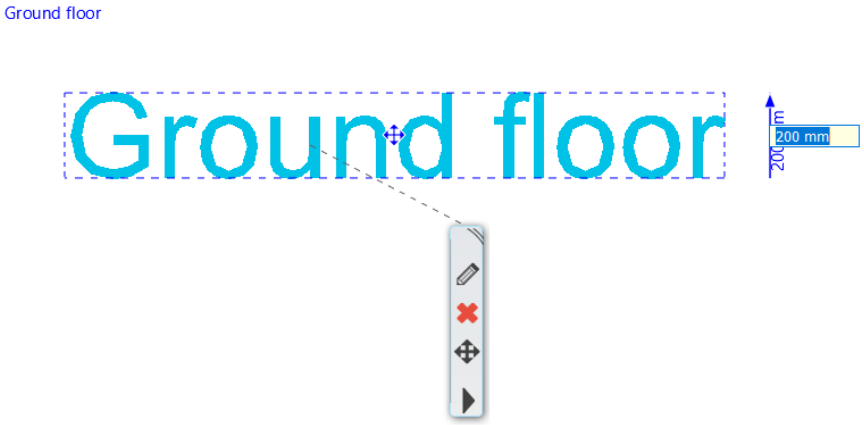



- An orange rectangle appears, with one of its corners anchored for moving with the mouse. Using this corner point, you can place the text anywhere on the drawing.
- After placing the text, the text input window reappears. Close it by clicking on the **Cancel** button.

The default text height is 200 mm, which is suitable for displaying texts in 1:50 or 1:100 scale drawing content.

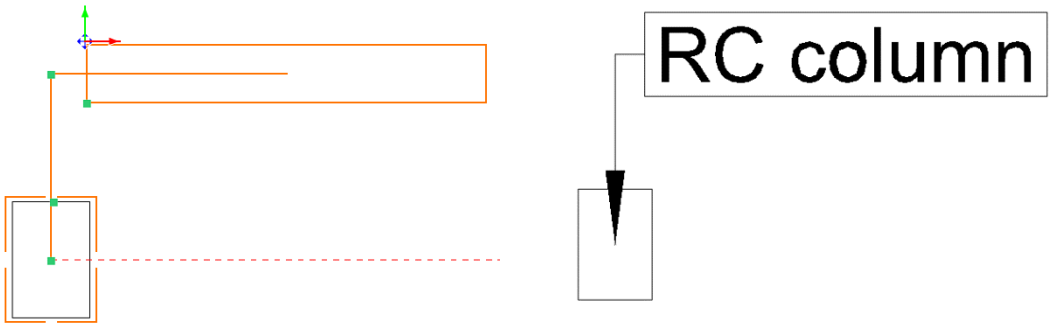
The selected text height can be changed by clicking on the height value and typing in the new value.

- Change the text height to 400 mm.




## 5.8.1. Text with pointer

- Select the **Ribbon Menu / Drafting / Text / Text with pointer** command. The text is: "Reinforced Concrete Column".
- Mark one of the columns, then place the text with the first click and determine the position of the arrow with subsequent clicks.



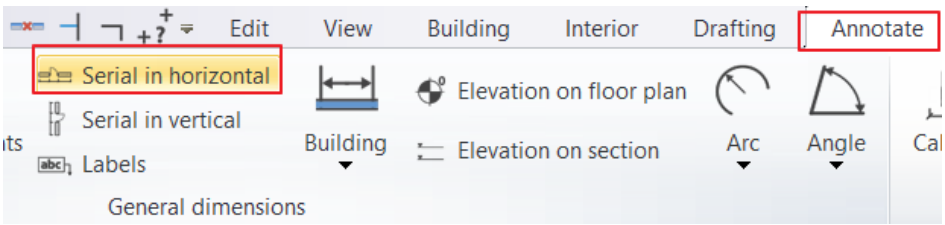

- Copy the text to the other two columns. Select the text, then copy it with Ctrl + C, specify the copy's reference point (grip point), and paste it to the two columns with Ctrl + V.

## 5.8.2. Serial dimensioning

Let's add dimensioning to the previously created elevation. Select the West elevation.

### *Serial in horizontal*

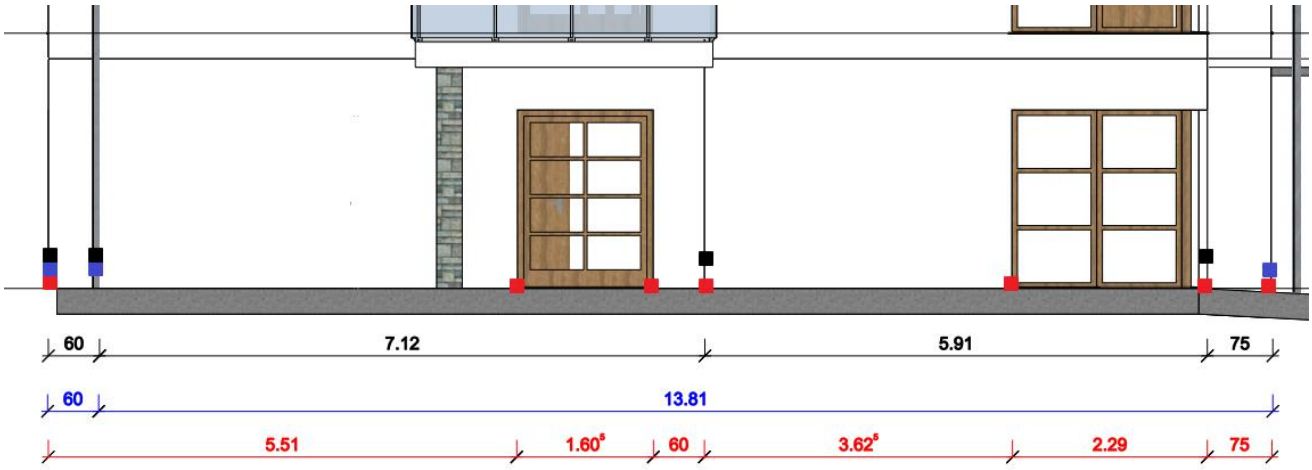
- Select the **Ribbon Menu / Annotate / Serial in horizontal** command.




- Click on the first point in the 2D elevation drawing to start dimensioning (1).
- Click on the second point to get the distance from the first point.
- The horizontal projection of the distance appears on the drawing with a dotted line, which can be placed at any distance.
- Due to the settings of Serial in horizontal, the second point of the previous dimension coincides with the first point of the next one. Therefore, you need to continuously determine each point one by one.
- Click one by one to add more points. The horizontal distance between the two previous points will appear on the dimension line along with the previous dimensions.

- Dimension the elevation as follows:

- Black: Wall corner points and projections
- Blue: Total length
- Red: Wall corner points and projections, window/door width

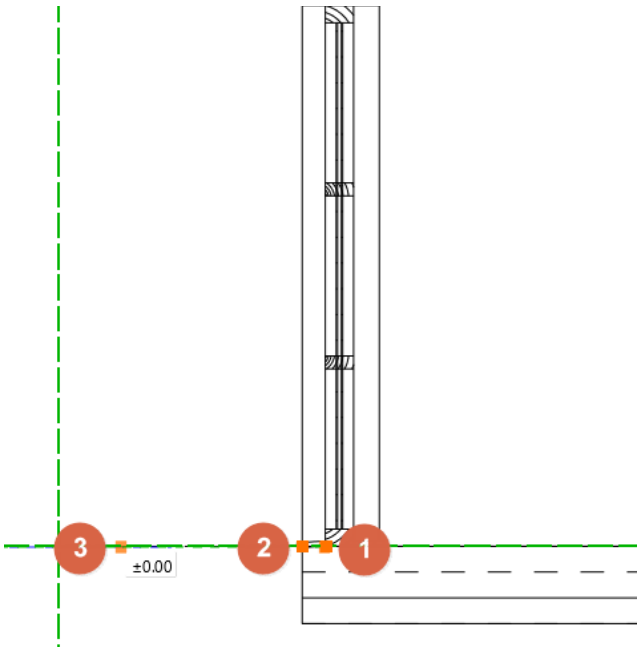


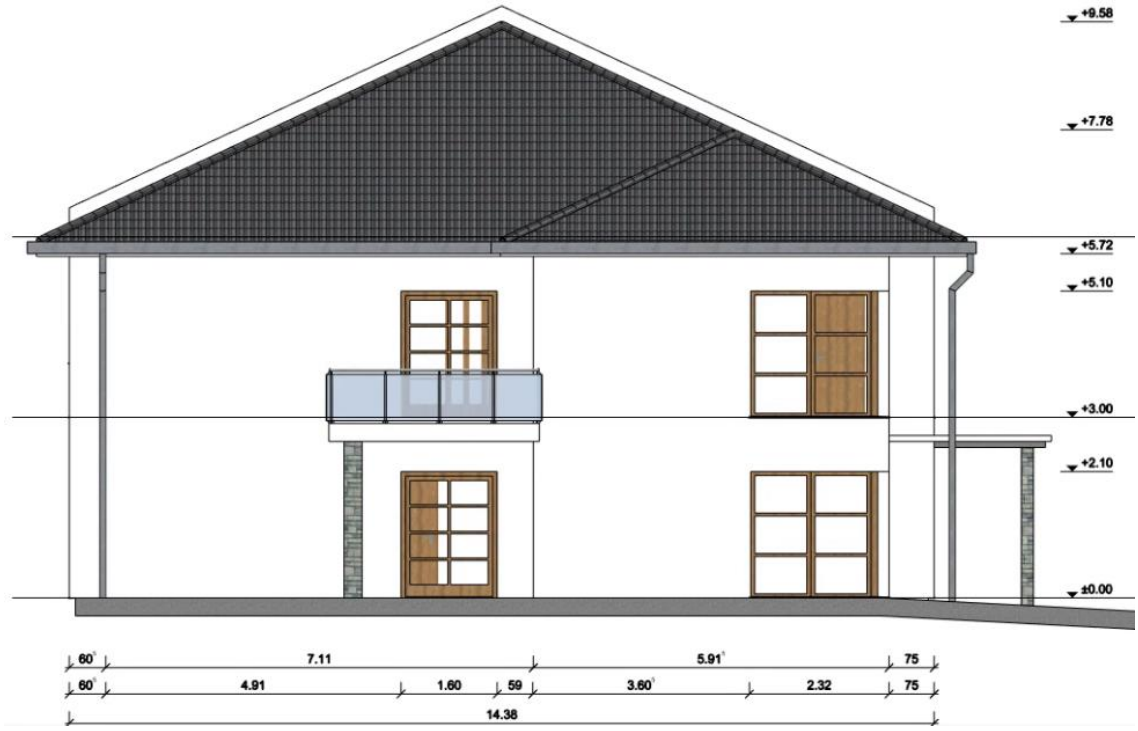

- Once you are finished with dimensioning, press **ENTER**.

### *Elevation on section*

The **Elevation on section** command can be found under the **Ribbon Menu / Annotate** submenu.
The process for dimensioning is as follows:

- Initiate the command, then select the starting height on the elevation wall by clicking on the junction point of the wall and the floor.
- To display the 0 height value, click again at this point or at the same height position, then determine the dimensioning position next to the elevation wall. Click at the preferred location, so the 0,0 value appears next to the elevation wall at the desired position.
- Additional points can be determined with a single click, and the height dimension will appear on the elevation wall.
- When you are finished with dimensioning, press **ENTER**.

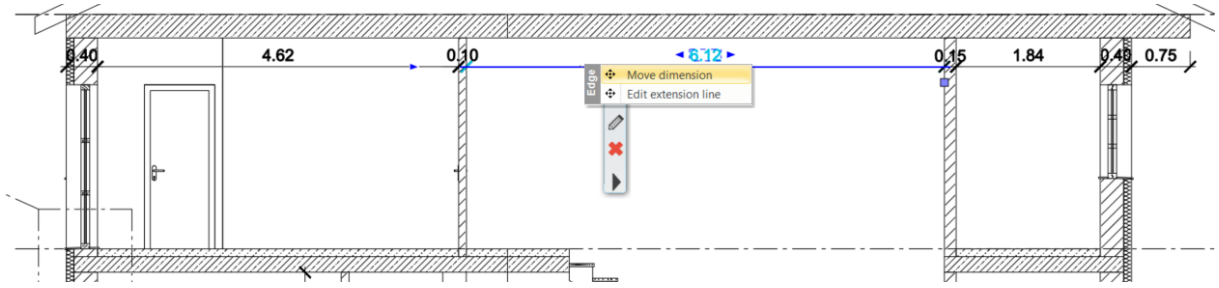





- Place a text here as well, indicating the West elevation.

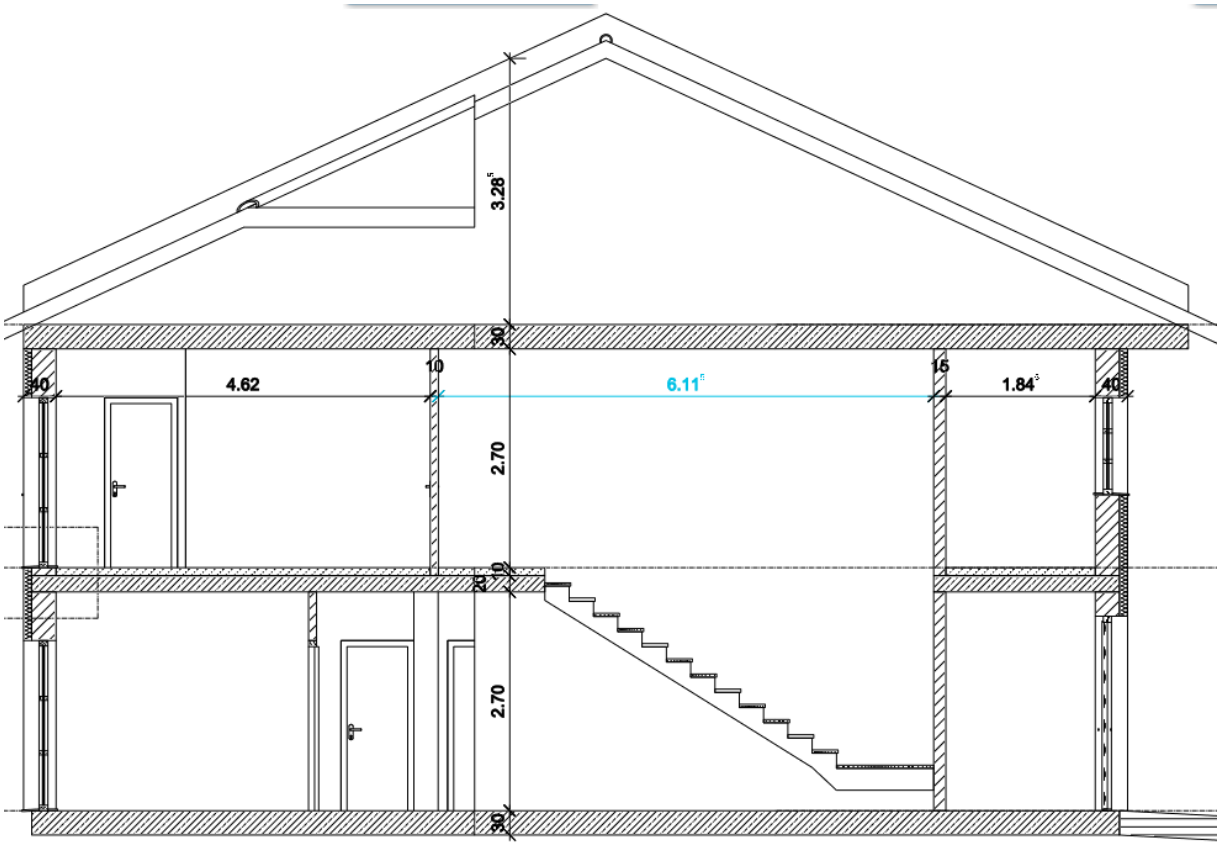
  Let's create the dimensions in the B-B section using the commands for Serial in horizontal, Serial in vertical, and Elevation on section.

- Select the **Ribbon Menu / Dimensioning / Serial in horizontal** command. Dimension the wall thicknesses according to the picture.

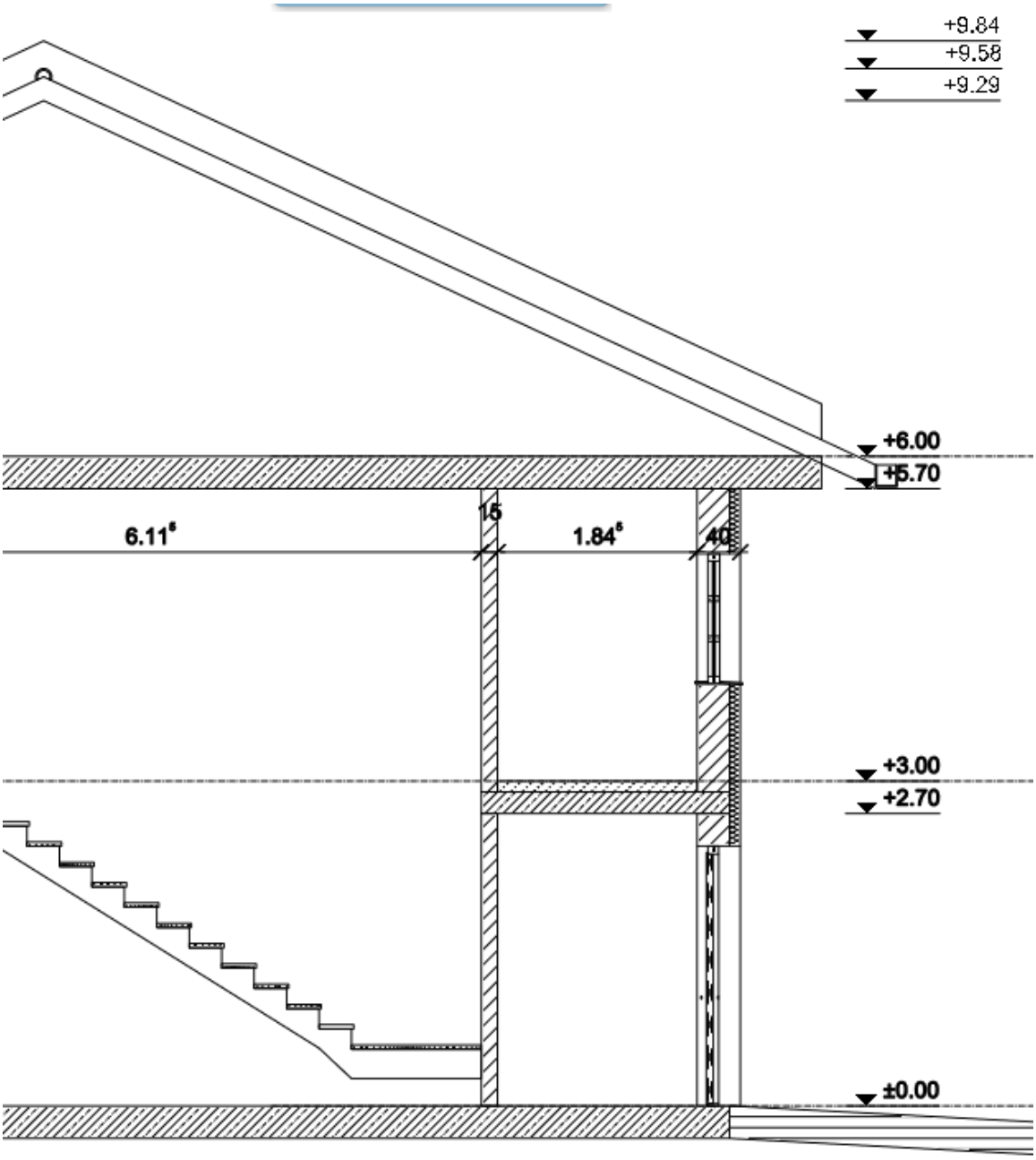



The linear dimensions can be moved together if we select the dimensioning and then, with the left mouse button, click once more. Using the Move Dimension command, we can move the entire chain of dimensions.

- Select the **Ribbon Menu / Annotate / Serial in vertical** command. Dimension the floor slab thicknesses and the room heights according to the picture.

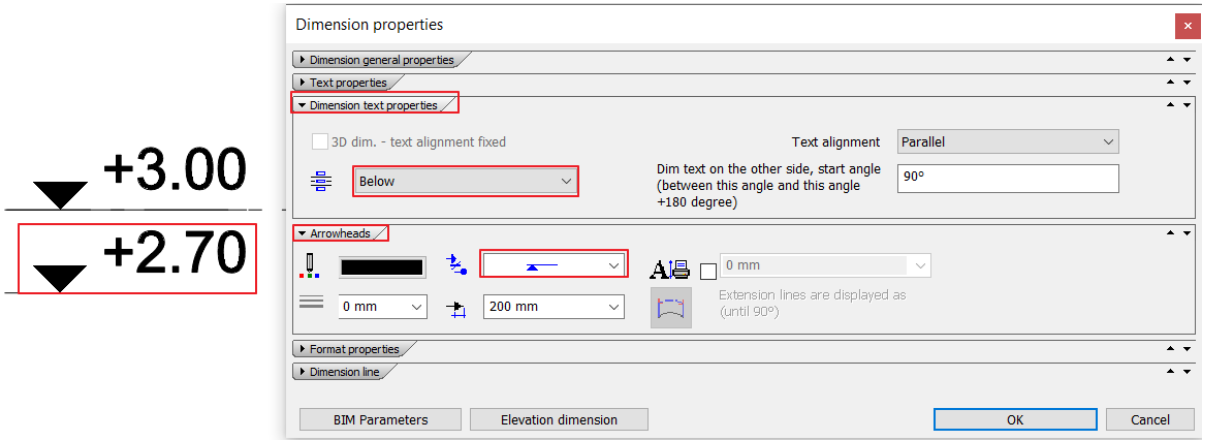



- Select the **Ribbon Menu / Annotate / Elevation on section** command. Dimension the bottom and top of the floor slabs and the roof, and display the height of the firewall according to the picture.




For better clarity of the dimensions, it is possible to modify the arrowheads and the position of the values.

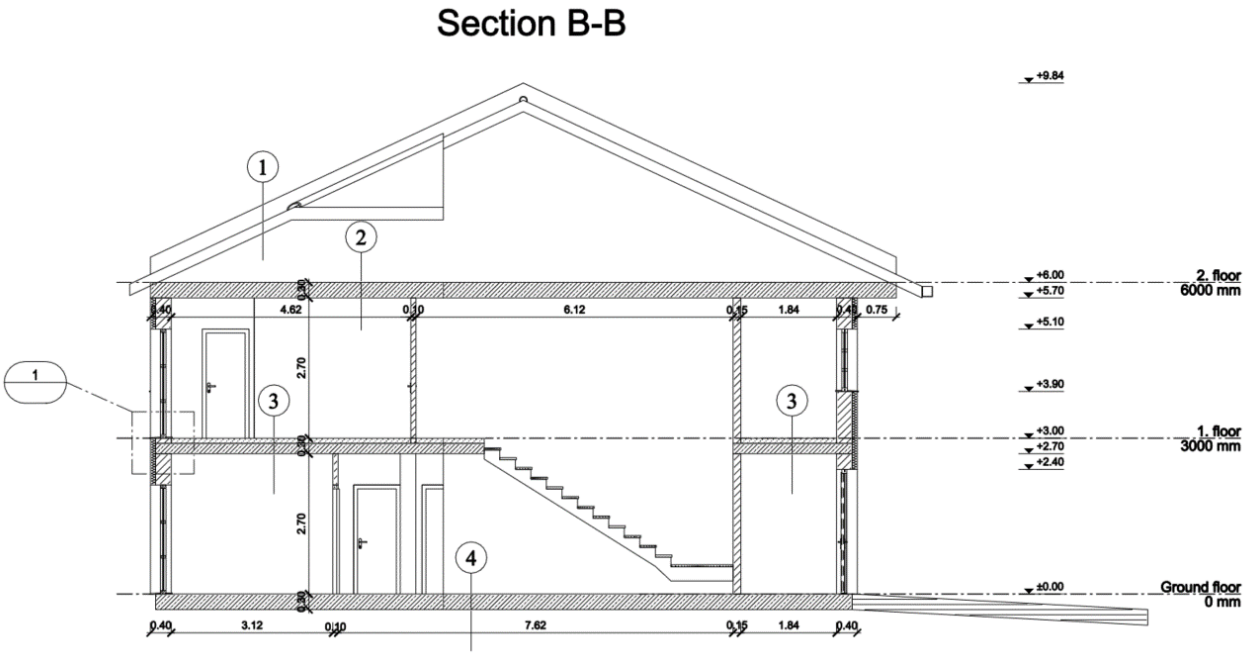
- Click on the 2.7 m height dimension and select its properties.
- Choose "Below" in the Dimension text properties,
- On the Arrowhead tab, select the upward-pointing arrow.




- Place text here as well, B-B section. Set the text height to 400 mm.

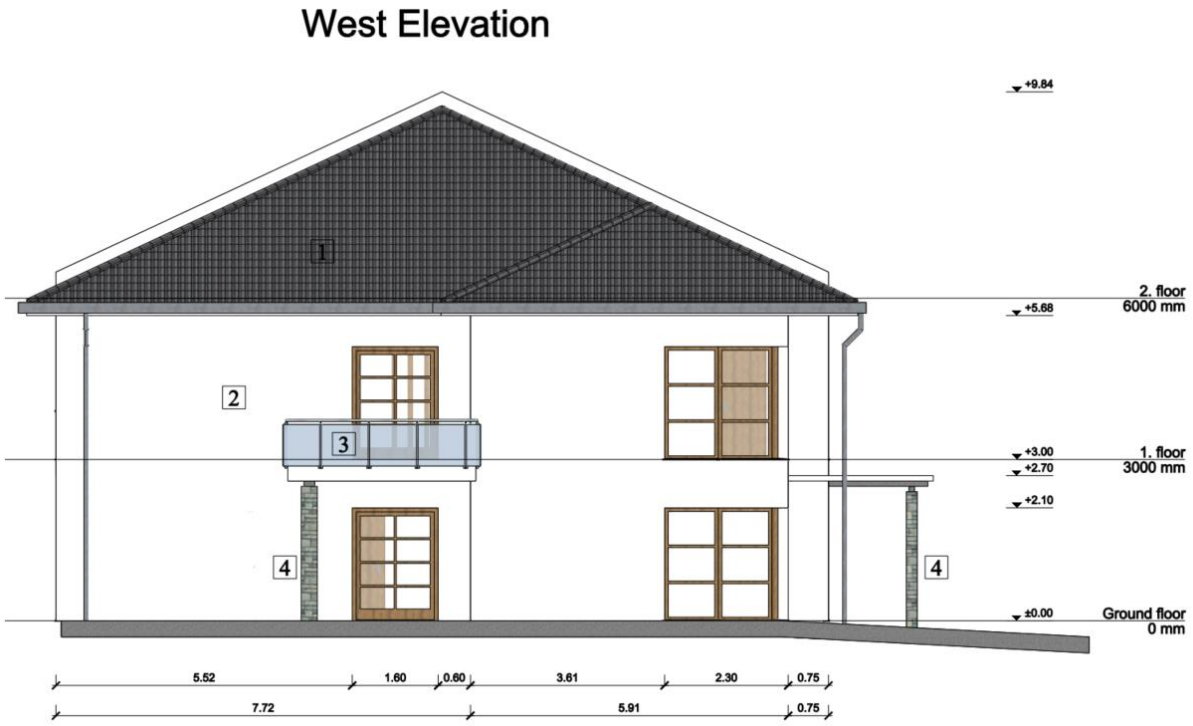
## 5.8.3. Numbering

- Select the **Design Center / Groups / Signs / Circle signs** folder. Drag the numbers to the various elements. This way, you can easily mark the layer orders.




We will also place numbers on the West Elevation.

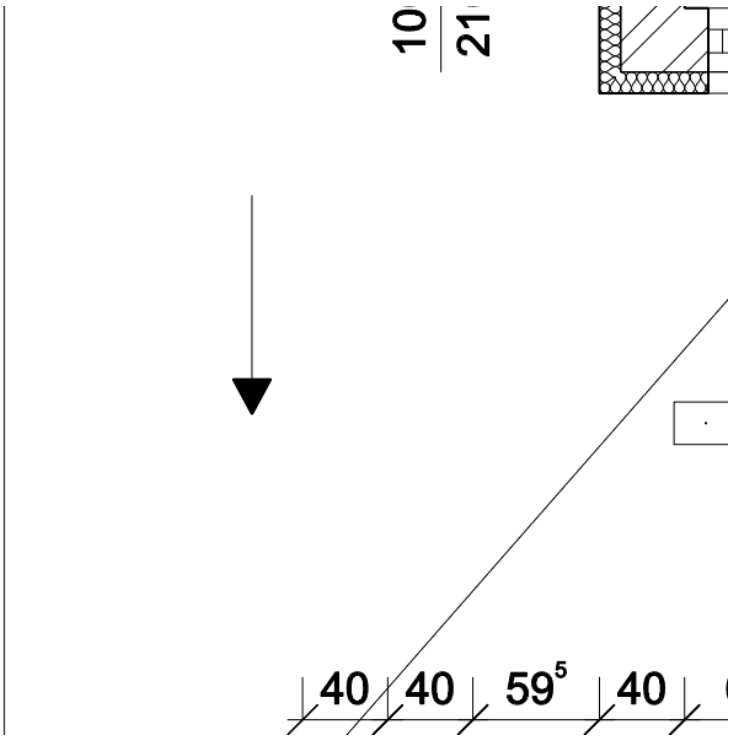
- Select the **Design Center / Groups / Signs / Square signs** folder. Drag the numbers to the various elements. This way, you will be able to easily prepare the material consignment.




## 5.8.4. Inclination Angle of the Ramp

Let's create the marking for the inclination angle of the ramp.

- Activate the floor plan and navigate to the ground floor.
- Select the **Ribbon Menu / Drafting / Line** command, then choose the *Simple Line + Arrowhead* style from the sidebar menu.
- Use the first click to indicate the starting point of the line and the second click to indicate the endpoint of the arrowhead.




# 5.9. Tags

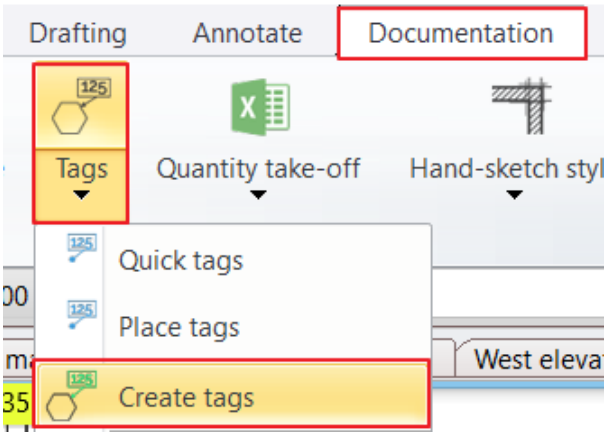
Using tags, you can display information about selected elements on the floor plan. The displayed information can be customized.

We will display the bottom elevation of the ramp, the upper elevation, and its inclination angle using a tag.

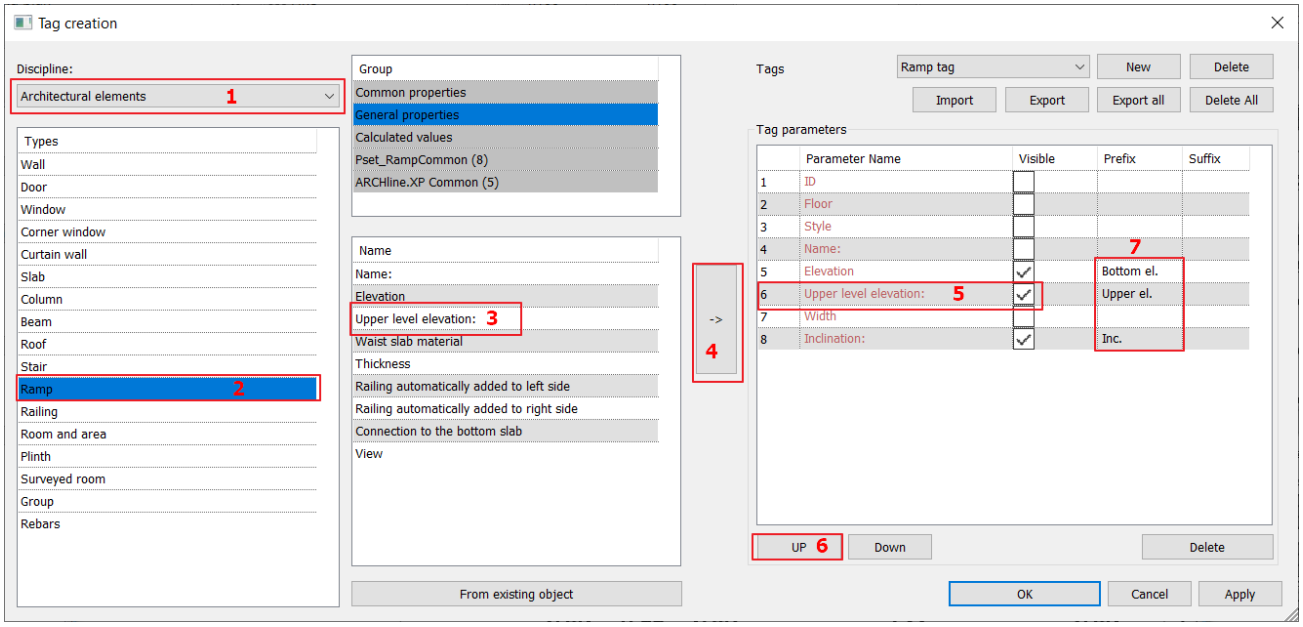
### *Placing a Tag*

In this section, we will place a tag in ARCHLine.XP. The items within the tag will automatically update when the linked elements change, and by modifying the parameters in the list, the elements can be altered.

- Select the **Ribbon Menu / Documentation / Tags / Create Tag** command.

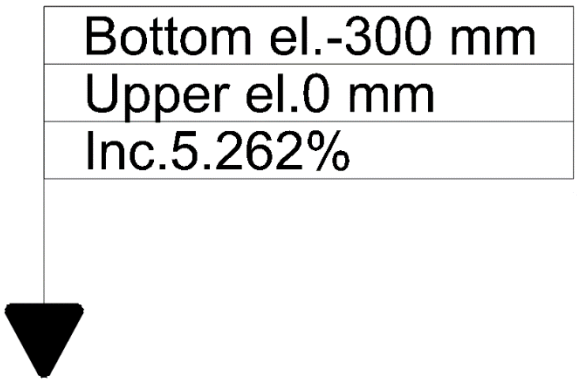



- In the pop-up window, on the left side, select **Architectural Elements** from the disciplines (1), then select **Ramp** (2). Choose the **Upper Level Elevation** (3) from the middle column and move it to the right column using the arrow (4). On the right side, uncheck the boxes for all properties except for Elevation, Upper level elevation, and Inclination. Select the Upper Level Elevation (5), and use the Up (6) button to change the order so that Upper Level Elevation comes after Elevation. Fill in the prefixes as follows: Bottom el.: ; Upper el.: ; Inc.: (7).
- Close the window by pressing **Apply** and then **OK**.



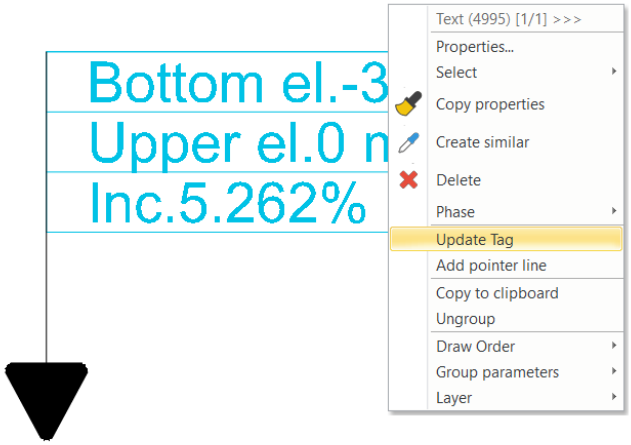

- Click on the **Ribbon Menu / Documentation / Tags / Place Tags** command.

In the appearing window, you can modify the properties set earlier. Accept it with OK. In the next window, you can adjust the style of the cells, font size, etc. Accept it with OK. Select the element you want to tag, in this case, the ramp.



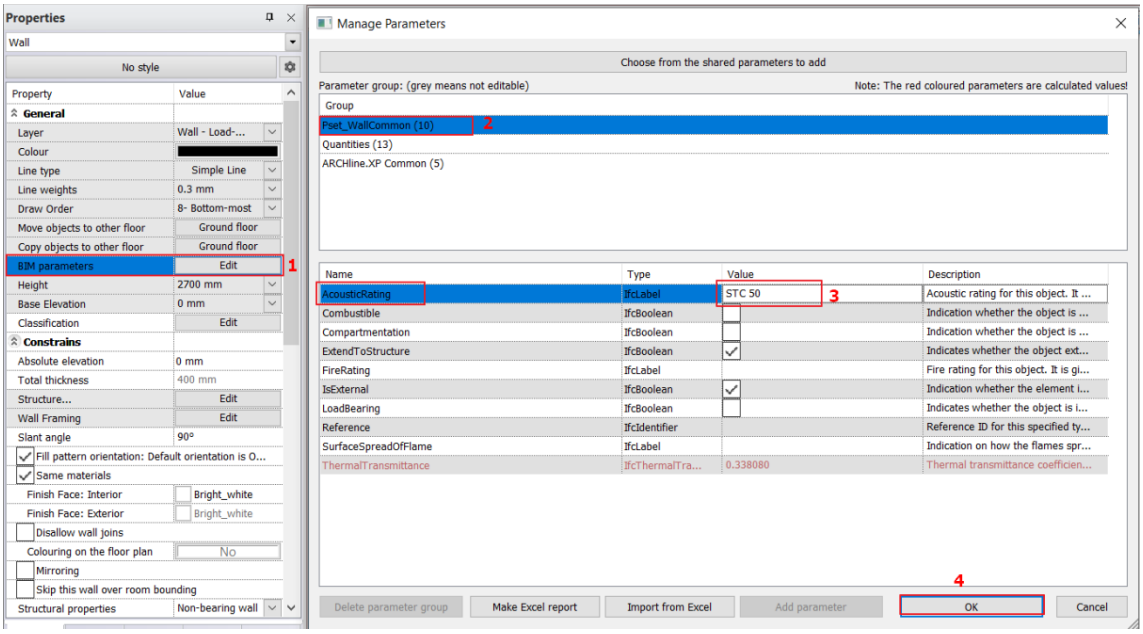

The line connecting the tag to the element can be deleted, while the connection between the element and the label remains intact. Upon updating, the tag will track any modifications made to the element.

You can access the update of the tag from its local menu.

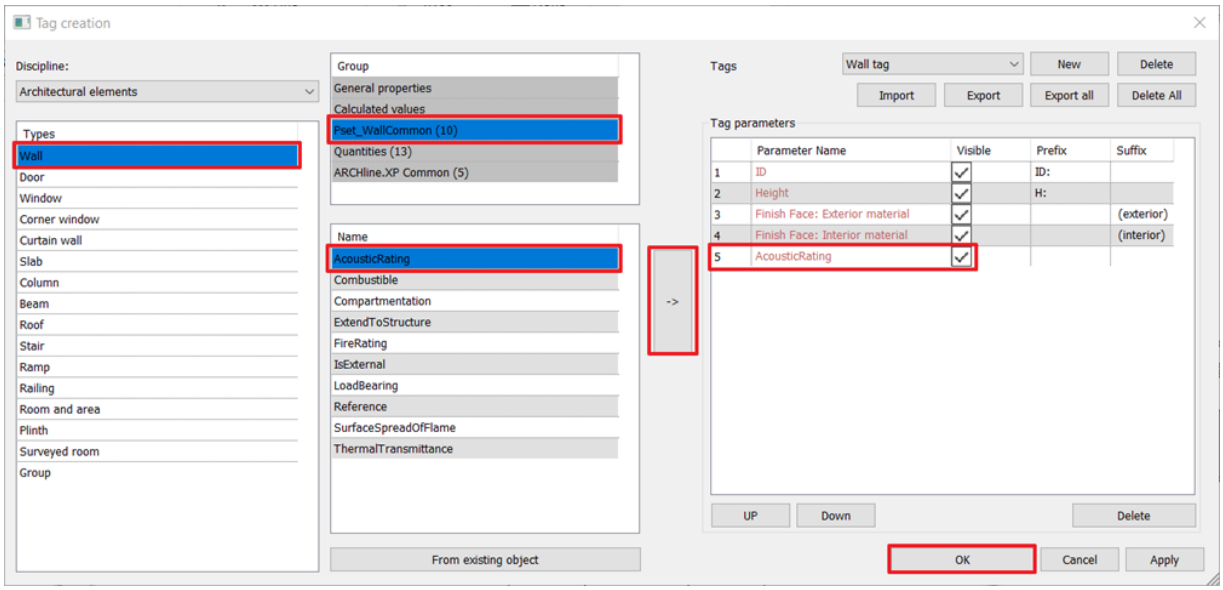



***Useful Tip: BIM parameters can also be displayed in labels.***

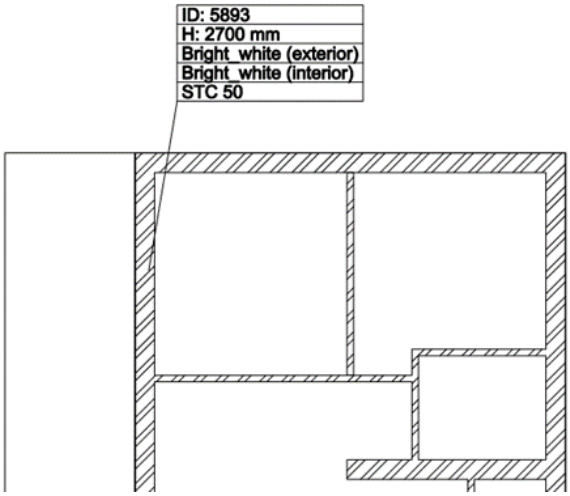
- First, set the BIM parameter of the wall.
- Click on the wall, access its properties, and click on the BIM Parameters button.
- In the pop-up window, select the option Pset_WallCommon (10) and set the AcousticRating value to STC 50, indicating good sound insulation.
- Click "OK" to accept the changes.



- In the Create Tags window, select the wall option from the left-hand list, the Pset_WallCommon (10) option from the middle column, and add the AcousticRating data to the label using the arrow.
- Click OK to accept the changes.



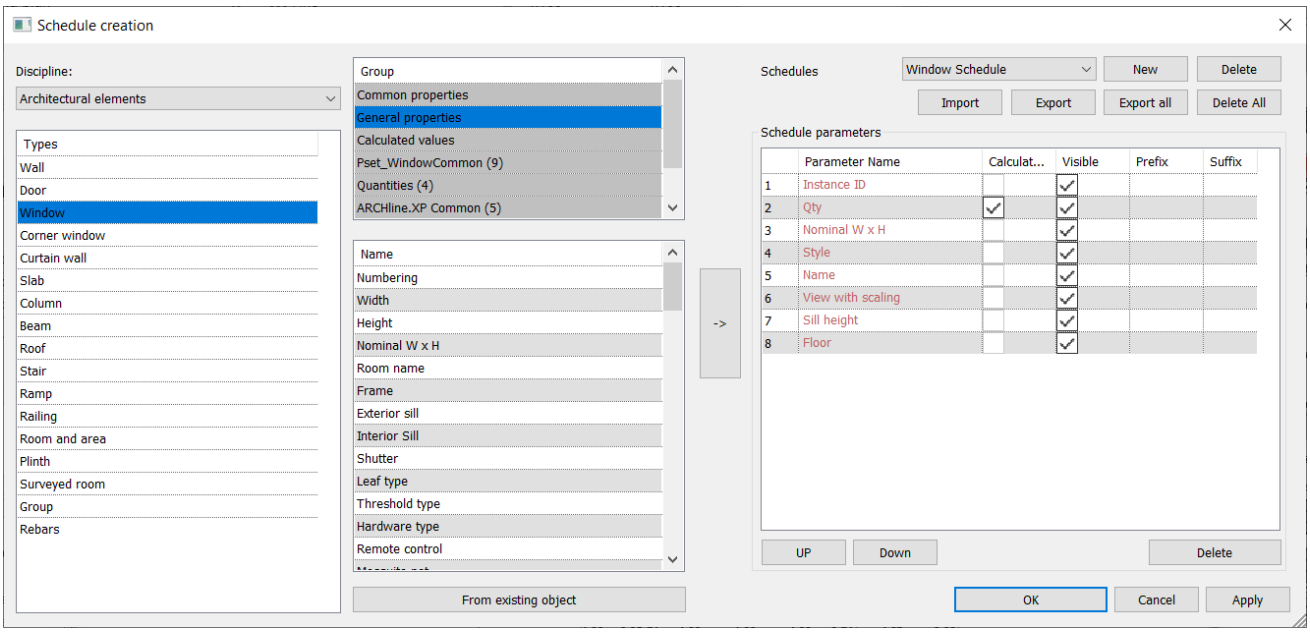

- Place the label on the floor plan.
- The label now includes the acoustic rating as well.



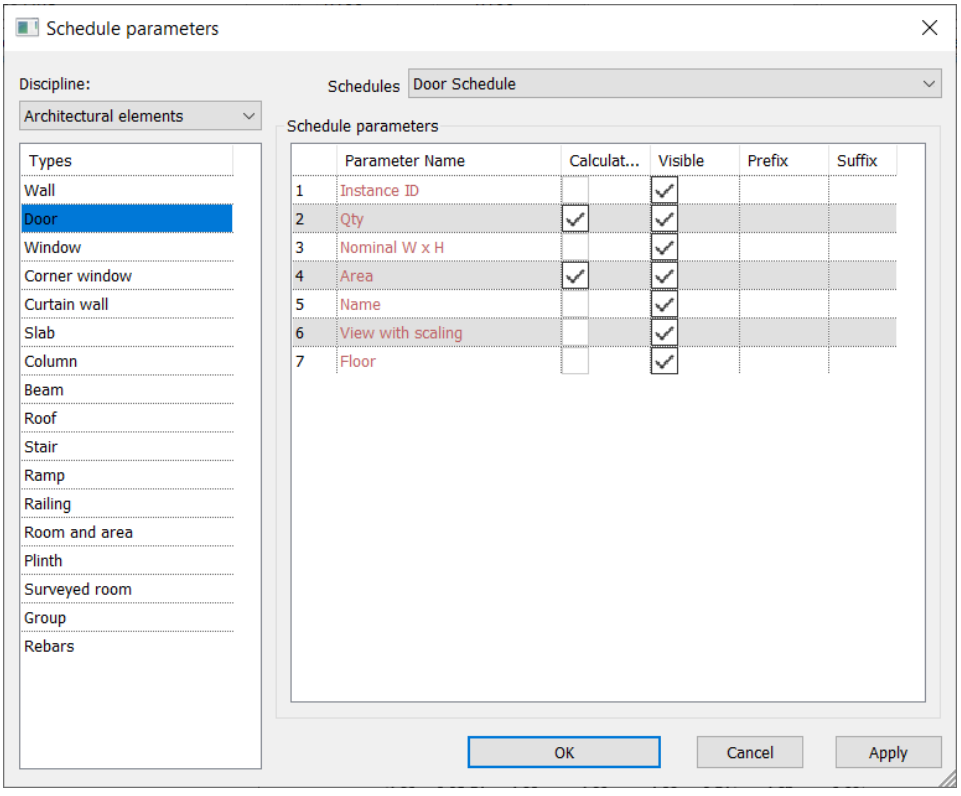

## 5.10. Schedules

Schedules are dynamic lists of building components that can be generated based on the content of the project. Schedules have a two-way relationship with the drawings. This means that changes made to the project are reflected in the schedules, and modifying the data in the schedules affects the corresponding elements in the drawing. Let's see how this works in practice.

- Click on the **Ribbon Menu / Documentation / Schedules / Define Schedule** command.
- In this dialog, you can customize the schedule, selecting which elements and what information you want to display. For now, we will place a default schedule, so close the window with the Cancel button.




- Select the **Ribbon Menu / Documentation / Schedules / Placing Schedule** command.
- From the architectural elements, select Door.




- After pressing OK, you can set the display properties of the schedule in the pop-up window. Accept it with OK.
- Place the schedule next to the floor plan with a single click.

**Door Schedule**

| Instance ID | Qty | Nominal W x H | Area | Name | View with scaling | Floor |
|---|---|---|---|---|---|---|
| N/A | 1 | 1300 x 2400 mm | 3.12 m² | Door5 | | Ground floor |
| N/A | 1 | 1500 x 2100 mm | 3.15 m² | Door4 | | Ground floor |
| N/A | 1 | 1600 x 2100 mm | 3.36 m² | Door4 | | 1. floor |
| N/A | 1 | 1600 x 2100 mm | 3.36 m² | Door4 | | Ground floor |
| N/A | 1 | 900 x 2100 mm | 1.89 m² | Door1 | | Ground floor |
| N/A | 1 | 900 x 2100 mm | 1.89 m² | Door2 | | Ground floor |
| N/A | 1 | 900 x 2100 mm | 1.89 m² | Door3 | | Ground floor |
| N/A | 6 | 900 x 2100 mm | 1.89 m² | Door4 | | 1. floor |

- Place another schedule for windows as well. Select the Placing Schedule command, then choose Windows. Place the schedule on the floor plan.

**Window Schedule**

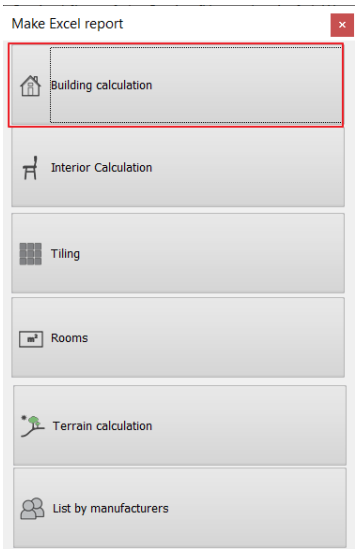
| Instance ID | Qty | Nominal W x H | Style | Name | View with scaling | Sill height | Floor |
|---|---|---|---|---|---|---|---|
| N/A | 8 | 1000 x 2100 mm | | Window5 | | 0 mm | 1. floor |
| N/A | 8 | 1000 x 2100 mm | | Window5 | | 0 mm | Ground floor |
| N/A | 2 | 700 x 1200 mm | | Window5 | | 900 mm | 1. floor |

### *Locating and Modifying an Item in the Schedule*

Identifying elements in the drawing through the schedule is straightforward with the selection of content.

- Select the previously placed schedule and find one of the doors on the ground floor within the list.
- Click on the small magnifying glass icon on the left side of the schedule, and the software will draw an arrow pointing to the selected item.
- Find the width value of the door in the schedule and click on it.
- Enter a slightly smaller or larger value (e.g., 850 mm or 1000 mm), then press **ENTER**. The software will then modify the width of the door on the drawing as well.

## 5.11. Quantity take-off

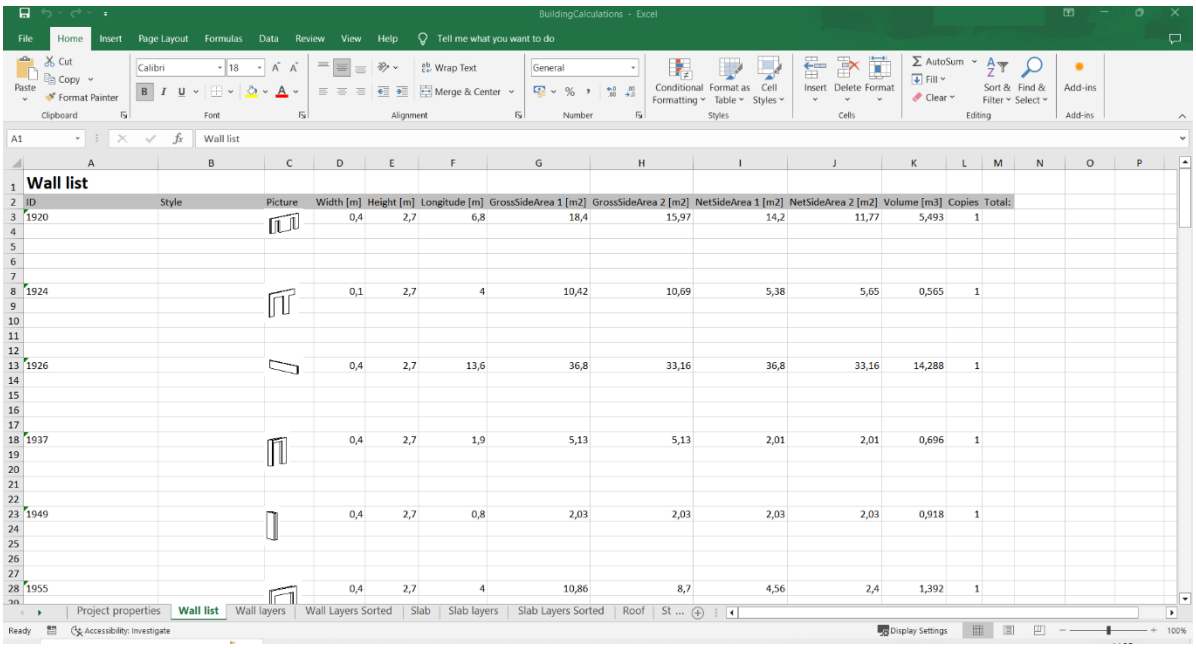



Quantity take-off is an excellent tool for extracting various data from the plan in Excel format for further calculations.

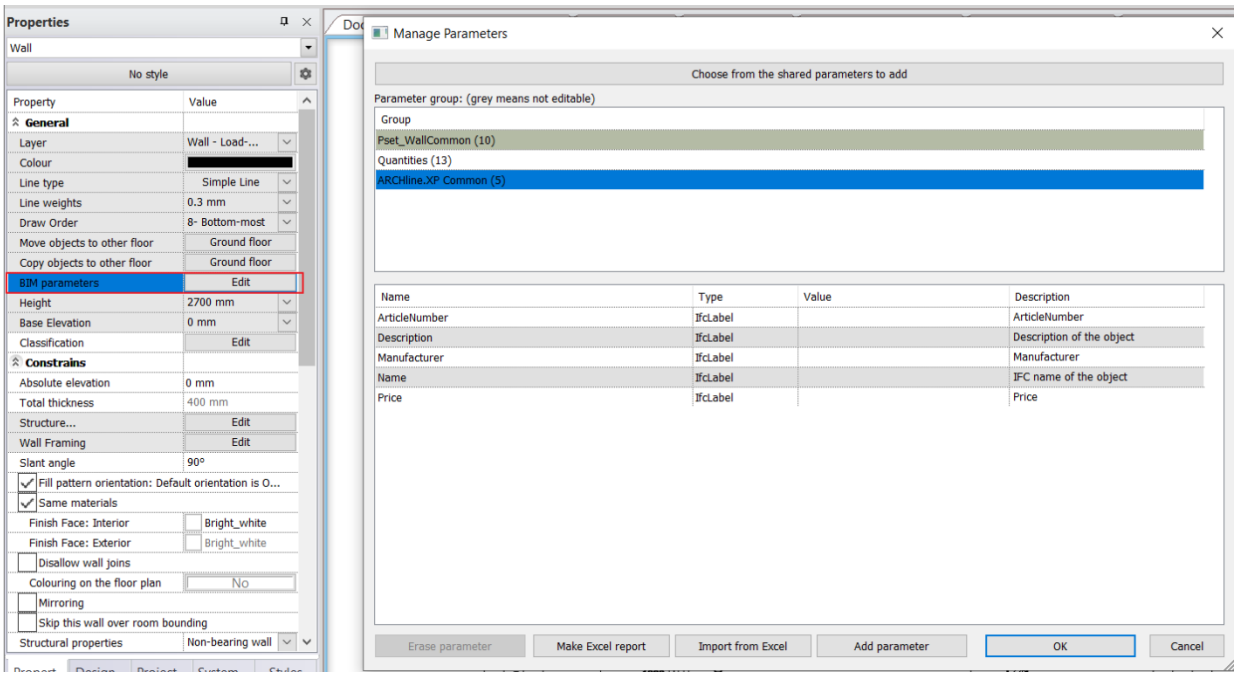
Let's create an Excel list for Building calculations.

### *Building Calculations list:*

- Use the **Ribbon Menu / Documentation / Quantity take-off / Excel list** command.
- Select the Building Calculations option.
- Keep all options enabled except for the "Export BIM parameters" option, then press the OK button.
- Name the file BuildingCalculations.xlsx and save it by pressing the Save button.
- Microsoft Excel will automatically open this file if the application has been previously installed on the computer.




The program can also list BIM parameters. By selecting an element, you can access these parameters in the side menu.



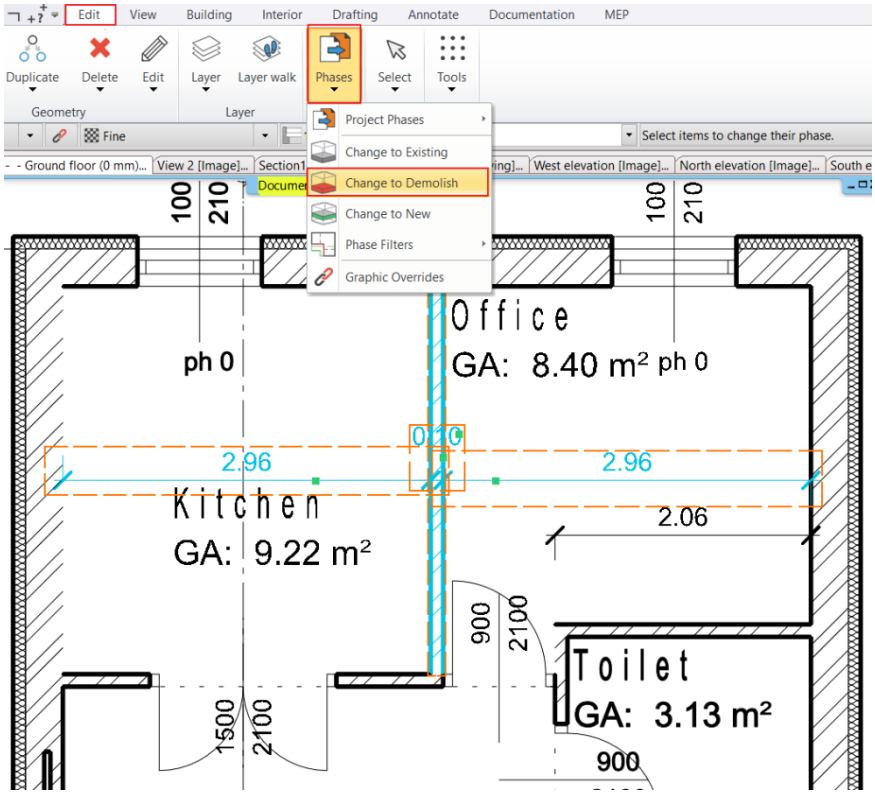

## 5.12. Managing phases

Using phases and phase filters, we can create a new design based on an existing design state. Phases can be tracked throughout the entire documentation, ensuring that 3D views, sections, and schedules follow the current phase.

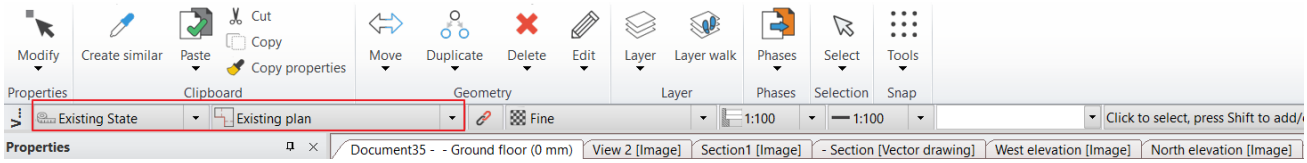
- Select the **Ribbon Menu / Edit / Phases** command.

  Here, we have the option to switch the appropriate elements to Existing, Demolished, or New status. This can be done for windows, walls, 2D symbols, etc.

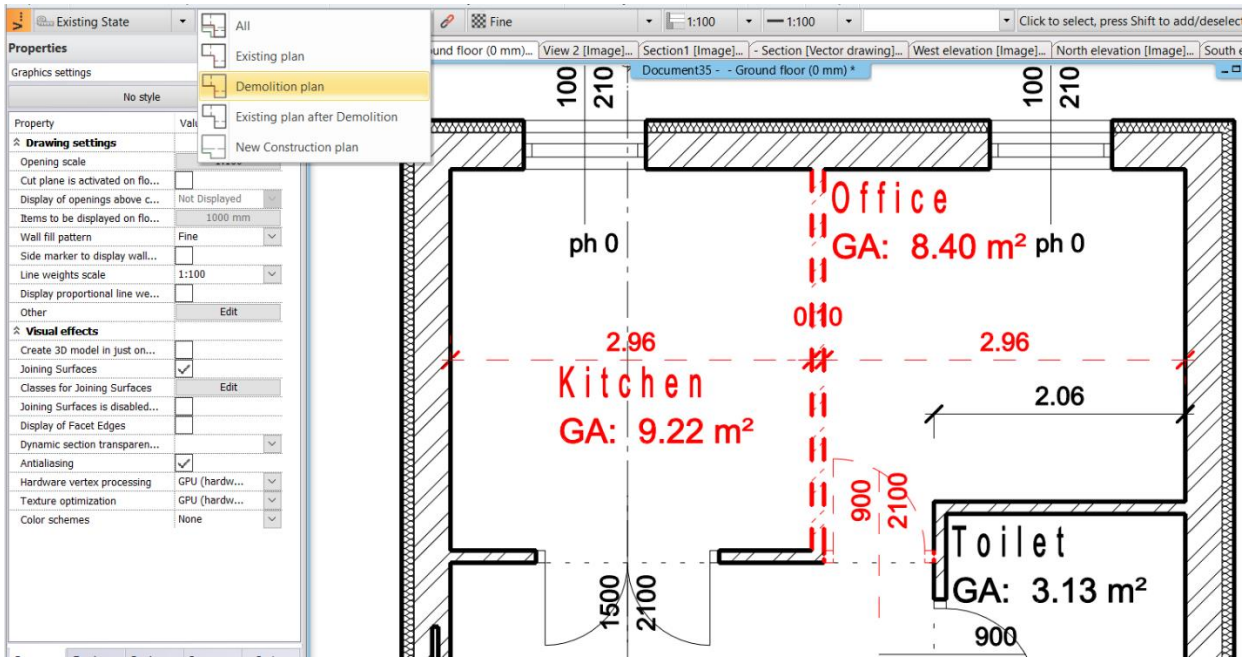
- Initiate the **Change to Demolish** command, then select the upper partition wall and the associated dimension lines. Accept with Enter.




To display the modification, we need to use the phase filter.




- All: Displays existing, new, and demolished elements.
- Existing plan: Displays existing elements. (Before demolition)
- Demolition Plan: Displays demolished elements in red.
- Existing Plan after Demolition: Demolished elements do not appear in the plan.
- New Construction Plan: Displays newly added elements alongside the existing ones.



# Workshop 6:
# Plan sheets, stamps, publishing multi-page PDFs and DWG/IFC export.

# 6. Workshop: Plan sheets, stamps, publishing multi-page PDFs and DWG/IFC export

In this workshop, we will familiarize ourselves with the process of compiling the plan sheets, where the completed drawings, floor plan, section, and elevation will be included. Additionally, we will create a stamp and examine how to print all of this arranged in a single PDF file.

Before starting the workshop, please watch the tutorial video Documents in Layout.

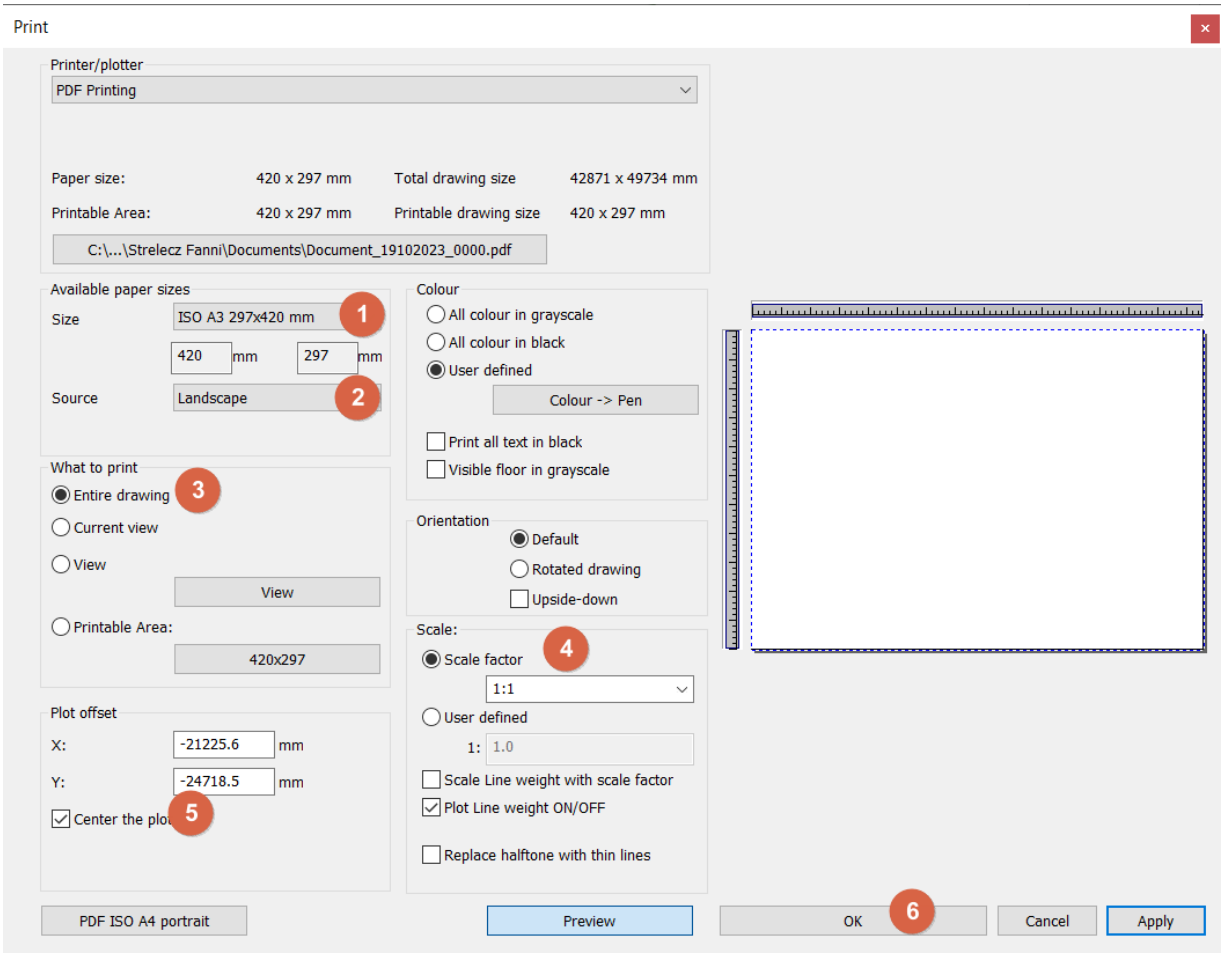
## 6.1. Printing to PDF

It is important that we can publish the drawings previously prepared in the project. The following options are available:

- print the current drawing, or
- print the current sheet set, which has been compiled from multiple drawings.

The result can be a printed copy or a PDF file, depending on what we want to deliver to the client. Let's quickly review the Print dialog box:

- Initiate the command **Print to PDF** under **Ribbon Menu / Documentation**.




### *Printer/plotter*

Here are all the available PDF printing options and the list of printers. Choose the option that you need here.

### *Available paper sizes (1)*

Here you can set the paper size and orientation.

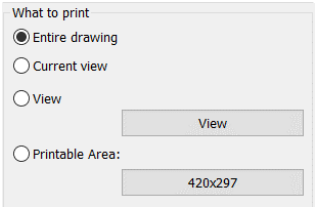
### *Orientation (2)*

Determines the position of the drawing. You can choose between default or rotated drawing options.

Do not confuse Orientation with the orientation of the paper. The first refers to the drawing, the second to the sheet of paper.

### *What to print (3)*

You can specify the area to be printed on the drawing.




### *Scale (4)*

You can select the default scale, e.g., 1:100. The optimal setting calculates the most suitable ratio for the drawing content to fit well on the current paper size.

If you want to display the print plan in its actual size, set the scale to 1:1 as the floor plan is a real-size virtual paper, eliminating the need for further resizing.

### *Center the plot (5)*

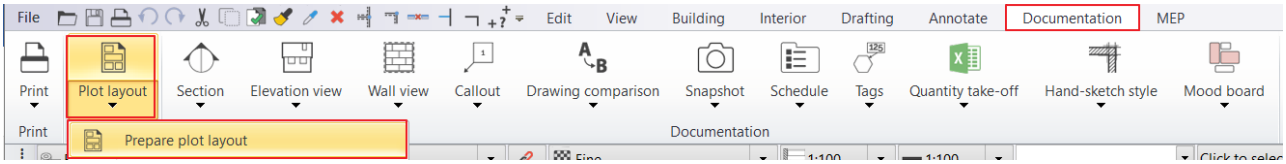
Moves the drawing's center to the center of the paper.

### *Print (6)*

By clicking the print button, you can start printing the content according to the parameters set in the Print dialog. Depending on the selected printer, the result can be paper-based or a PDF file.

## 6.2. Creating Plot Layout

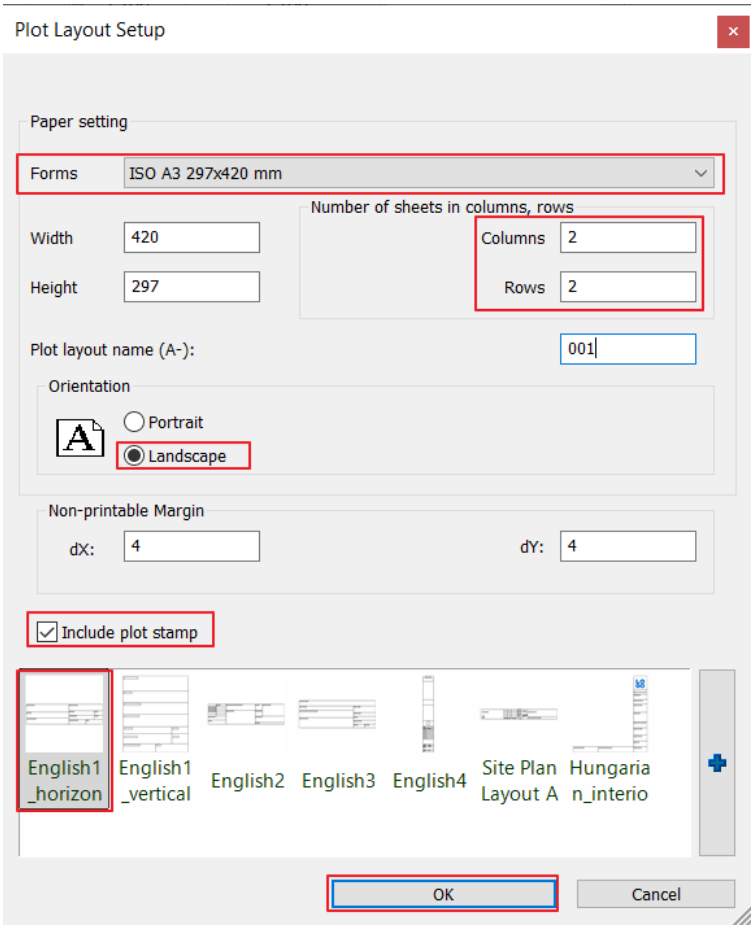
The **Prepare Plot layout** command is available under **Ribbon Menu / Documentation / Plot layout**.

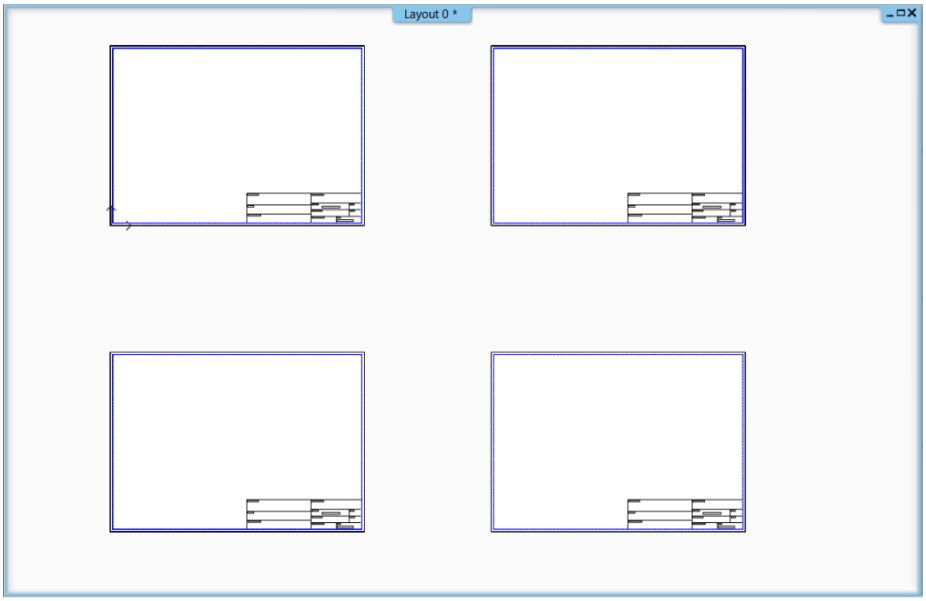



This command allows you to create a large number of drawing sheets in a matrix with the same stamps, for example, multiple A3 sheets in one go.
With the Print Queue command, the program automatically combines the contents placed within the dashed lines into one PDF document with the click of a button, based on the name of the plan sheet.

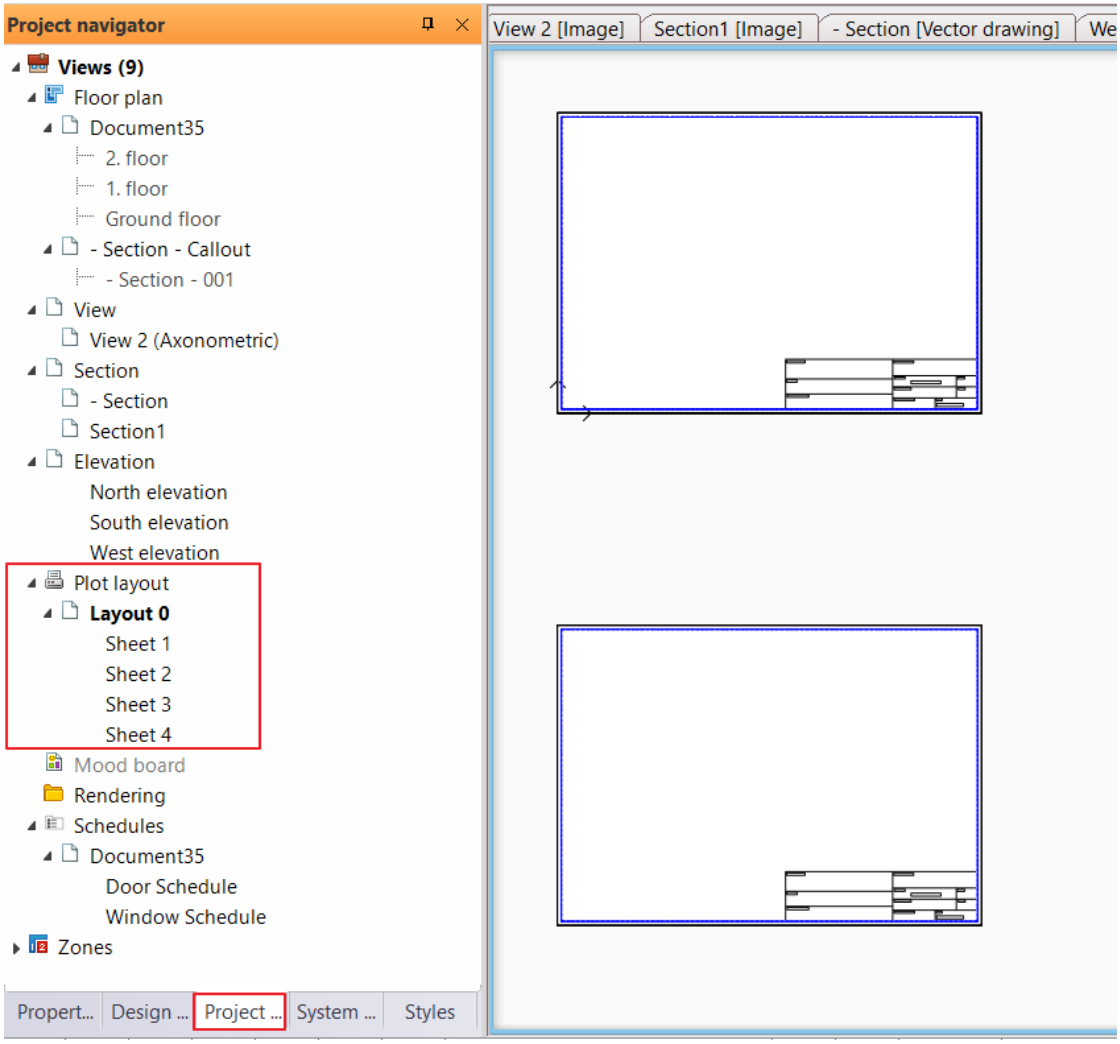
Now, we will place multiple sheets within one plan sheet layout.

- Set the **A3** size for the sheet size and **landscape** orientation.
- As we want to create 4 sheets, both the **rows** and **columns** should be set to **2**.
- Select the Print Stamp, for example, **English1_horizontal**.
- Click OK to generate the 4 empty print sheets.

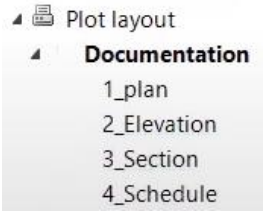



You can manage the plan sheets using the Project Navigator on the left side. Under the Plan Sheets, you can find the Print Sheet along with the 4 sheets.



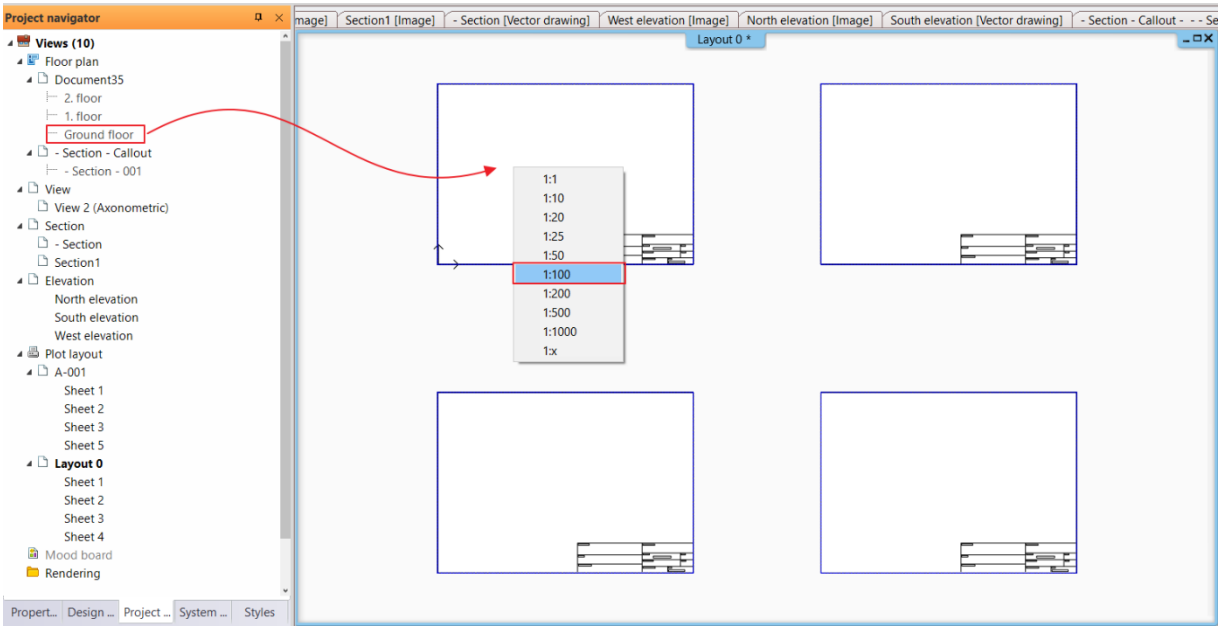

These can be easily renamed by right-clicking and selecting Rename. Let's rename them as follows:



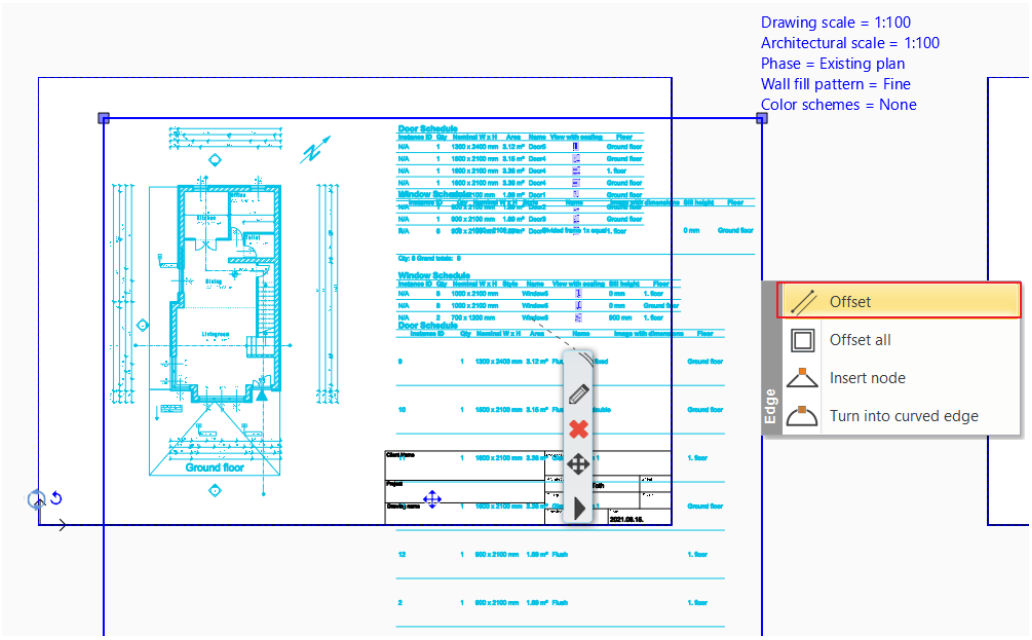

Even when working with numerous plan sheets simultaneously, it's easy to find a specific one: clicking on its name will prompt the program to show us which sheet it is and what it contains.

From the Project Navigator located on the left side, let's find the Floor Plan / Ground Floor section.

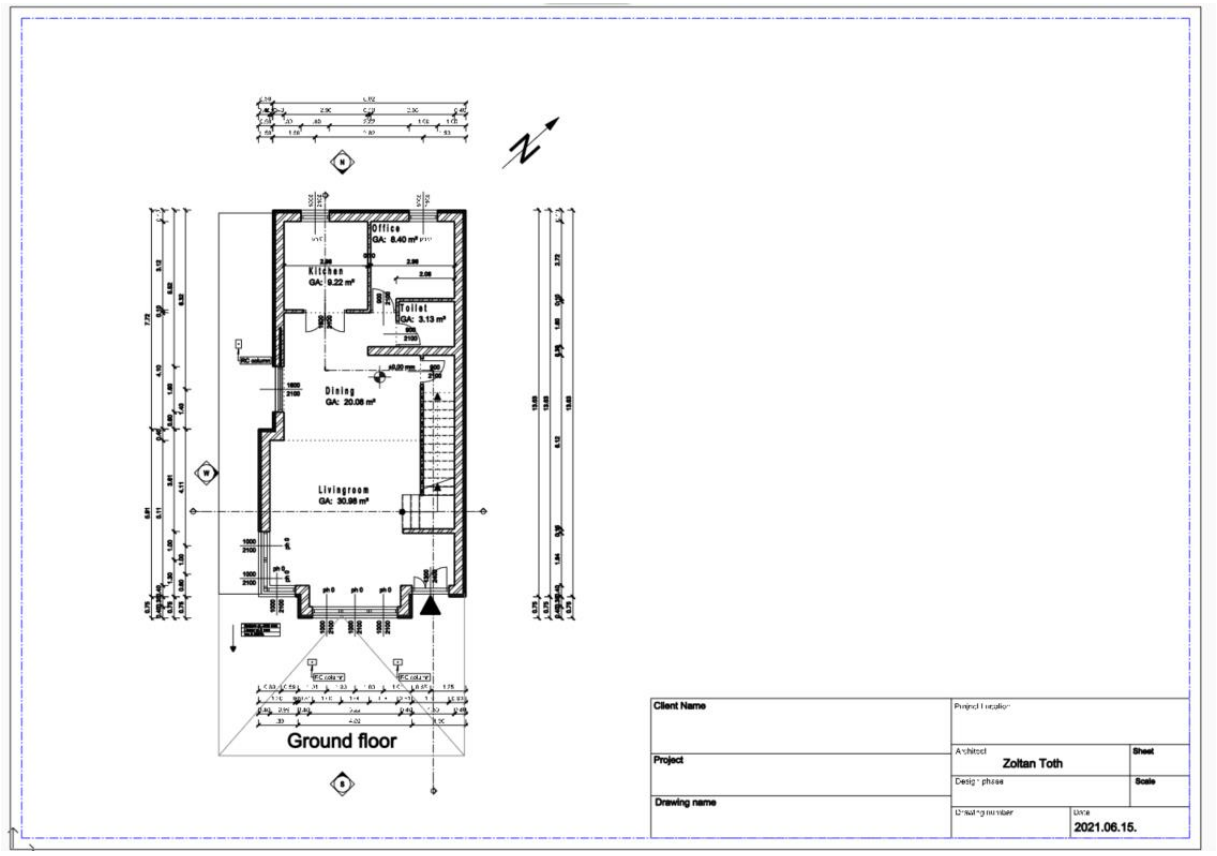
- Using the "drag and drop" method, place the Ground Floor plan onto the empty page and select a 1:100 scale.




- Place the floor plan! We can see that the program has placed the entire content of the ground floor view on the plan sheet.
- This is not correct; we need to modify this. Click on the drawing, then on the edge marker, and select the Offset command.



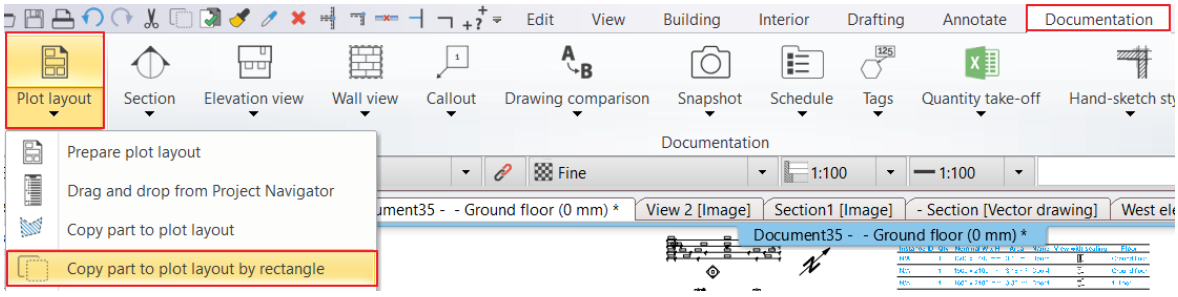

- Drag the edges until the point where you want to see the drawing.
- Click on the final drawing, then use the Move command to place the content onto the empty space of the plan sheet.



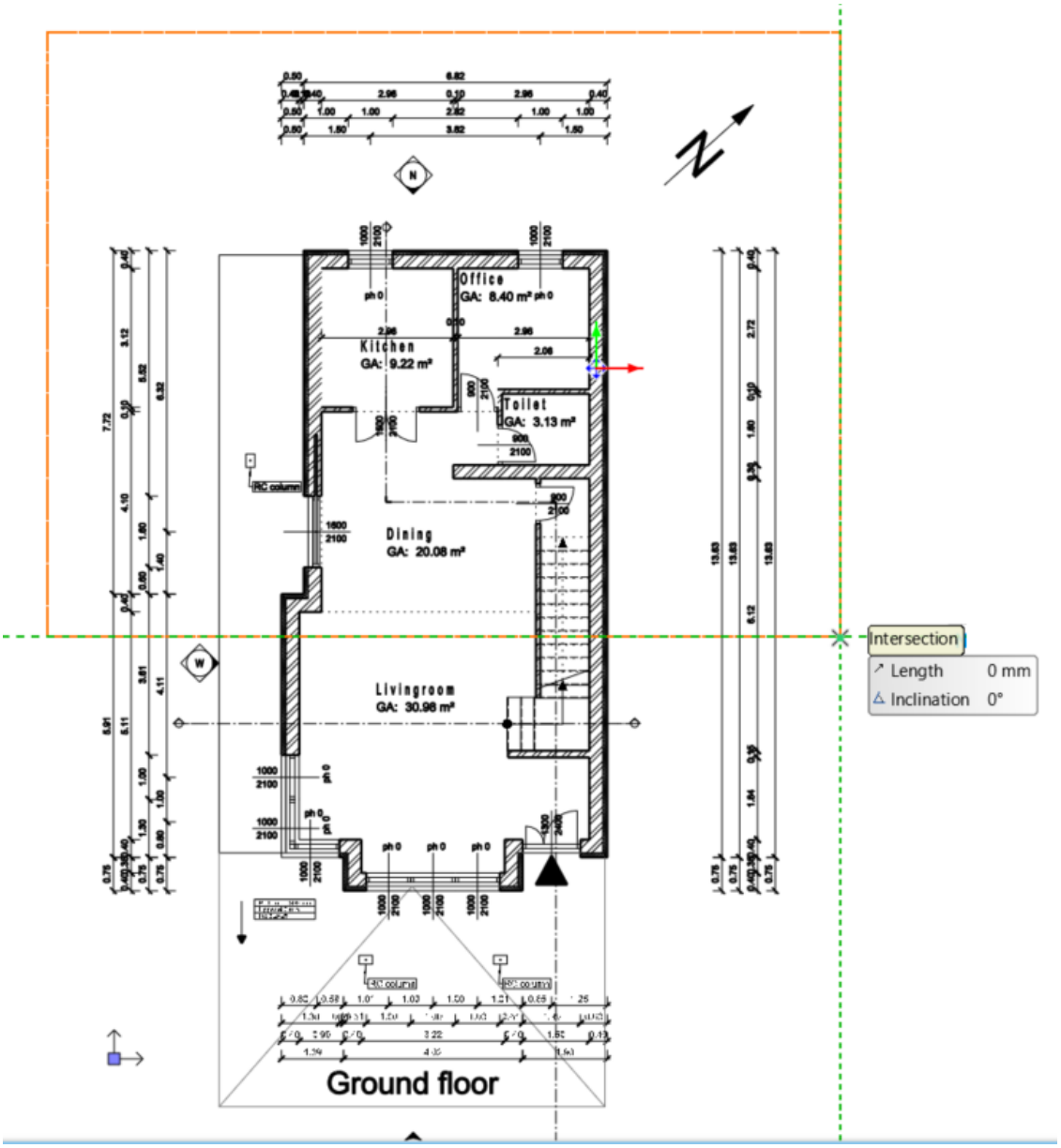

- This method allows you to place different drawings with different scales on the plan sheet.
- Next, place a section of the floor plan next to the Ground Floor plan on the sheet, showing the phase of the demolition plan.

If you only want to copy a portion of the floor plan onto the plan sheet, follow these steps:

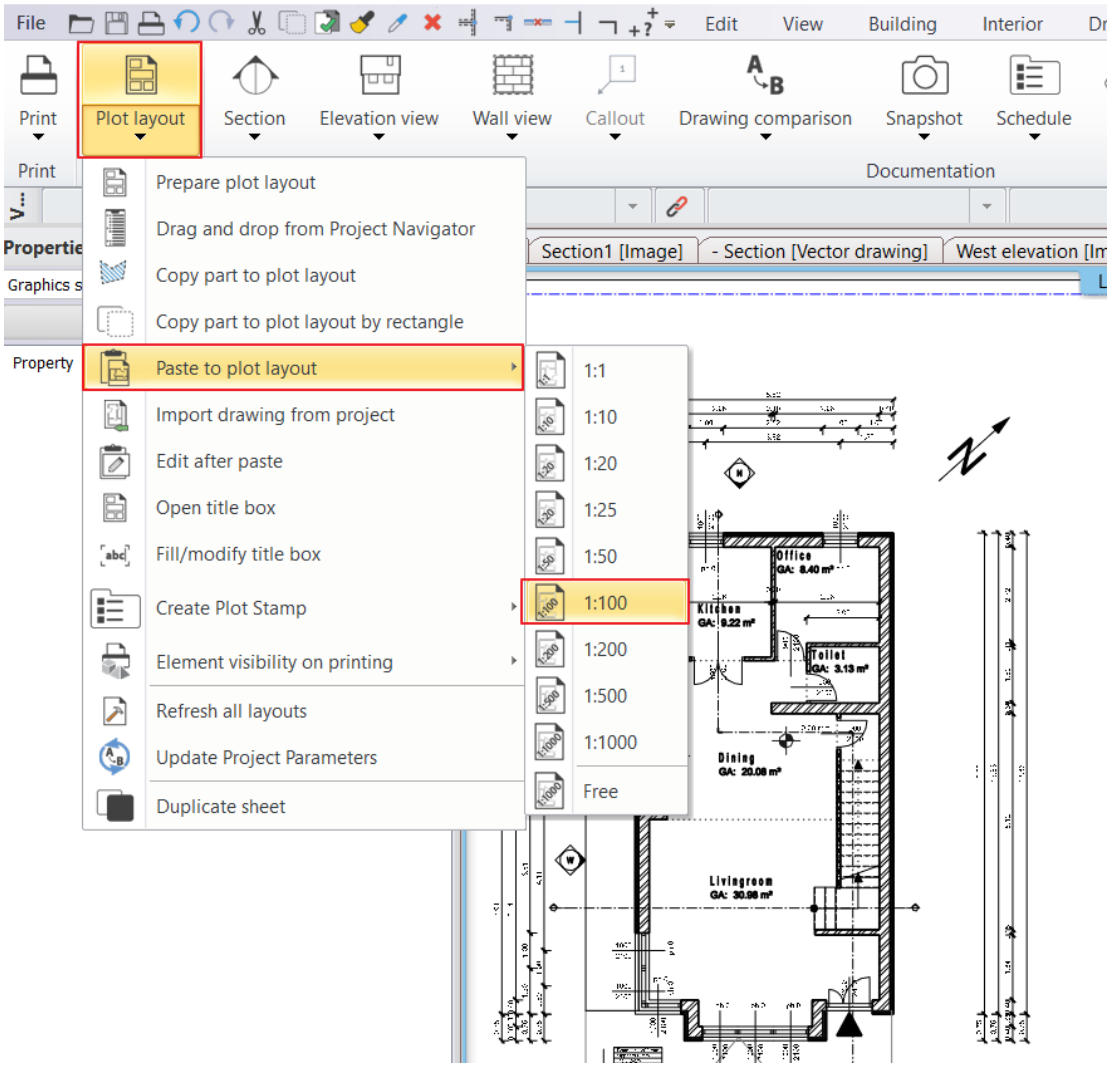
- Activate the window whose content you want to copy (in this case, the floor plan window).
- Select the **Ribbon Menu / Documentation / Plot layout / Copy part to plot layout by rectangle** command.




- Highlight the portion of the floor plan that you want to copy.
- Then, on the third click, determine the reference point by which you will grab the selected portion and place it on the plan sheet.



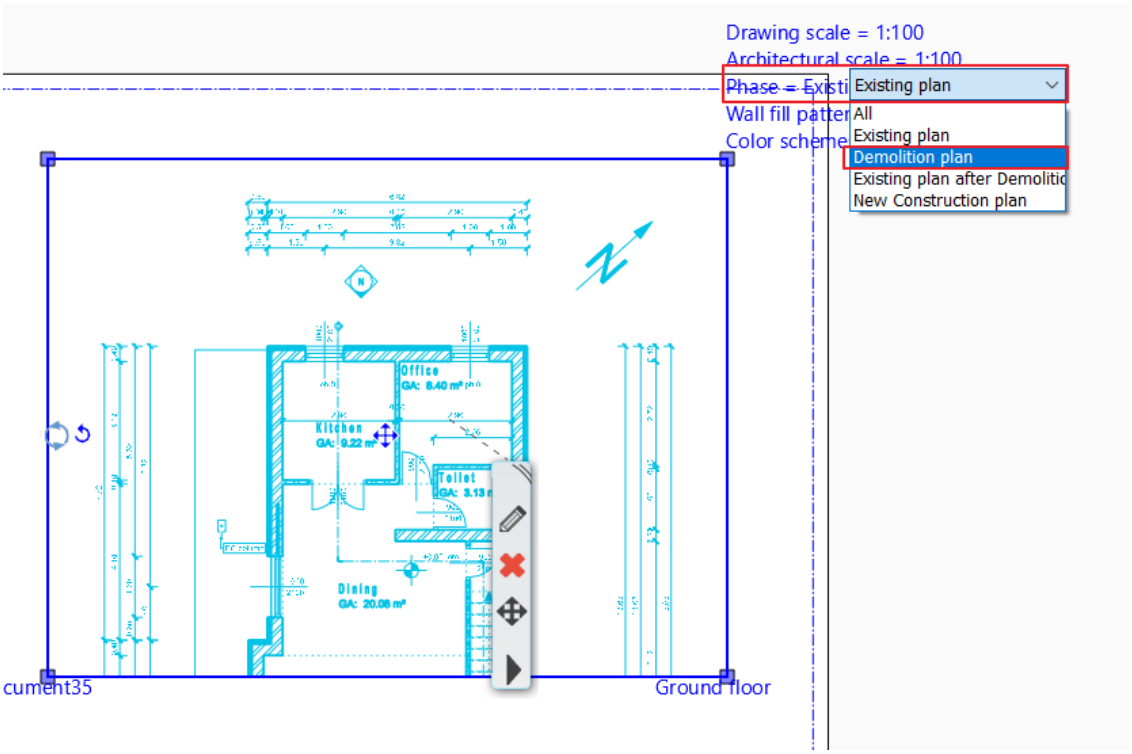

- Activate the Plot layout.
- Select the **Place to plot layout** command from the **Ribbon Menu / Documentation / Plot layout** group, then specify the scale for placing it on the plan sheet.



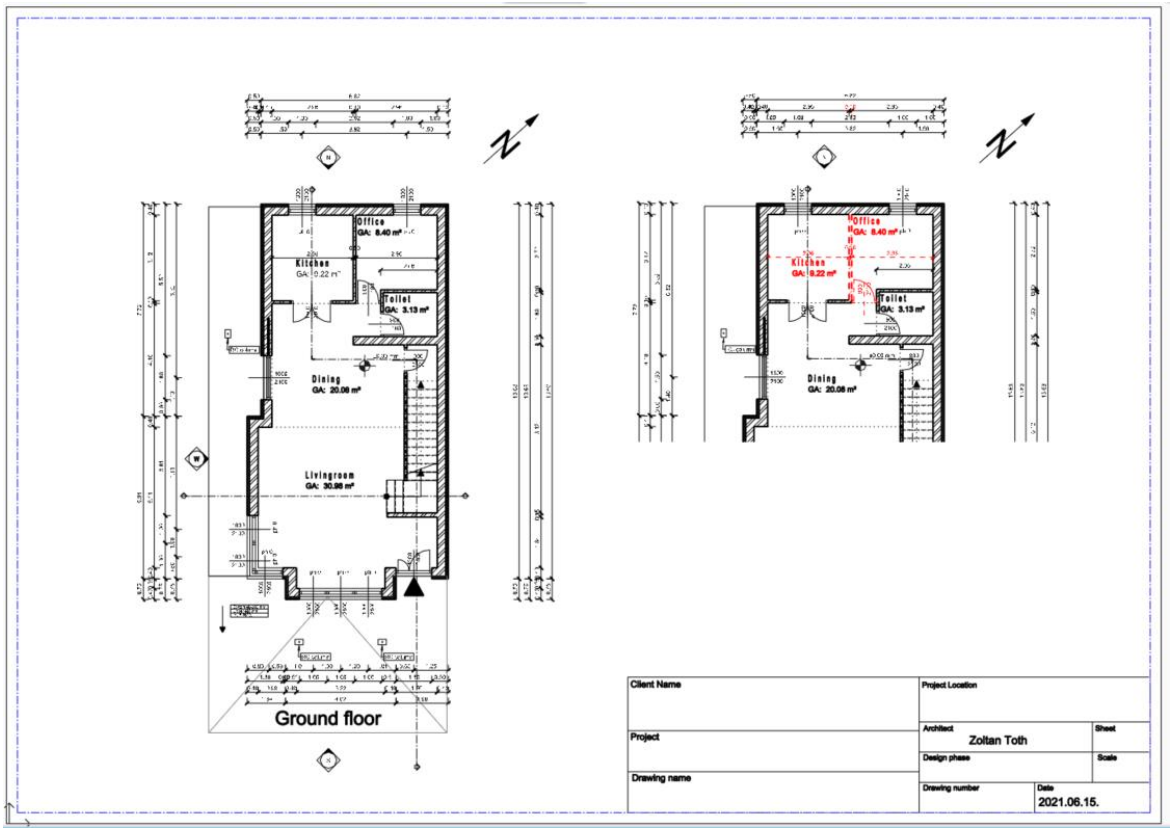

- Place the selected portion.
- If later we want to see a larger detail from this drawing, we can modify it in the same way as in the previous example, using commands like Offset.

To select the phase of the demolition plan:

- Clicking on the floor plan reveals various data modification options in the upper right corner.
- Click on Existing Plan, then from the drop-down menu, select the **Demolition Plan**.




- At this point, the walls to be demolished will appear in red.




The Plan Sheet is a dynamic drawing, so if changes are made in the original drawing, they can be reflected on the plan sheet. To do this, select the content of the Plan Sheet and click on the **Refresh this** command.

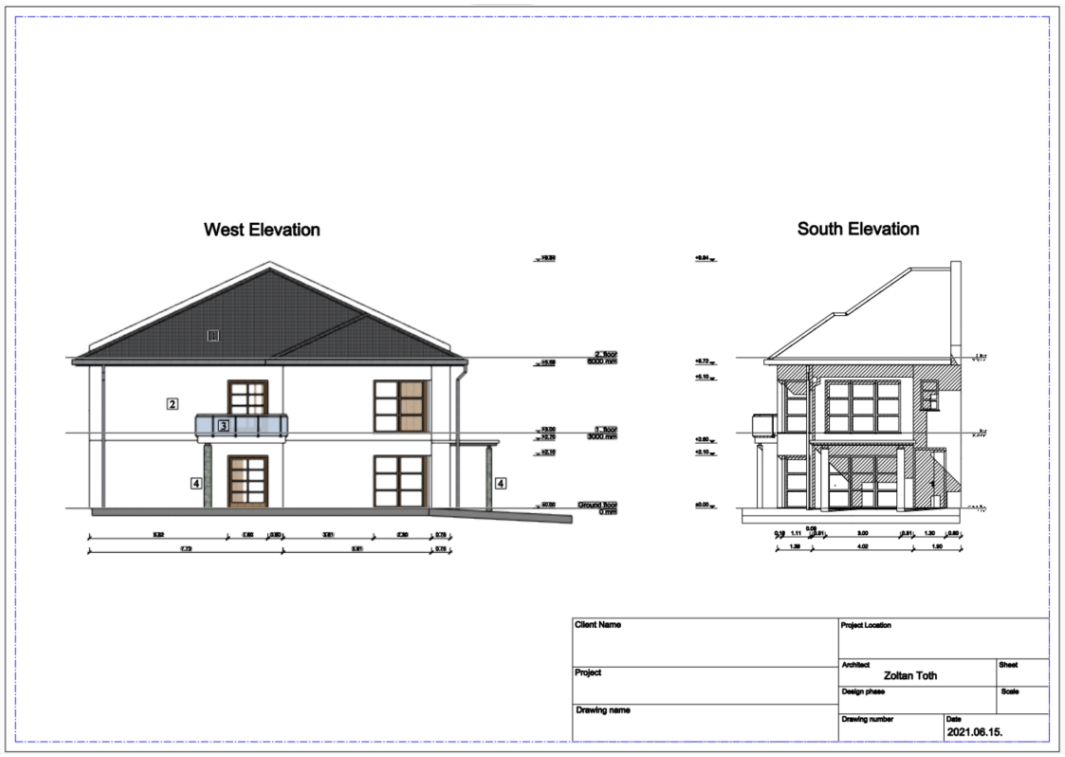
## 6.3. Creating Additional Plan Sheets

***Placing the Elevation:***

Let's continue placing the elevations!

- Using the "drag and drop" method, place the West Elevation in a 1:100 scale onto the second empty sheet from the Project Navigator.
- Then, place the South Elevation on the same sheet.
- Switch to the South Elevation view, recreate the technical shadow, which we have already covered in the previous (4.1.3. Elevation Views) section.
- Use the **Copy part to plot layout by rectangle** command under the Documentation – Plot layout, and then place it on the plan sheet using the **Paste to plot layout** command in a 1:100 scale.

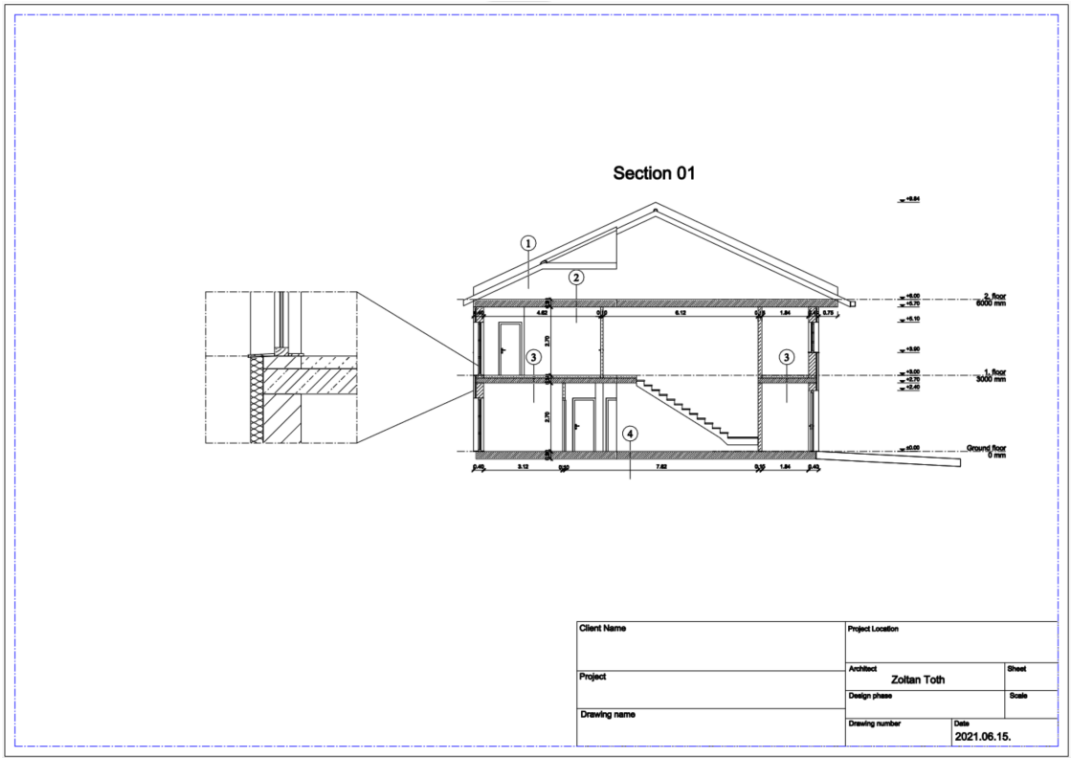
The difference between Copy part to plot layout and Copy part to plot layout by rectangle is that in the first case, we can specify a polygon shape, while in the second case, only a rectangular shape can be selected.




### *Placing the Section:*

On the third sheet, let's place a section!

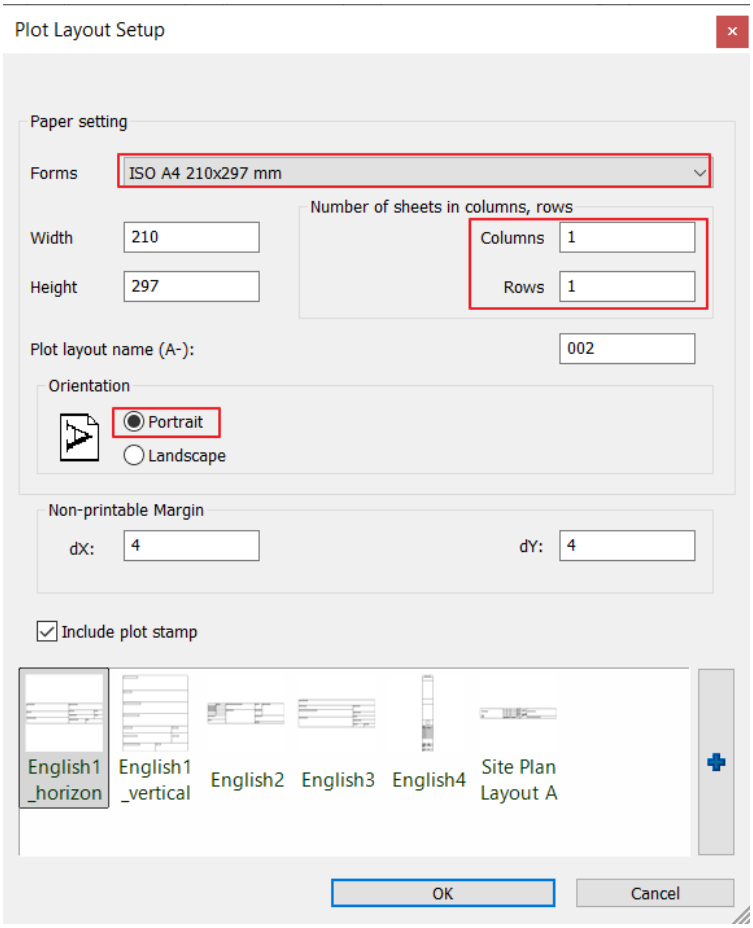
- Using the "drag and drop" method, pull the B-B Section to the right side in a 1:100 scale from the Project Navigator.
- On the left side, add a detail drawing: In the B-B Section - Elevations tab, choose the Documentation – Plot layout – **Copy part to plot layout by rectangle** command as before, then copy it onto the plan sheet.
- Use the Offset command to trim the pointer line from the elevation drawing, then create one manually. Connect the elevation to the appropriate location of the B-B Section with a dashed line.



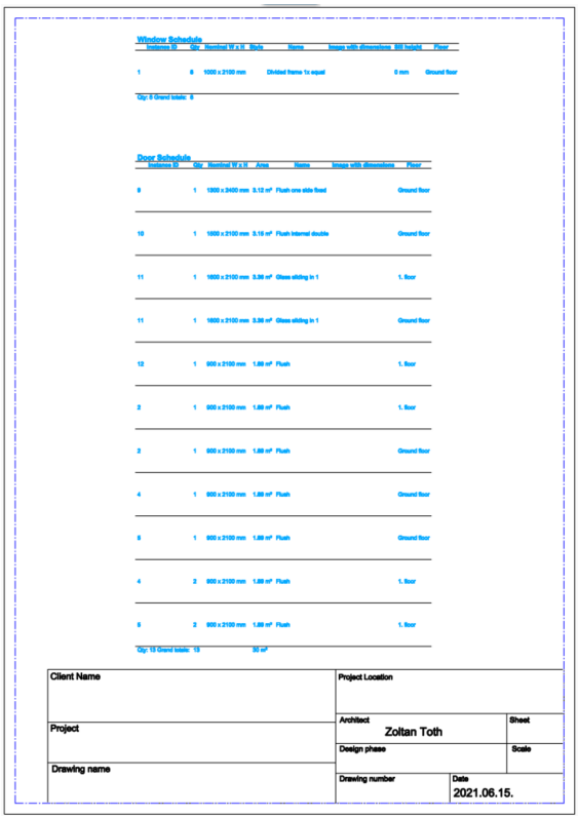

### *Placing the Schedule:*

On the fourth sheet, we want to place the schedule, but on an A4 sheet in portrait format. To do this, first select the already created plan sheet and delete it.
Now, let's create a completely new plan sheet!

- Select the **Documentation – Plot layout - Prepare Plot layout** command, then set the following:
- The format should be **A4**, **Portrait** orientation, and the number of sheets should be 1 column and 1 row. All other settings can remain as default. Accept with OK.



- The program will inquire whether to create a new print plan sheet (Yes) or add a next page to this layout (No). Choose No as it will add it to the existing ones.
- In the Project Navigator, this sheet will appear as "Sheet 5" (since we deleted Sheet 4). Rename it to 4_Schedule.
- Go back to the floor plan, then place the schedule found here using the Documentation - Plan - **Copy part to plot layout by rectangle** command based on what you have learned so far.
- When placing it, select a **1:200** scale.



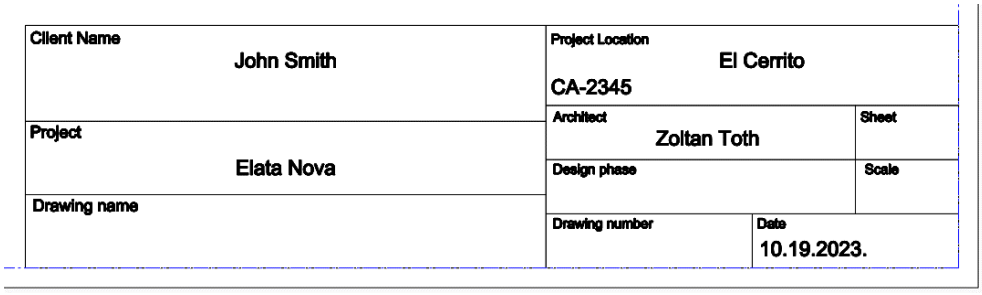

From a printing perspective, it is crucial that the printability of all (necessary) sheets is enabled. You can check this by clicking on Used Layers in the Layer Manager.
Similarly, the plan sheets also have layer settings, so it is worth checking there whether all layers are printable.

### *Filling in the Print Stamp*

Using a print stamp can standardize the formal appearance of the documentation, providing a perfect frame for the presented plan.
The program has already created the print stamps on the plan sheets, so we just need to fill them out.
This can be done by simply clicking on the stamp and then filling in the necessary information one by one. However, this can be time-consuming.

Automatic filling makes this task much faster:

- Select the **File - BIM - Project Parameters** command.
- Fin the necessary information here, then accept with OK.
- If you want to fill out a single stamp, click on the stamp, then choose the option in the local menu **Edit Text in group**.
- Click the **Update Project parameters** button, then click OK.
- The program will immediately fill in the specific print stamp in this case.



However, if you have multiple stamps, the program also provides the option to fill them all at once.

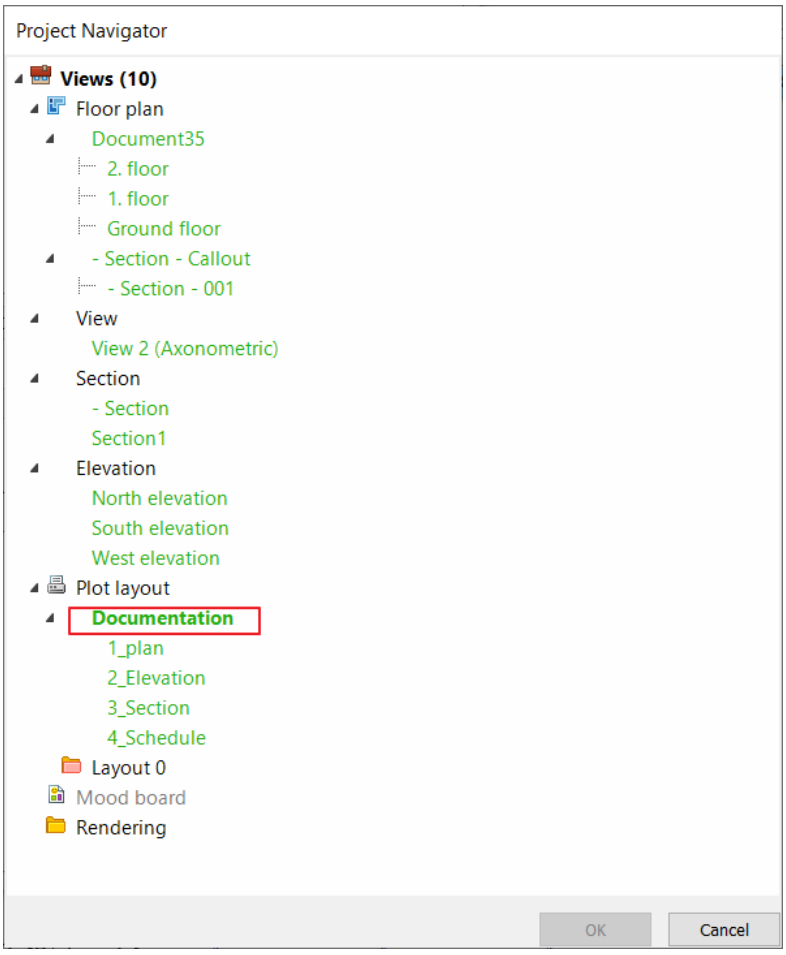
- Select the **Plot layout - Update Project Parameters** command. If you need to provide additional parameters here, you can do so. Accept with OK.
- You will then see the program filling in all the stamps in the project.

## 6.4. Print Queue

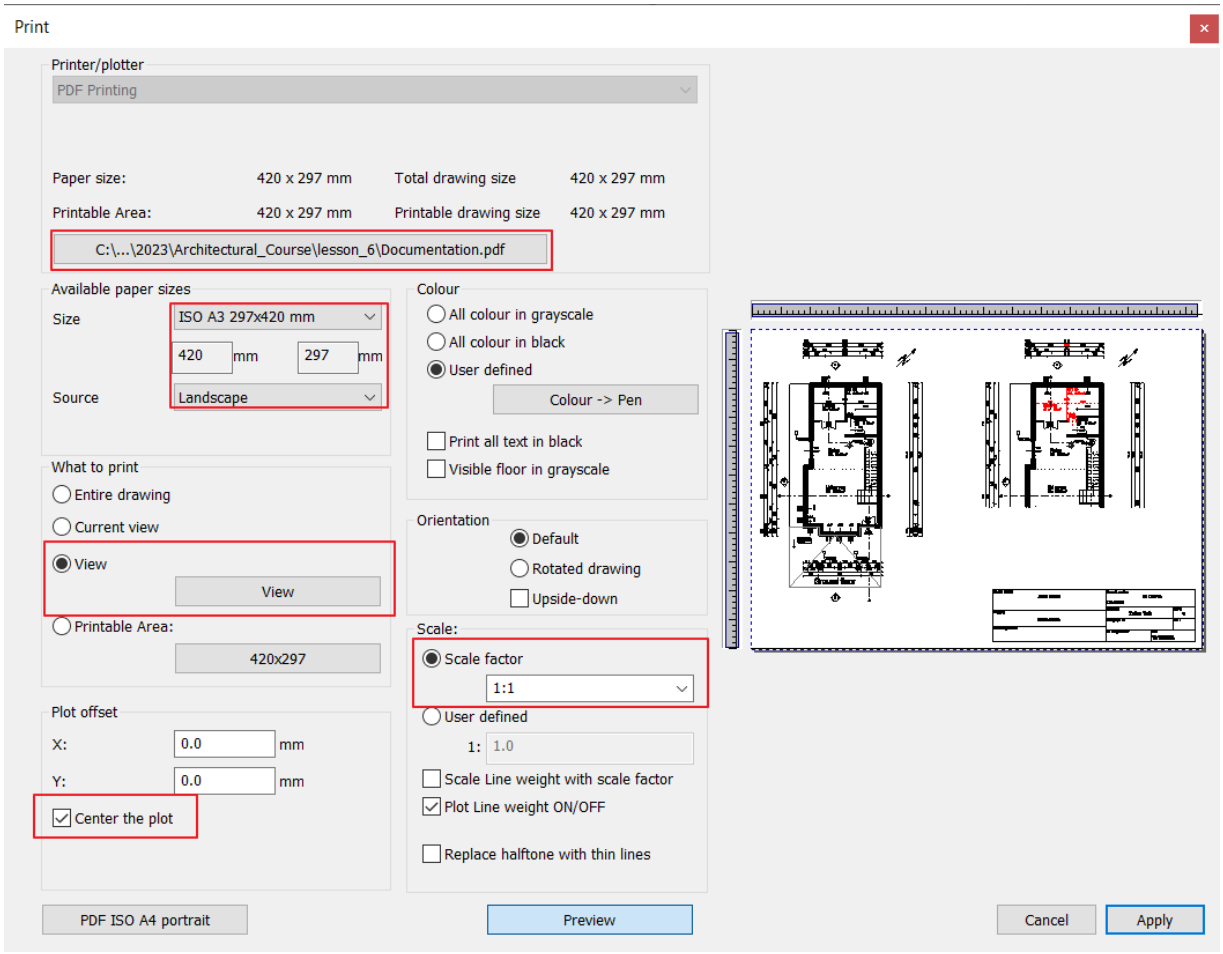
The print queue is simply a list of printing tasks that can be compiled and saved with the project. This is an extremely useful tool when plans and drawings need to be repeatedly printed, as the print queue stores the printing settings for each added content in the program.

Creating a print queue by selecting multiple sheets at once:

- Start the **Ribbon Menu / Documentation / Print / Print Queue** command.
- Click on the **Green plus** button, then you can select the Views / Drawings / Plan Sheets to be added to the Print Queue from the Project Navigator. These will appear in green.



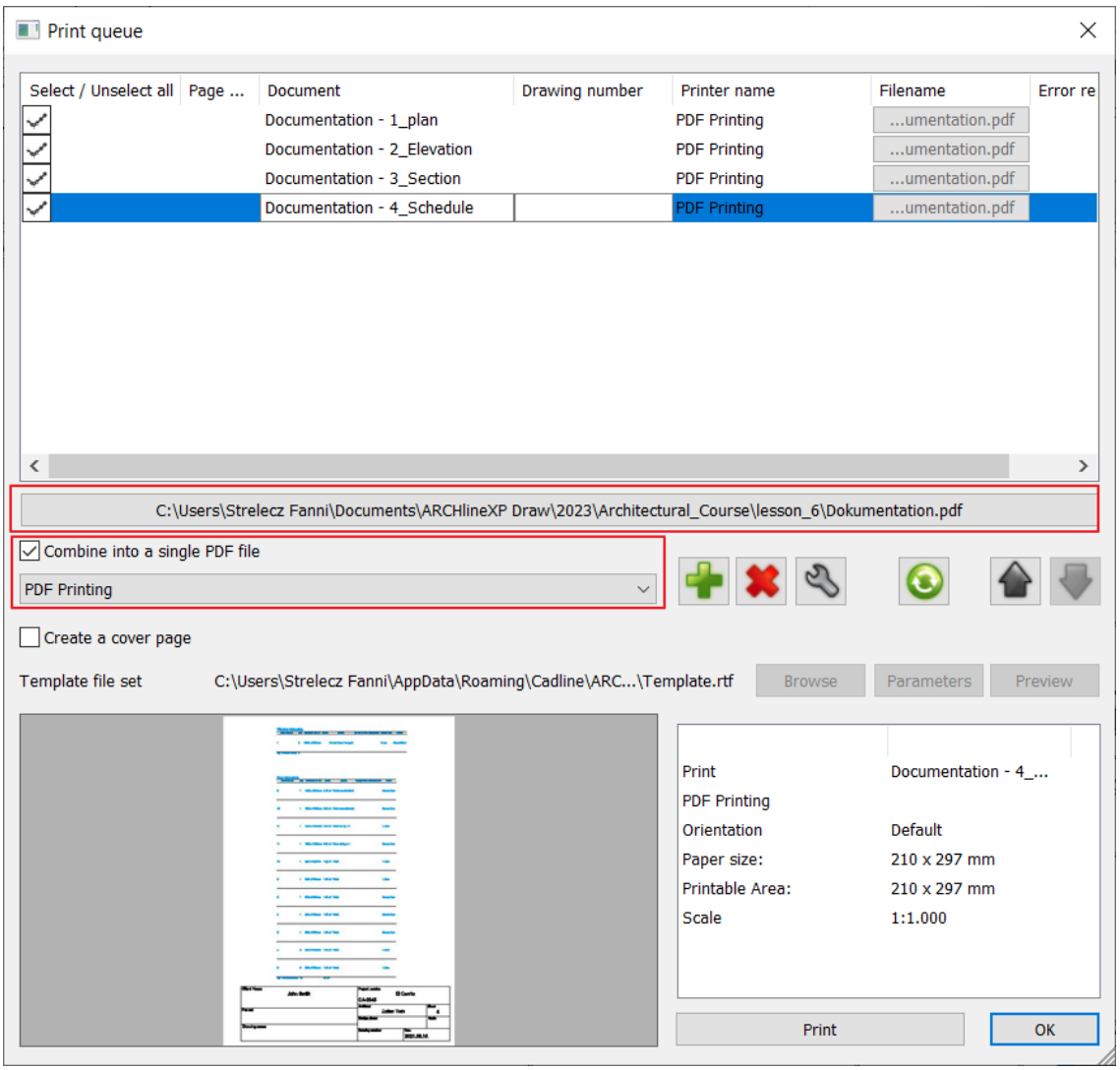

- Click on the created plot layout (in this case, **Documentation**). With this option, the program automatically prepares the print settings for all associated plan sheets at once. Pressing the OK button will bring up the print dialog.




- Set the print properties in the dialogue box that appears and close it by pressing the **Apply** button.

  The program automatically resizes the plan sheets and displays the scanned sheets in the list.
  You can print the documents in a multi-page PDF file by checking the option to **Combine into a single PDF file**.
  The order of the plan sheets can be modified, their settings can be edited later, and they can also be deleted from the list.

  By clicking the print button, the program starts the printing process. When finished, the program automatically pops up the completed PDF file. You have completed the documentation creation process.

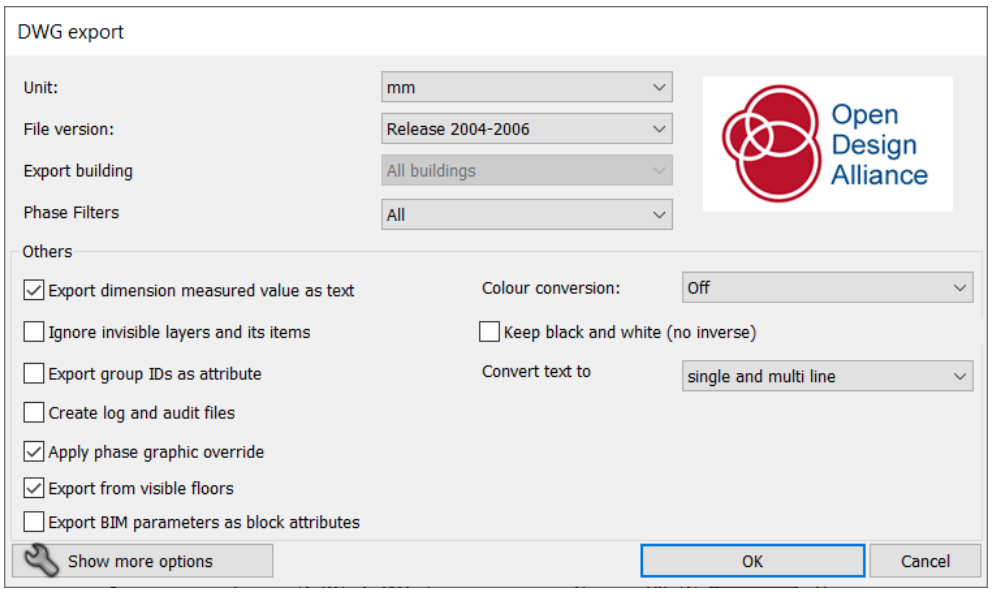



## 6.5. Exporting DWG/IFC Files

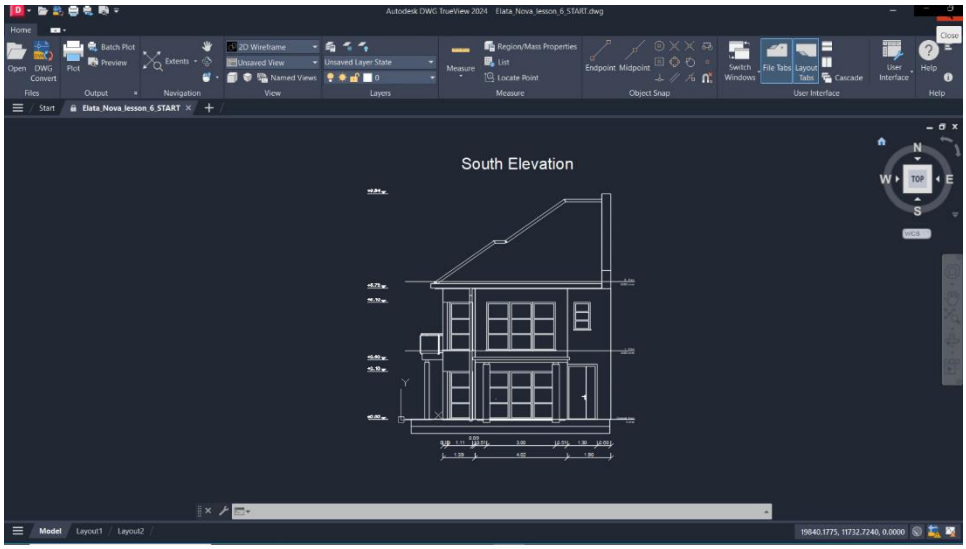
If we want to hand over the project to a fellow planner, we can do this using DWG/IFC files.

### *Exporting to DWG file*

- Make the South Elevation window active.
- Select **the File - Export - DWG** command.
- Specify the location within the folder system where you want to export this file.
- Clicking the Save button will bring up the DWG export dialog.



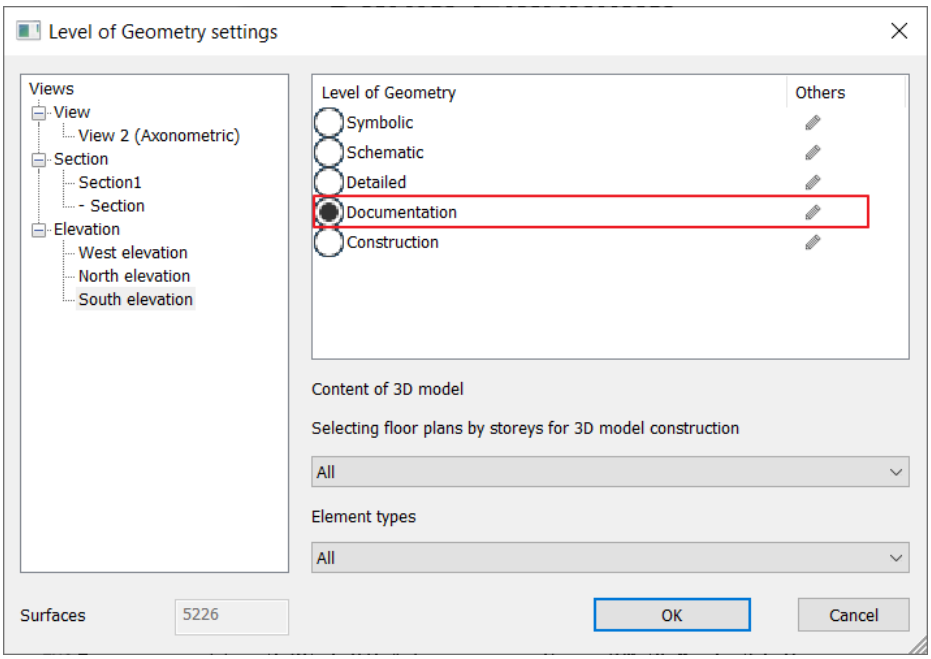

- Here, we can set different file versions depending on the software the recipient will use to read our file. I accept it by clicking OK.
- We can check the result of the export and view it in a free DWG viewer program like Autodesk DWG TrueView.
- Open the generated DWG file and check what content the program has exported. We cannot edit it, only view and verify it.



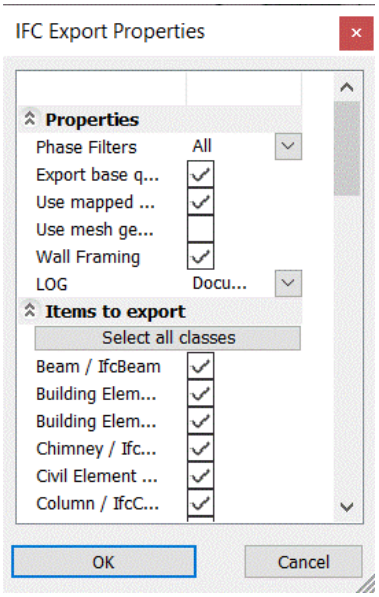

From the program, we can export many other file formats under the File menu - Export - **Export** command.

### *Exporting to IFC file*

- Activate the 3D model!
- Set the level of detail you want to export this model with: you can do this using the **Build 3D model** command with the 3D hammer.
- Now select the **Documentation** option and accept it with OK.



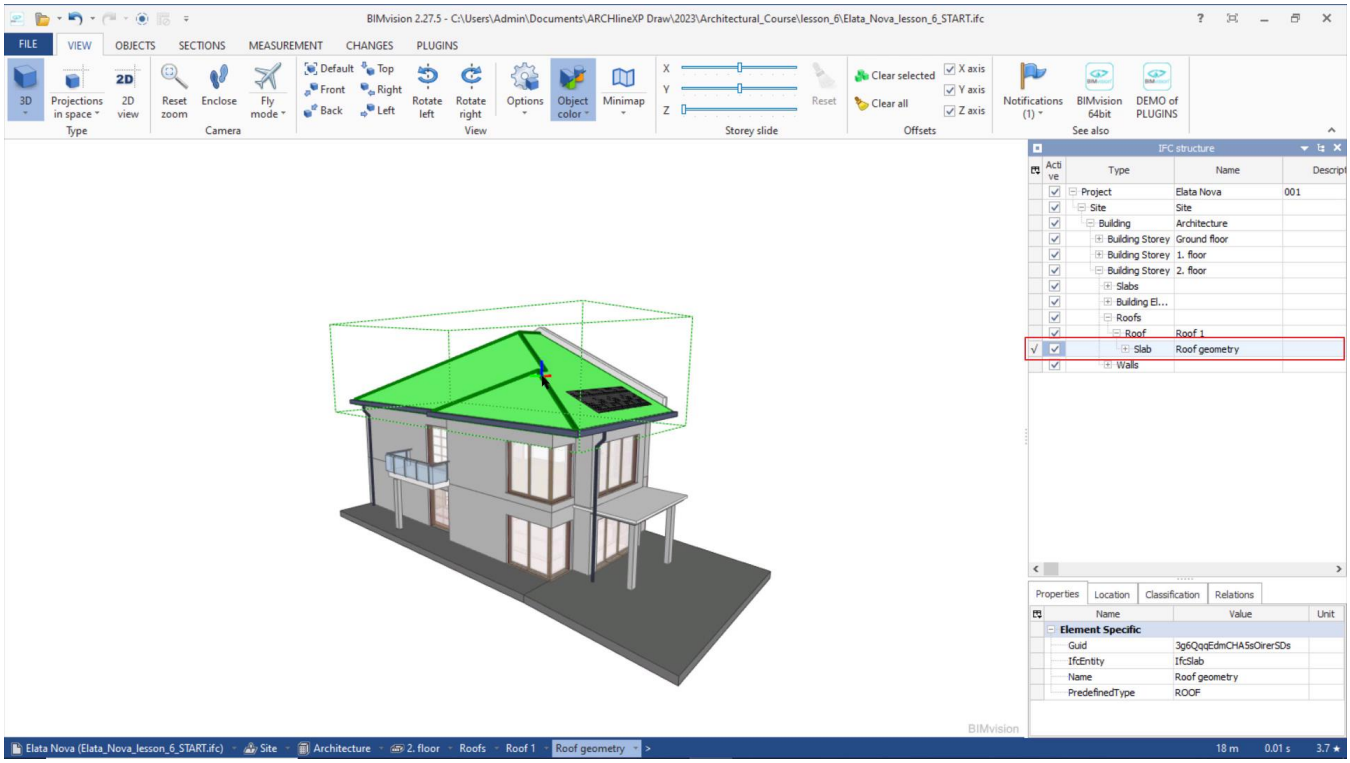

- Select the **File menu - Export - IFC** command, then set the location for saving.
- I leave the IFC Export Properties as default in the pop-up window.




It is important to know that IFC not only transfers the complete 3D model and the 2D floor plan but also all building information. Therefore, software capable of this will recognize walls, slabs, and openings created in ARCHLine as such.

ARCHLine can do the same. If we import an IFC format file into the program, it is capable of recognizing these architectural elements.

- Exporting can take a few minutes depending on the complexity of the model. Once the program is done exporting, it lists exactly what elements were exported in a new window.
- Let's check the end result in a free IFC viewer program (BIMvision)!
- If we click on any detail, the program recognizes the specific element. These also cannot be edited here.


BIMvision 2.27.5 - C:\Users\Admin\Documents\ARCHlineXP Draw\2023\Architectural_Course\lesson_6\Elata_Nova_lesson_6_START.ifc
FILE
VIEW
OBJECTS
SECTIONS
MEASUREMENT
CHANGES
PLUGINS
IFC structure
Project
Site
Building
Building Storey
Ground floor
1. floor
2. floor
Slabs
Roofs
Roof
Roof 1
Slab
Roof geometry
Walls
Properties
Location
Classification
Relations
Element Specific
Guid
IfcEntity
IfcSlab
Name
Roof geometry
PredefinedType
ROOF
BIMvision
Elata Nova (Elata_Nova_lesson_6_START.ifc)
Site
Architecture
2. floor
Roofs
Roof 1
Roof geometry

# Workshop 7:
# Creating in-place mass model, reference to other projects

# 7. Workshop: Creating in-place mass model, reference to other projects

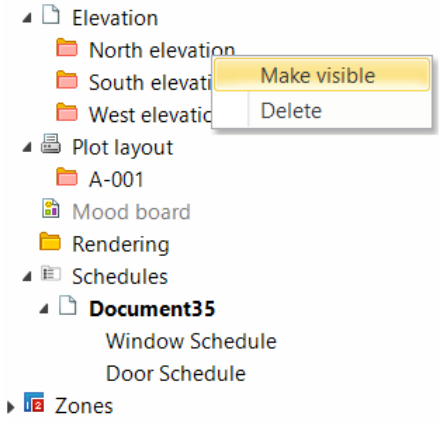
In this workshop, we will focus on environmental representation. For this purpose, we will import projects prepared by partner designers into the program, which were also created with ARCHLine.XP. We will explore how to schematically represent a building block.
In the previous workshops, we created a part of a row house, and now we will conceptually represent the additional members of the row using the mass modeling tool.
Before we start the workshop, please watch the tutorial video Creating in-place mass model.

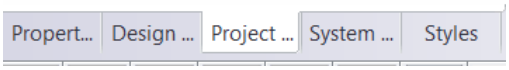
## 7.1. Preparation

In the previous phase of the design, we created a floor plan, a print sheet, a section, and an elevation drawing. For the remaining part of the tutorial, we will only need the floor plan and the associated 3D model.

- Find and close all drawings except for the floor plan and the 3D model window.
- Use the Magnify view icon on the bottom left of the navigation bar to arrange the windows.

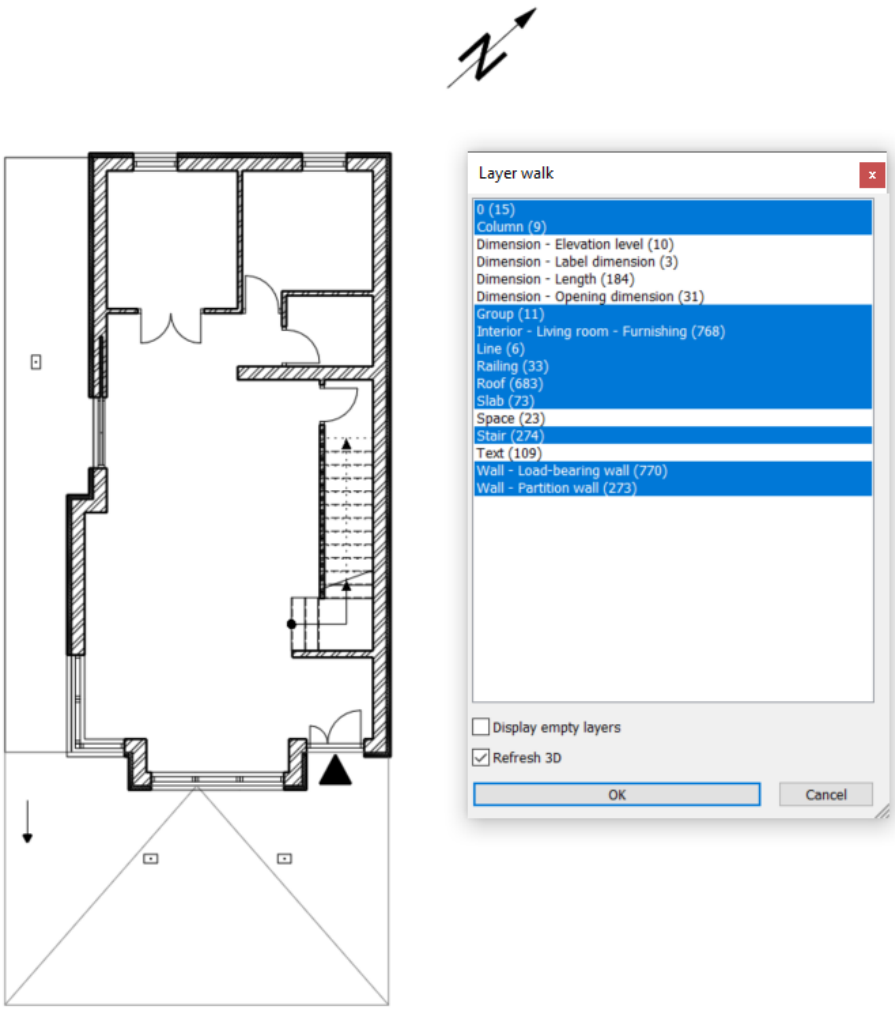
The closed windows can be accessed in the Project Navigator. The program indicates these windows with a red icon, indicating that they are not open. To open them, click on the desired item (Section, Elevation, or Plan) and select the 'Make Visible' command.




We will make the floor plan more transparent.

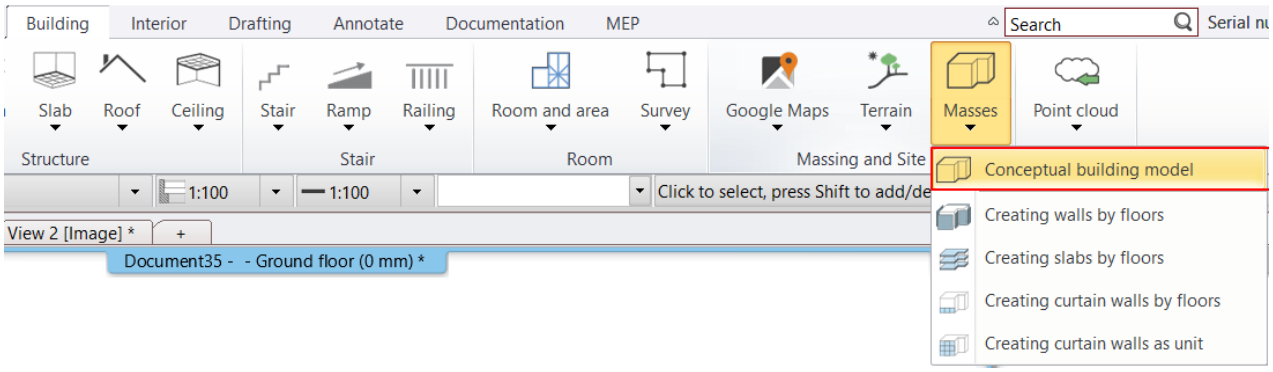
- Open the **Layer walk**.
- Turn off the Dimension, Text, and Room Stamp layers, then click OK to confirm.



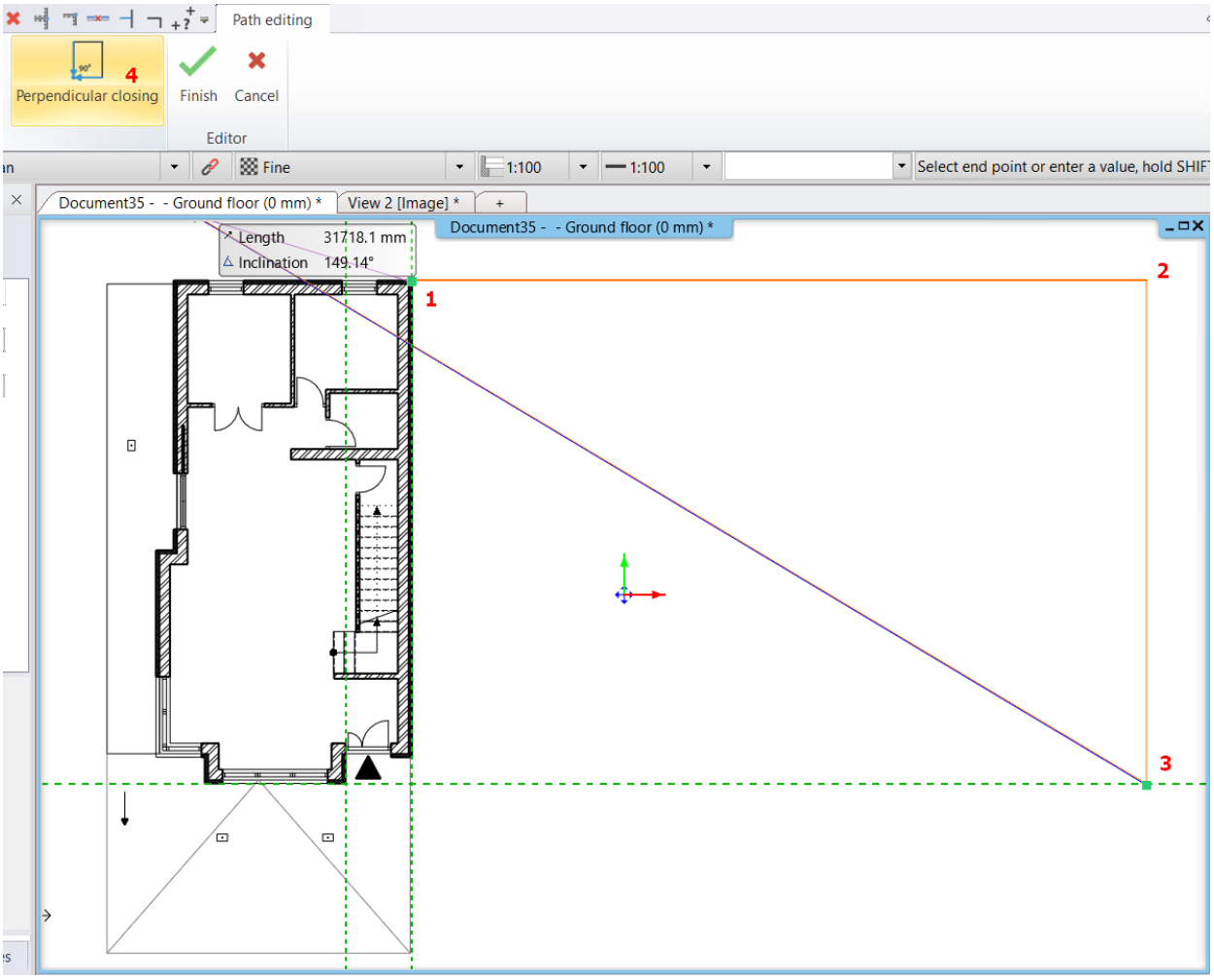

- Select the Optimal Zoom icon next to the Navibar to center the floor plan.

## 7.2. Creating a Mass Model

- Choose the **Building / Masses / Conceptual building model** command.

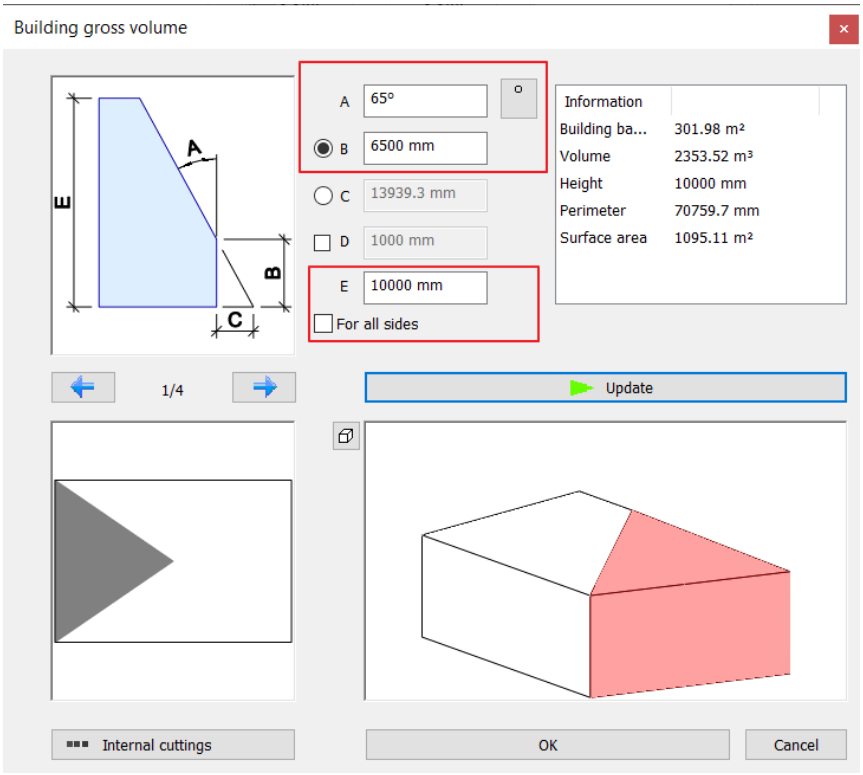



- Draw the outline size of the mass model on the floor plan. Select the upper right corner of the building (1), then click 21 meters to the right for the second point (2). Place the third point on the line of the building's protrusion (3) and close the drawing with the Perpendicular Closure command (4).



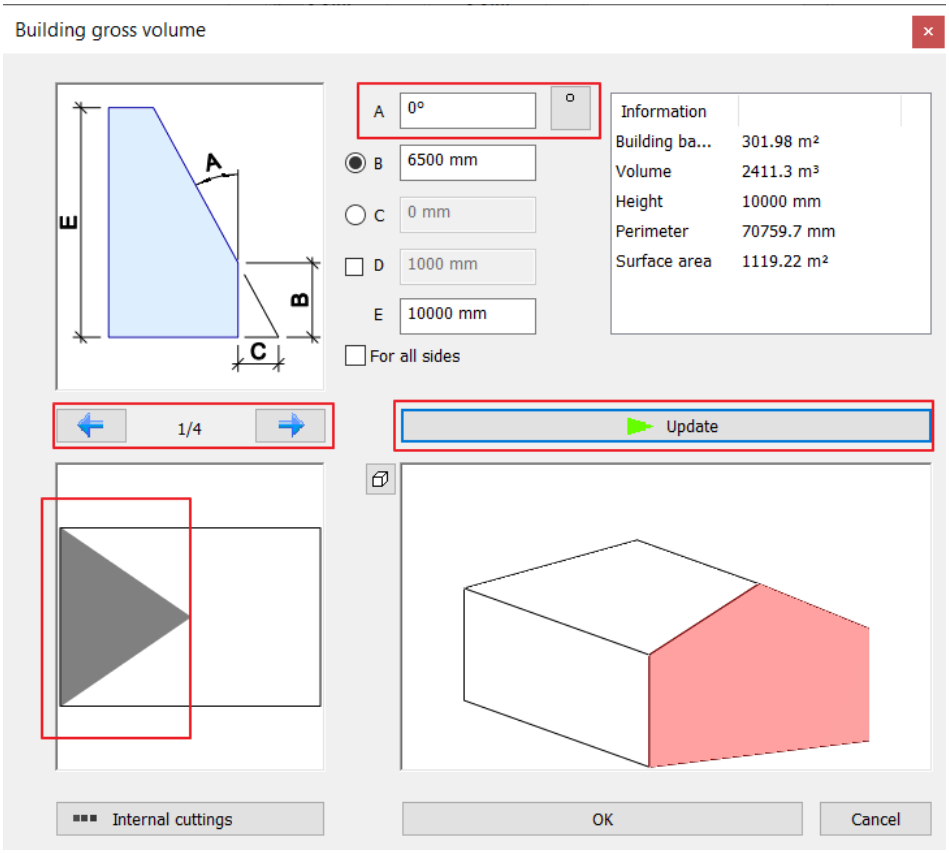

Set the properties of the mass model:

- Set the **A value** to **65 degrees**. Activate the "**For all sides**" option, so this value will appear on all sides of the shape.
- Set the **B value** to **6500 mm** on all sides. The **E value** should be **10000 mm**. This is the total height of the building.



Modify the side facing the firewall.

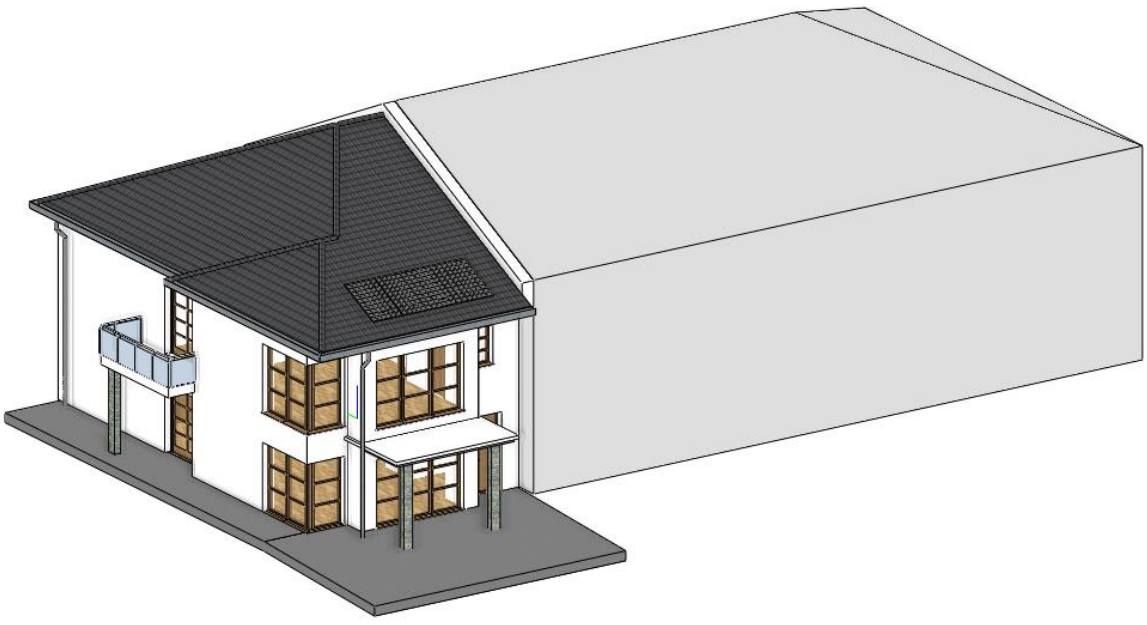
- Click on the left side in the top view or select the 1/4 plane using the arrows, and change **the A value** to **0 degrees**. Click the Update button. This will create the gable.



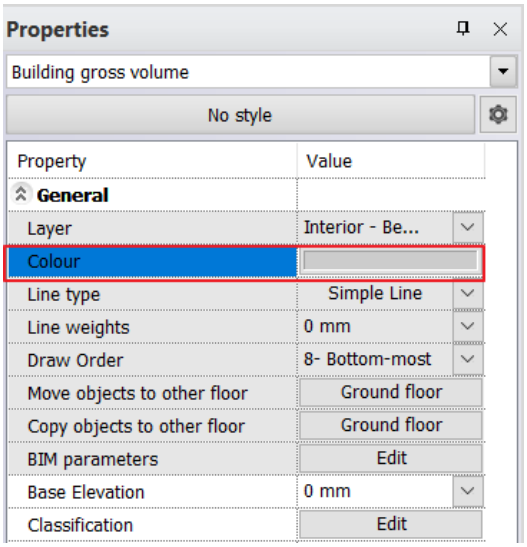

- Close the dialog box by clicking the **OK** button.

  You have now created a mass model with default height values and materials. Let's modify these.

- Select the 3D mass model and find its material on the left side of the Properties panel. Change the material to "**Light_gray**".

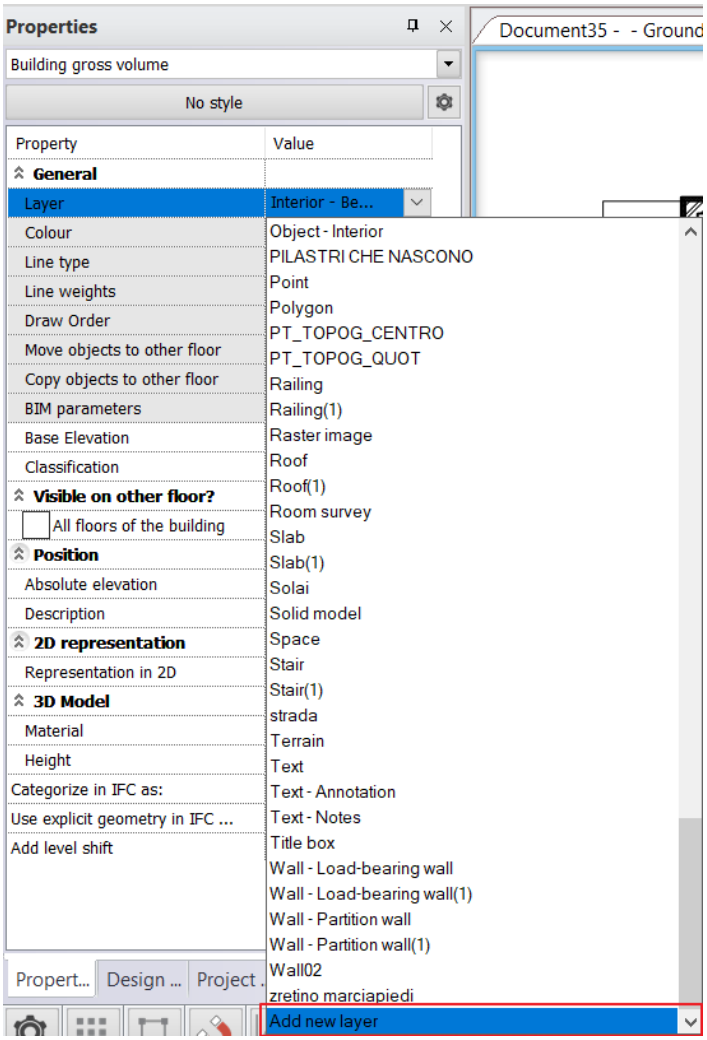


- Switch to the floor plan and click on the mass model. Change its color to "Light_gray" here as well, by clicking on the **Color** in the Properties menu on the left.



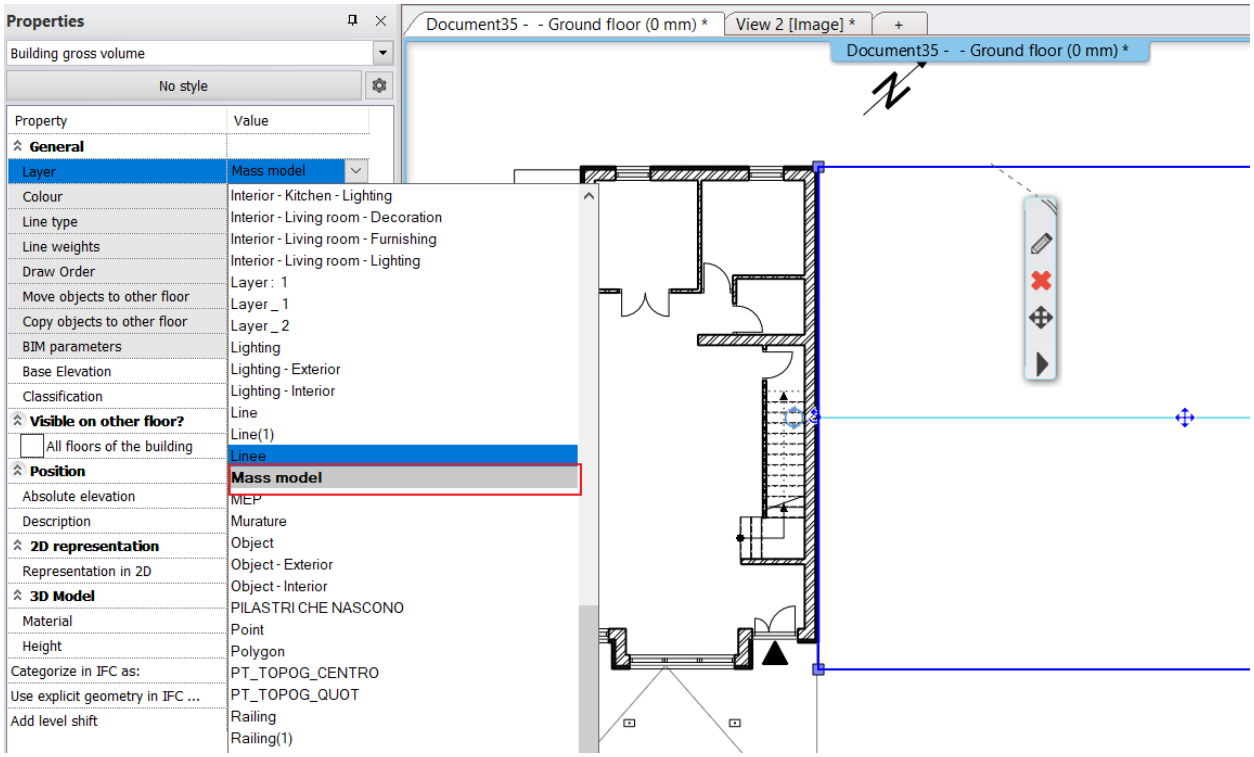

With the completion of the mass model drawing, let's create a new layer for it.

- Select the mass model on the floor plan, then in the side Properties menu, open the Layer command. Choose the "Add new layer" option from the bottom of the dropdown list.




- In the appeared layer manager, add a new layer by clicking the "Add Layer" button and rename it to "Mass Model".

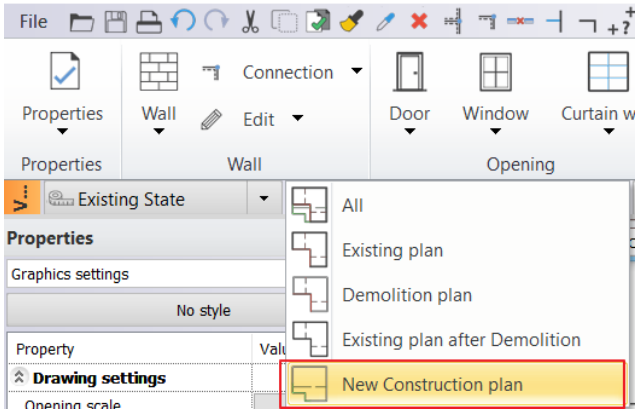
- Close the Layer Manager with the OK button, then select the Mass Model layer you created from the Properties menu. This will assign the mass model to this layer.




## 7.3. Urban Planning and Importing Neighboring Buildings

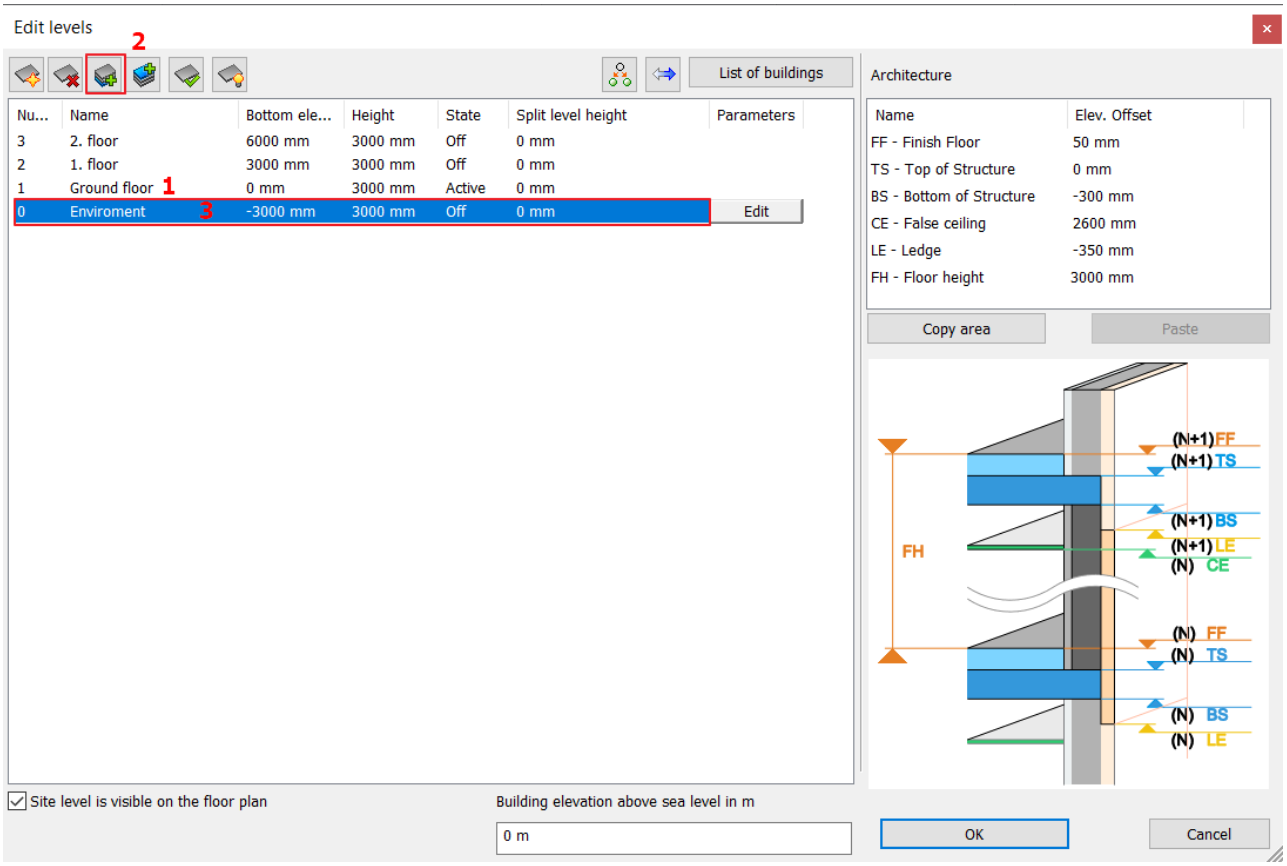
We will reference and import urban planning and neighboring building models prepared by partner designers.

- In the phase filters, select "New Construction Plan," where we will continue our work.

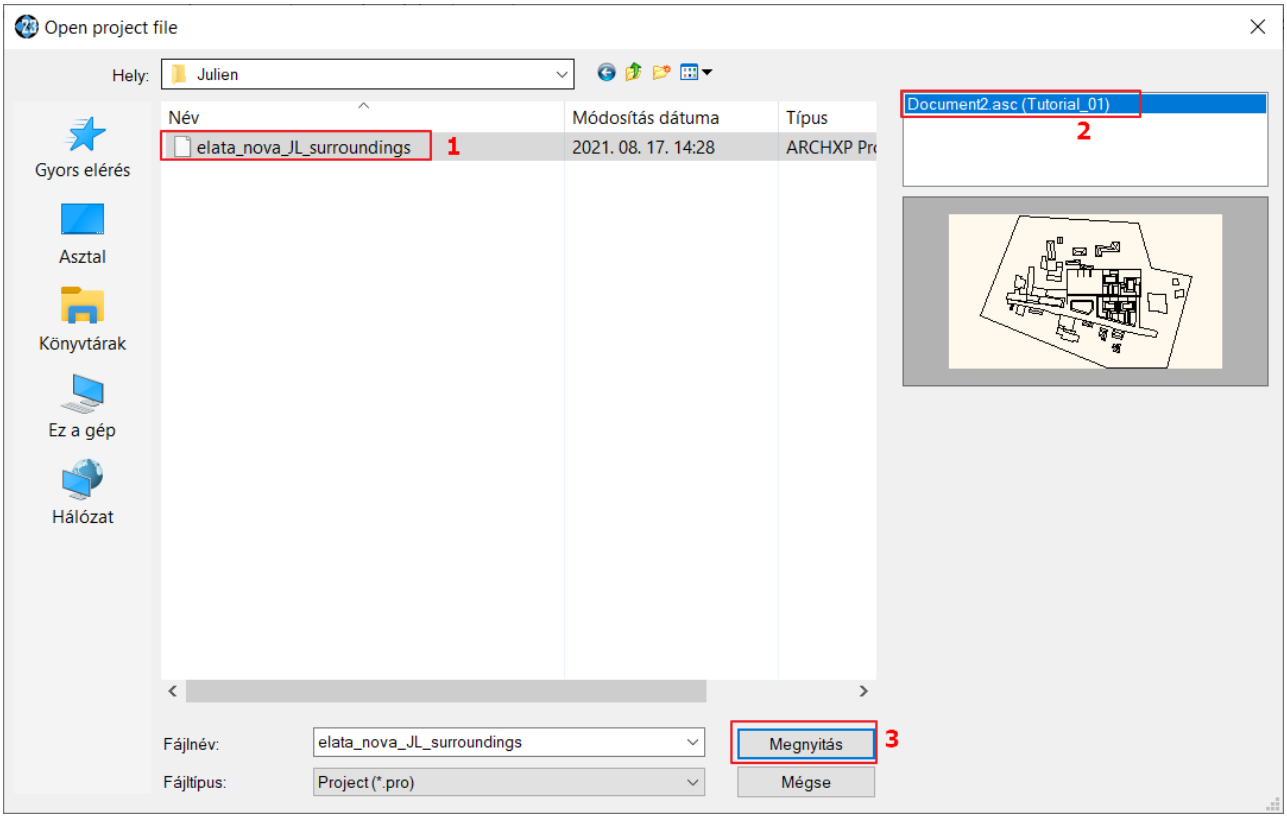



We will import the projects onto a new level positioned below the Ground Floor. Let's prepare this level.

- Open the Level Manager, select the Ground Floor (1), and then choose the "Insert Below" command (2). Rename the new level to "Environment" and close the dialog with the OK button.

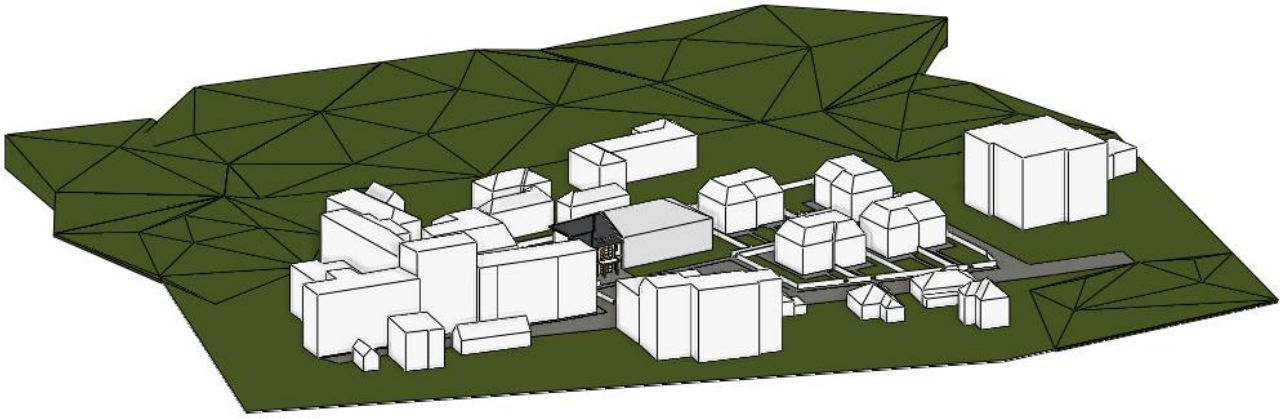



- Navigate to the new Environment level on the floor plan, then select the **File menu / Link / Link Project** command.
- Choose the file from the …\Documents\ARCHlineXP Draw\2024\Architectural_Course\lesson_7\external_projects folder.
  Julien's project folder contains the Environment, while Tomasz's project folder contains the surrounding buildings.
- Let's start with Julien's project. Select the elata_nova_BT_surroundings file, then choose the drawing on the right side. Open the project by clicking on "Open".



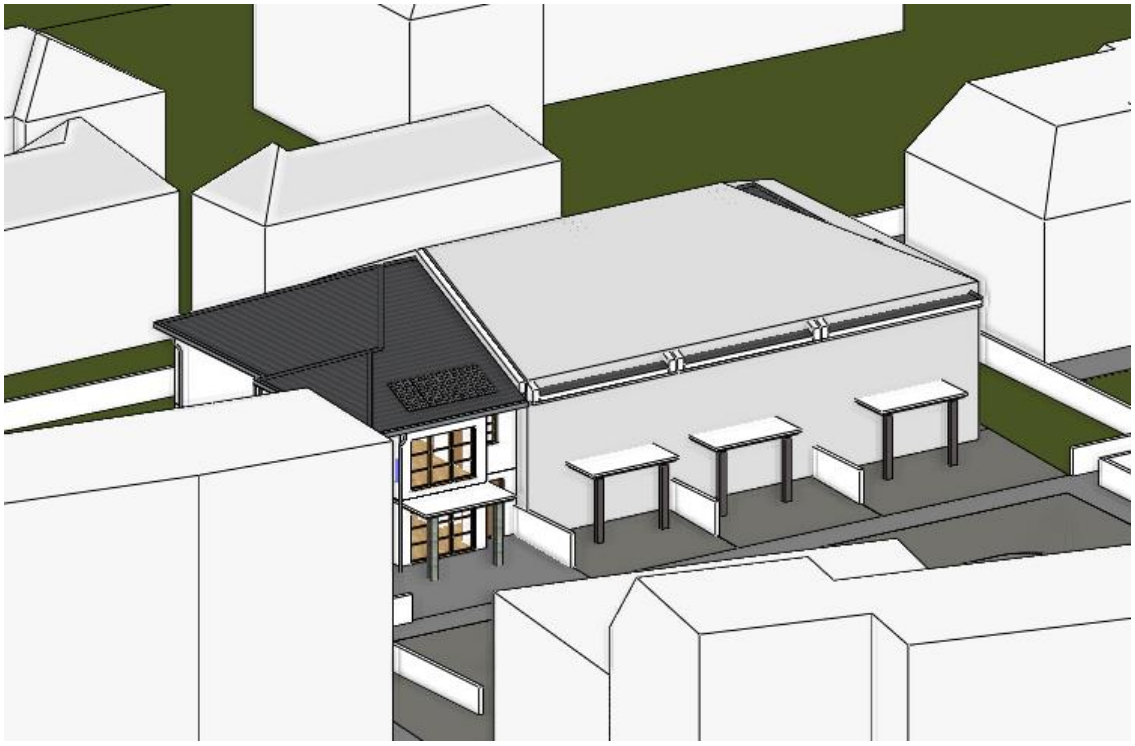
- In the pop-up dialog, you can choose how the program adds the new drawing to your project. If you don't select any option, the program will automatically import the drawing with default settings. Therefore, do not select any option and simply accept the dialog by clicking the OK button.

The environment has now been imported.



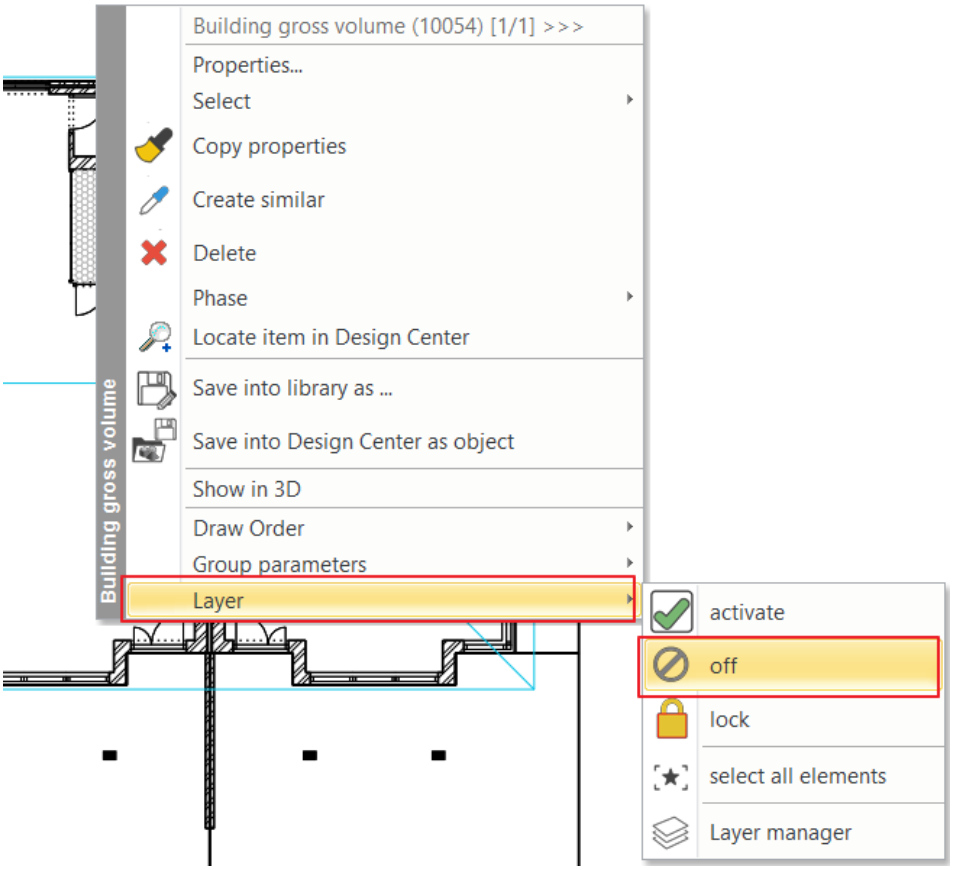
- Let’s link the next file. Select the **File menu / Link / Link Project** command, then choose Tomasz's project folder from the …\Documents\ARCHlineXP Draw\2024\Architectural_Course\lesson_7\external_projects folder, then the elata_nova_TS_Buildings.pro file. Click on the project, then choose the drawing on the right, and open it.
- Accept the pop-up dialog with the OK button for automatic placement.

The surrounding buildings have now been imported as well.



After the import, the mass model is no longer needed, so let's turn off its layer.

- Activate the floor plan and go to the ground floor. Select the mass model, then from its local menu, choose the Layer, Off command. Rebuild the 3D model.

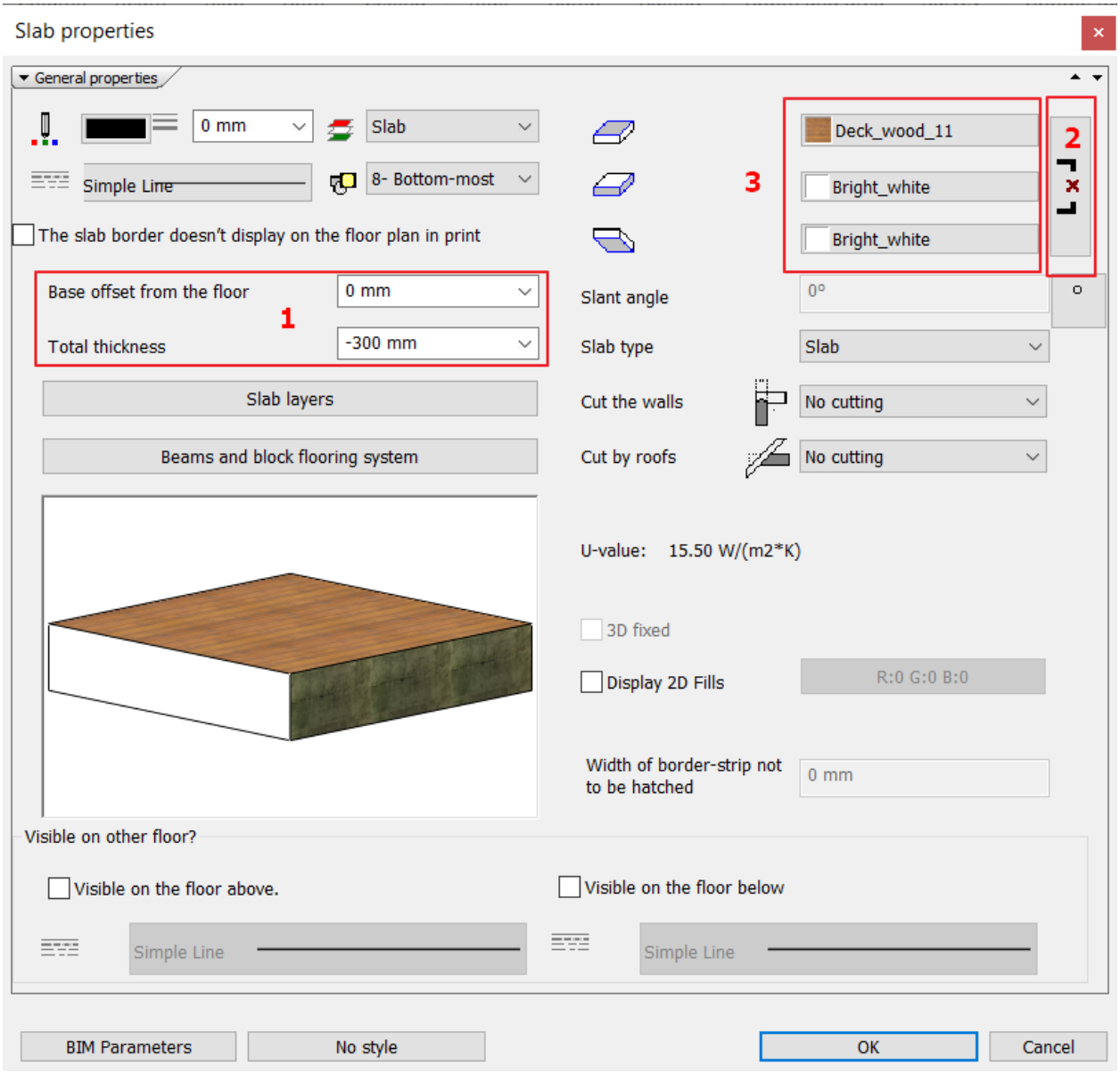


# 7.4. Creating the Terrace in the Garden

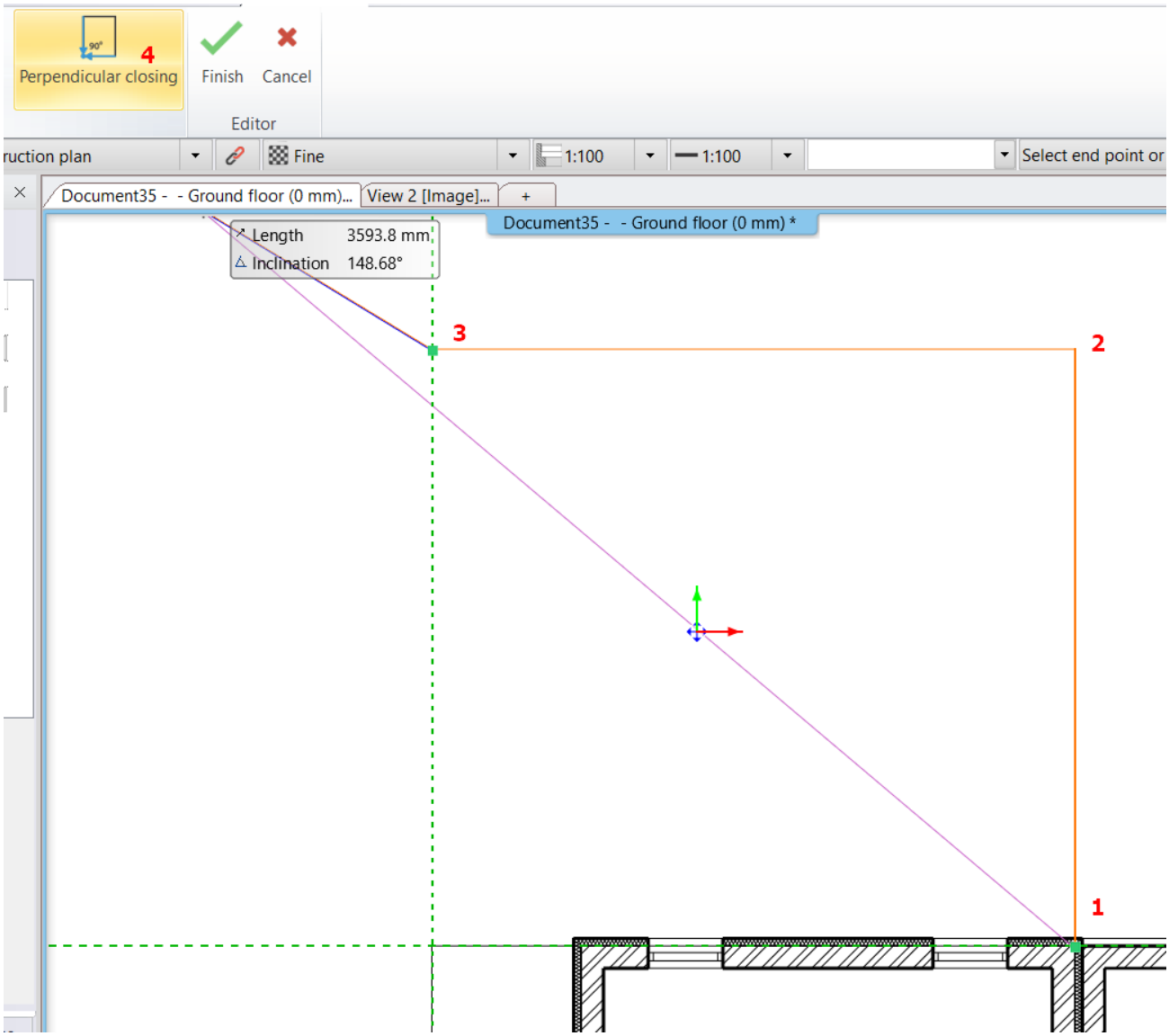
Since the terrace is more of a visual element and not part of the documentation, we will create a very simple representation using the slab tool.

- Navigate to the 3D view to the back garden for a clear view of the process. Switch to the floor plan.
- If any layer has been reactivated that is not currently needed, turn it off in the Layer Manager or by clicking on the element in its local menu.

- Right-click on the Ribbon / Building / Slab command, and select its properties.
- The base offset from the floor should be 0 mm, with a total thickness of -300 mm (1). Turn off the option for identical materials (2). Set the lower and side material to *Bright_white*, and the upper material to *Deck_wood_11* (3).




- Draw the slab in Sketch mode. Start at the upper right corner of the building (1), then place the second point 8000 mm upwards (2). Align the third point with the left edge of the pavement (3), then finish drawing the slab with the Perpendicular Closure (4).

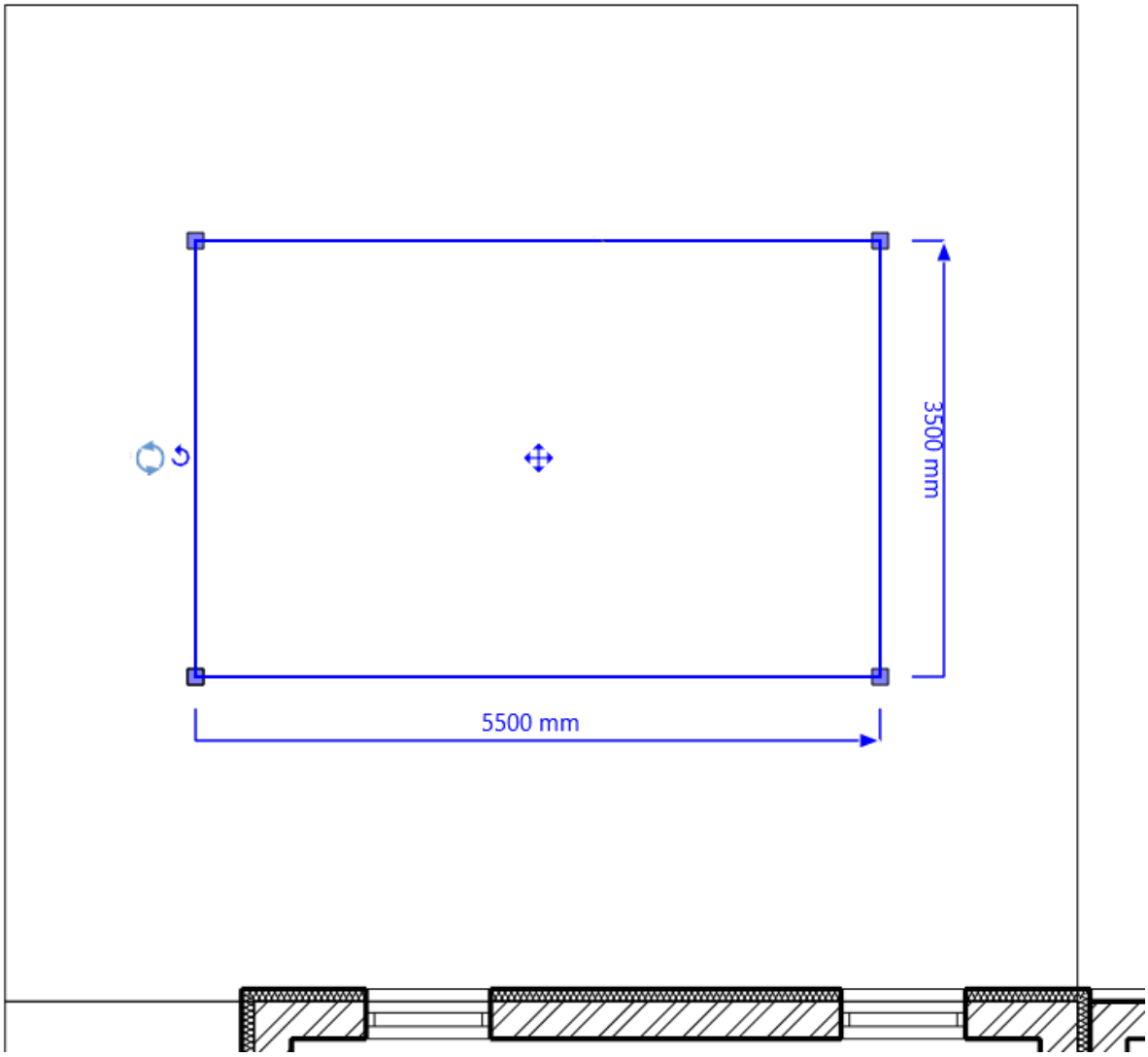



## 7.5. Creating the Pool area

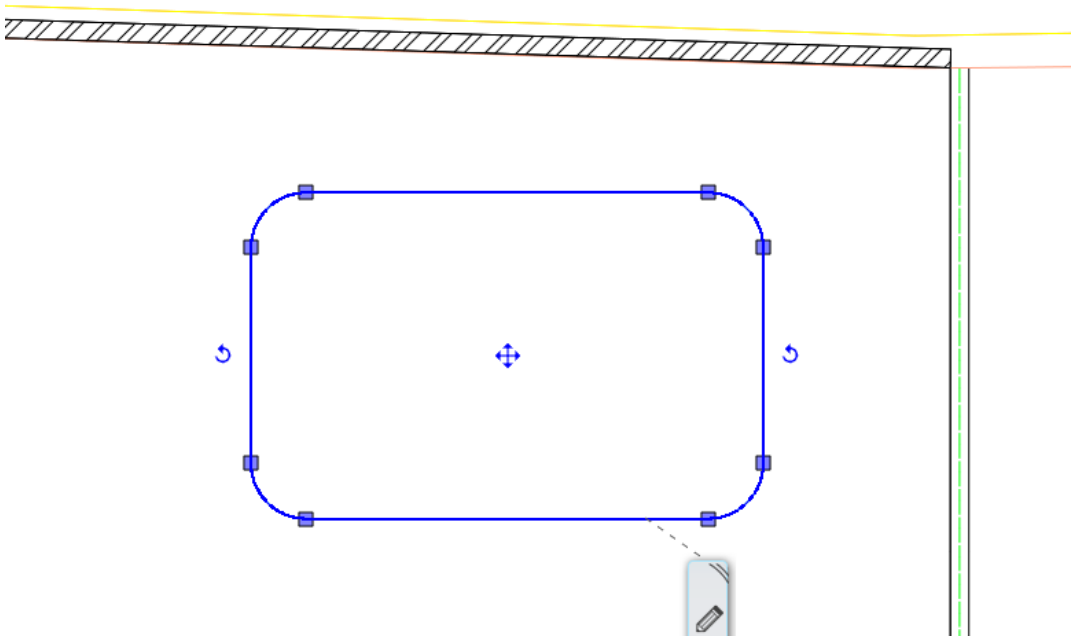
It's possible that the previously turned-off layers might reappear during work. This generally occurs when the selected tool uses a layer that was turned off earlier. In this case, the software activates the layer to create the element. Use the Walk or Layer Manager to turn off these layers.

Before creating the hole on the slab, let's design its shape using the classic Drafting tools.

- Select the Ribbon / Drafting / Rectangle tool.
- Draw a rectangle, then adjust its values. Its length should be 5500 mm and its width 3500 mm. Position it so that the pool is accessible from all sides.

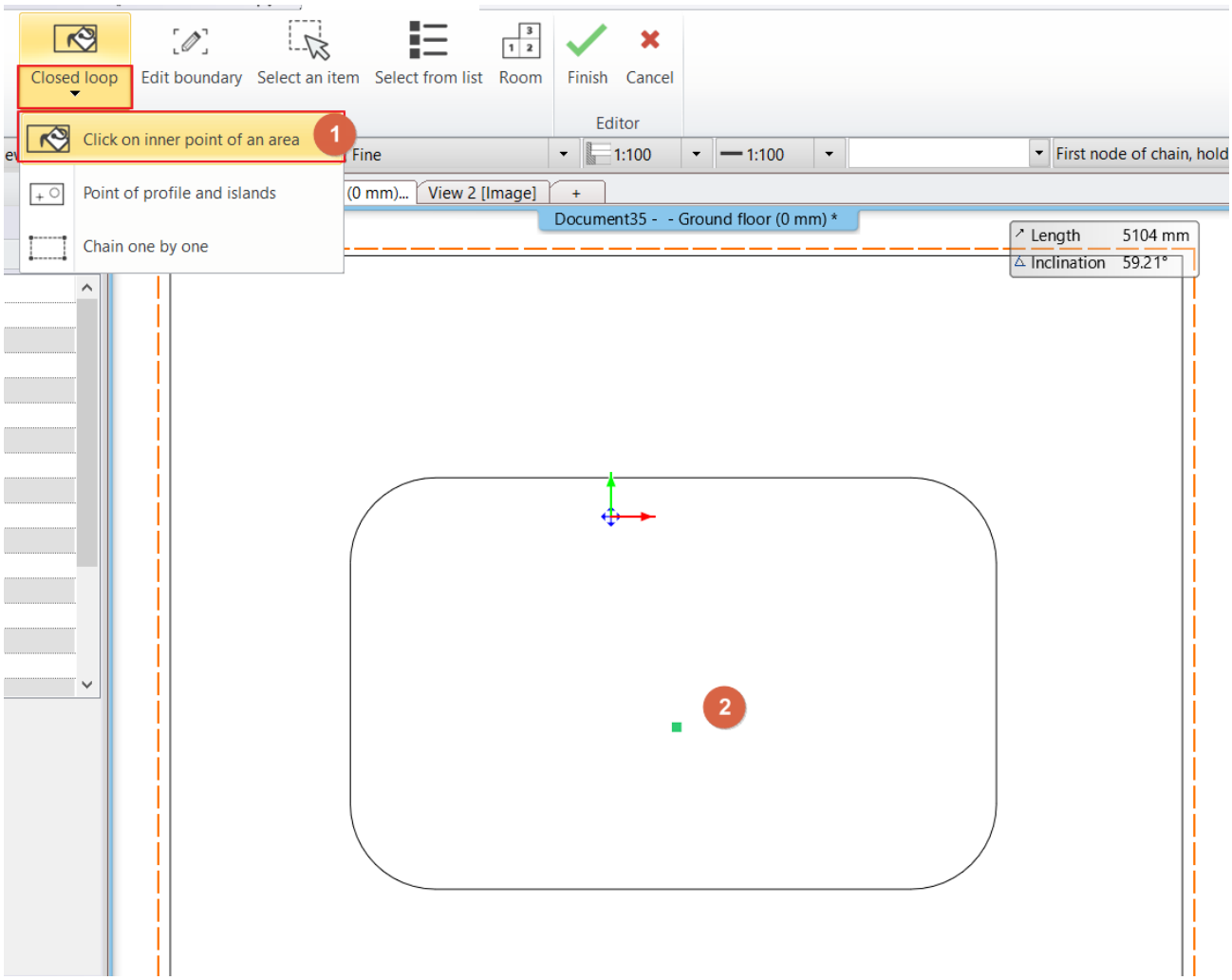



- Click on one of the corner points of the rectangle, then select the "**Fillet All**" command. Move the cursor to the position that gives the best visual result, then click to apply the rounding.



There are numerous advantages to creating a 2D drawing of a 3D form. Before the final version is created, it can be repositioned, modified, and used for visual ideation, and can be retrieved at any time in the future. Let's create the actual cutout in the slab structure based on the previously designed pool shape.

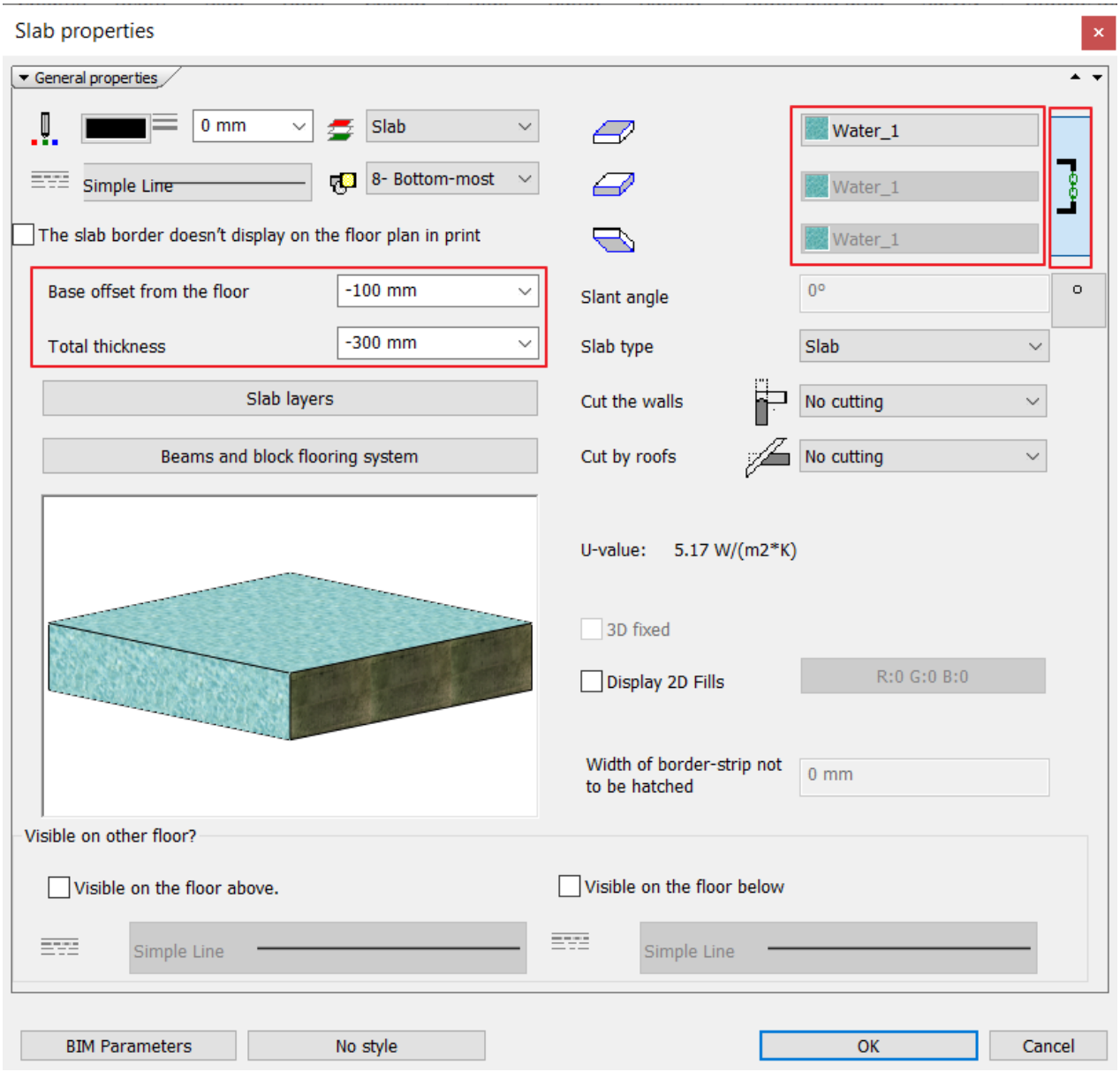
- Click on the contour line of the slab, and from the local menu, select the "**Hole / Create hole**" command.
- Look for the keyword **Closed Loop** in the top menu bar and click on it.
- Click inside the created rectangle shape so that the software recognizes the shape. This will create the pool cutout on the terrace slab.




## 7.6. Adding Water using the Slab Tool

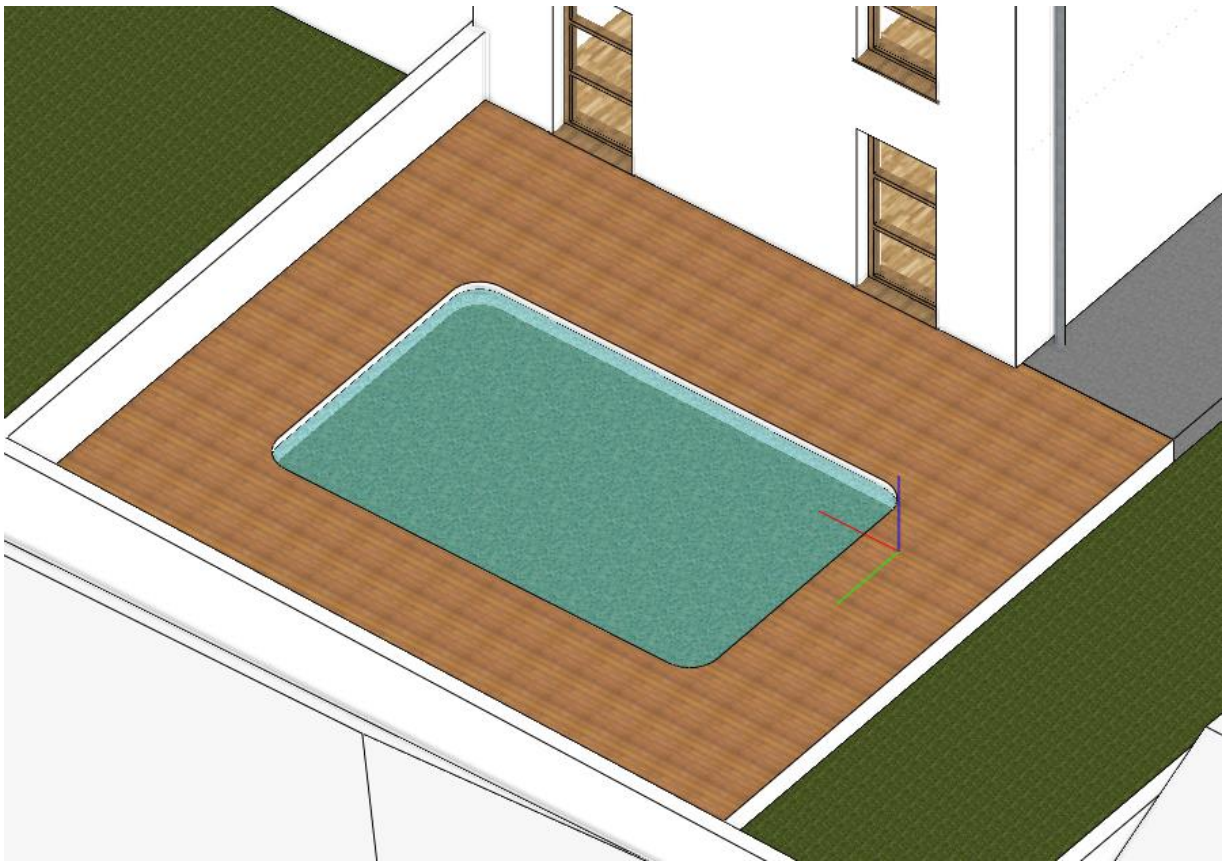
The cutout has been created on the slab, which we want to fill with water.

- Right-click on the Slab command and set its properties. The base offset from the floor should be -100 mm, and the total thickness should be -200 mm. Connect the slab materials and select the *Water_1* material.




- Draw the slab in Sketch mode. Select Closed Loop from the top menu bar, then Click on inner point of an area.

  We have now completed the pool.



## 7.7. Placing objects

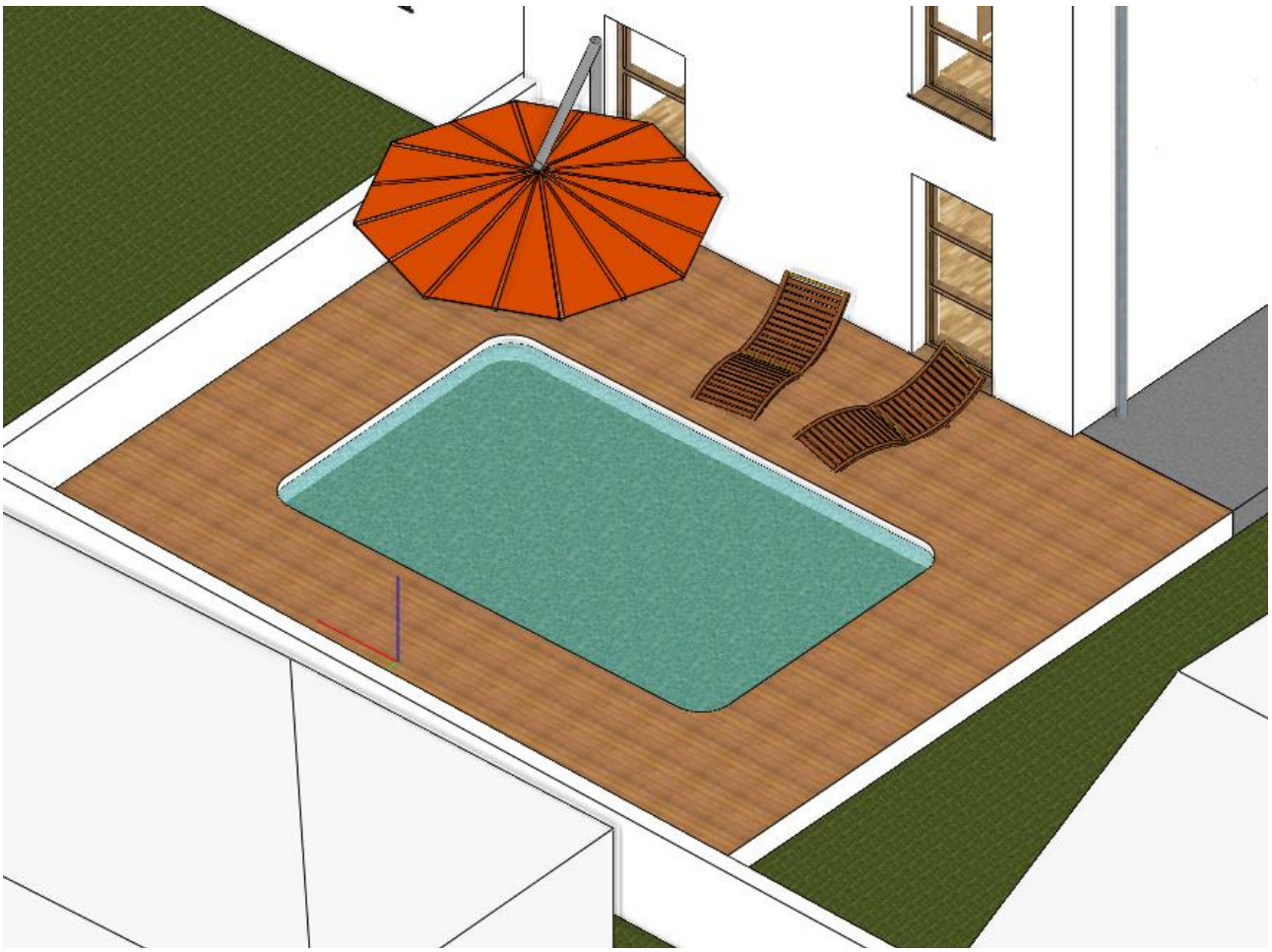
The ARCHLine.XP program comes with a built-in library of smaller objects that can be used at any time. One of the greatest strengths of the program is the ability to utilize and import various file formats, enabling users to search for the latest products online, whether free or commercial. Let's start with a built-in parametric object, the parasol.

- Find and launch the Ribbon / Interior / Soft furnishing / Parasol tool.
- Place it on the drawing with a single click and adjust its position if necessary.

Most built-in objects in ARCHLine.XP are parametric, meaning not only their material and size can be changed, but also other parameters. For the parasol, this could include the number of sides.

There are popular platforms that can be connected to through the program. Let's see how to use the free 3D Warehouse platform.

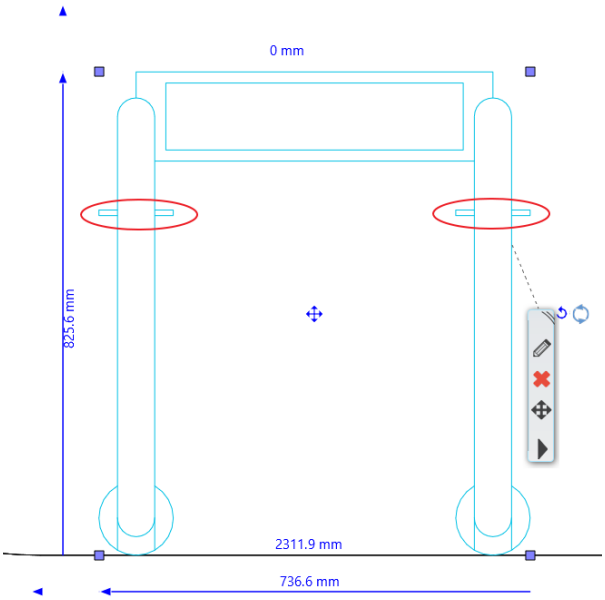
- Launch the Ribbon / Interior / 3D Warehouse tool.
- Search for a sun lounger. Use the keyword "liegestuhl" to find the model used in the tutorial material.
- Click on the thumbnail for a closer look and to download it. (It's important to download the model in the format suitable for your ARCHLine.XP version.)
- Place two instances on the drawing, then rotate and position them appropriately on the terrace.



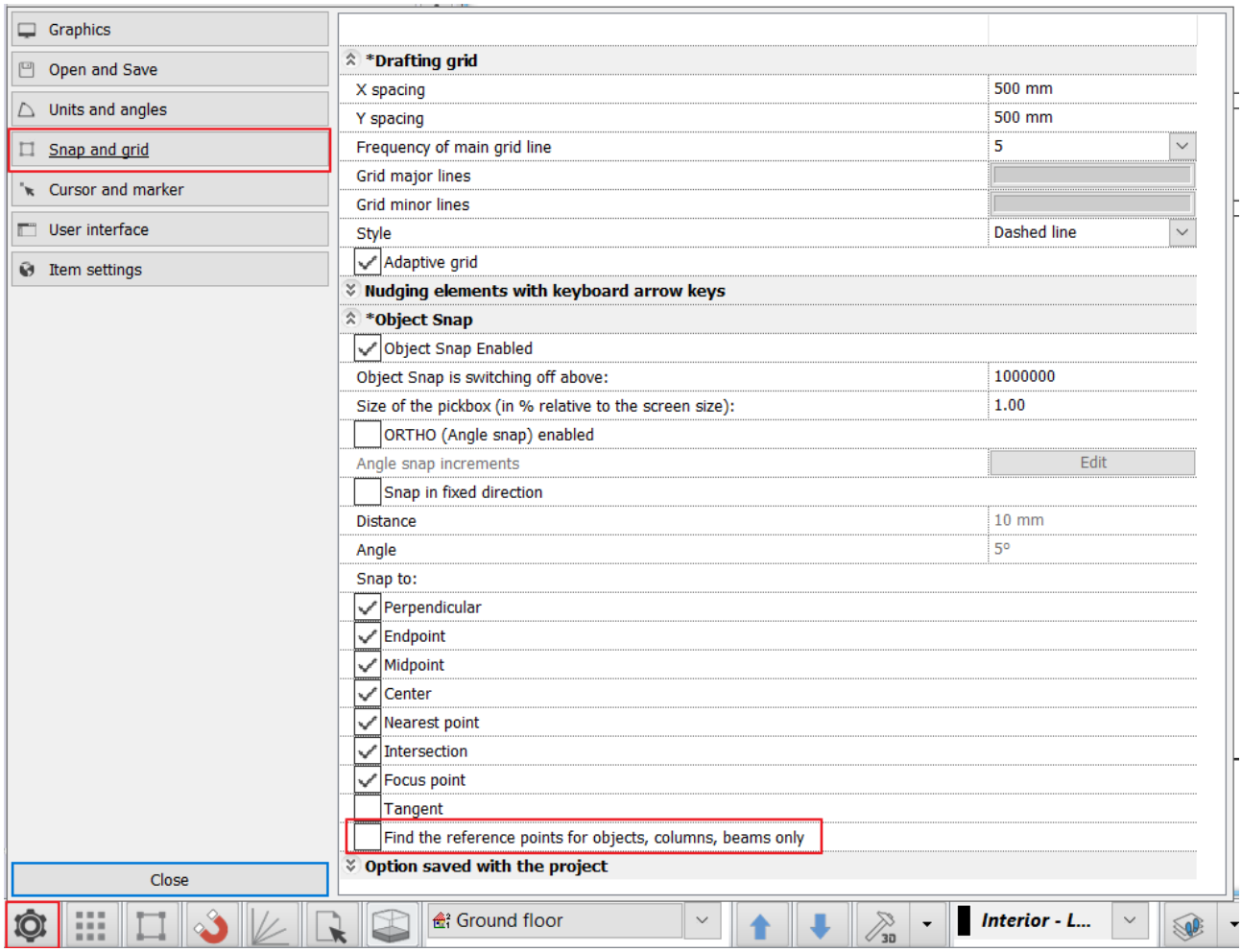
For the pool, we need a ladder.

- Open the Warehouse and search for one.
- Click on the appropriate one and download it.
- Place it on the drawing and rotate it if necessary.

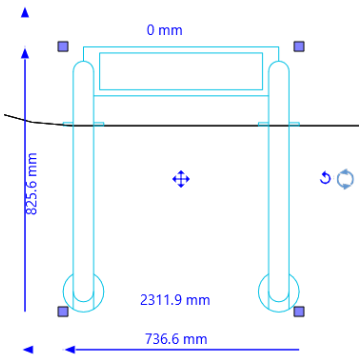
The floor plan top view will help precisely position the ladder at the edge of the pool. (Here you can see the ladder's bottom fitting point clearly.) While using the **Move from…** command, currently, we can only grip the ladder's four corners and its center. For precise fitting, we should grip other fitting points of the ladder.



- We need to modify a setting for this. Go to the settings and select the Snap and Grid tab. Under Object Snap settings, uncheck the box next to "Find the reference points of the objects, columns, and beams only." This will cause all nodes of the object to snap to the cursor, enabling us to grab each one of them.



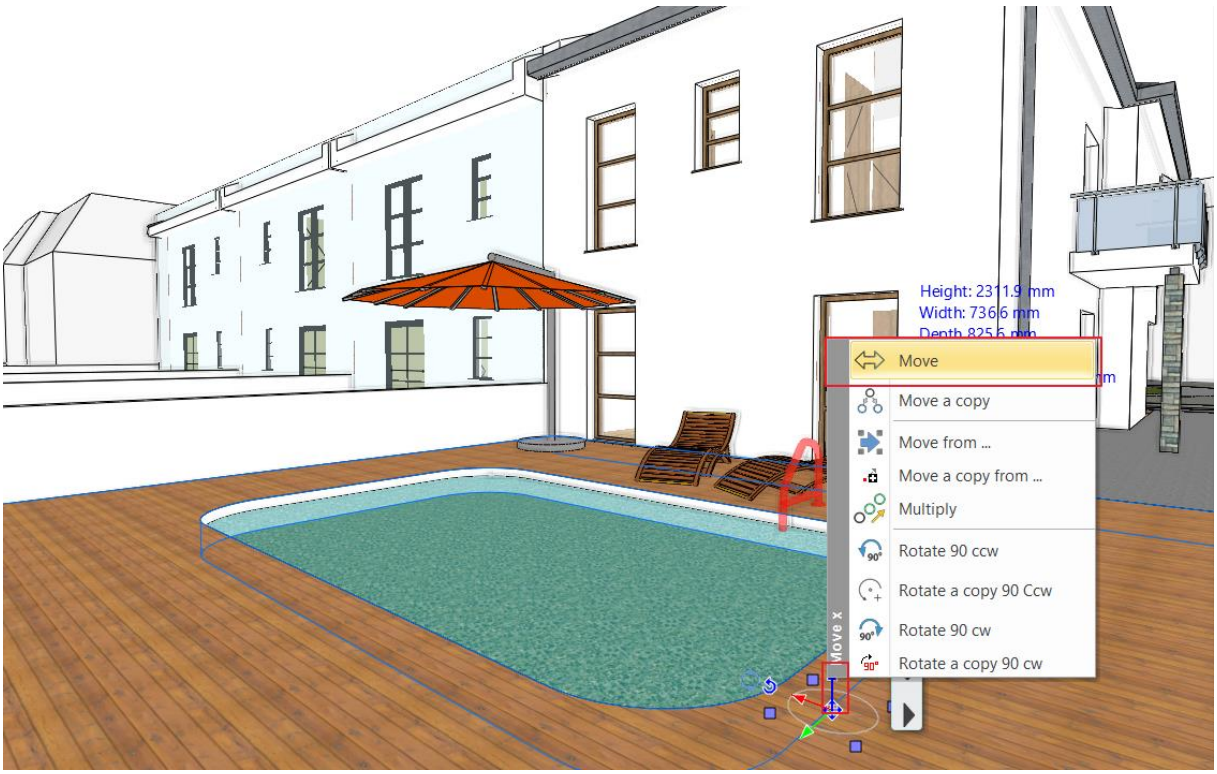

- Select the Move from… command again, and grab the ladder by one of the points indicated in the image above. Fit it to the side of the pool, then place the ladder by clicking.




The previously used setting requires more complex calculations, potentially slowing down the program. It's advisable to switch it back after use.

- Go back to Settings, then to the Snap and Grid tab, and check the option "Find the reference points of the objects, columns, and beams only."
- Select the ladder in 3D, then click on the blue arrowhead.
- Choose the **Move** command and now move it vertically until you find the right position, then click to place it.

Let's take a look at how the entire building, its surroundings, and neighboring structures appear. With this, you have completed the representation of the complete environment. In the next workshop, we will create photorealistic renderings.


Height: 2311.9 mm
Width: 736.6 mm
Move
Move a copy
Move from ...
Move a copy from ...
Multiply
Rotate 90 ccw
Rotate a copy 90 Ccw
Rotate 90 cw
Rotate a copy 90 cw
Move x

# 8. Workshop:
# Rendering: Creating a photo-realistic visual design

# 8. Workshop: Rendering: Creating a photo-realistic visual design

Taking a good photo-realistic picture is not a matter of pressing a button.
You have to learn how to deal with light and shadow, know the physical properties of the materials, find the ideal point of view and build up a photorealistic image that looks realistic, step by step. 25-30 test renders are needed to create the final image.
In this workshop, you will learn the technical requirements and rendering settings needed to make a good interior and architectural rendering.
We will discuss the following topics:

- Project settings
- Render settings
- Render styles
- Render effects
- Render list

Please open the following playlist and watch our Rendering workshop video in your browser: Visual Design

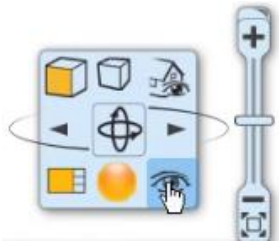
## 8.1. Default settings

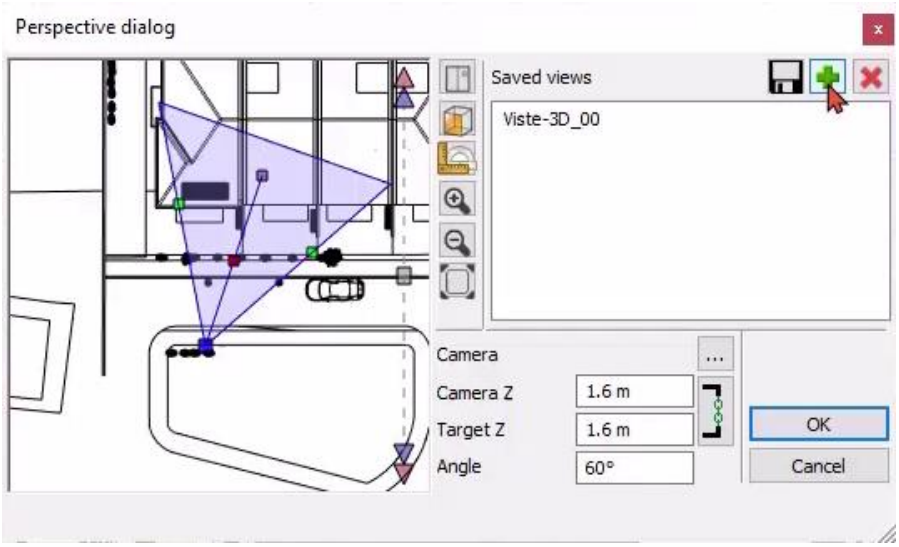
Before starting the work, get to know the project.

### 8.1.1. Perspectives

First, set the perspective views!

- Activate the 3D window, then select the eye icon in the NaviBar, called Perspective settings.






In the pop-up window, zoom in on the icon on the floor plan - this will help you navigate the space:

- Use the blue square marker to move the camera position,
- Use the purple square marker to move the position of the point you are looking at.
- Use the green square markers to change the viewing angle. You can also enter the angle on the right manually. This value should be between 50 and 60 degrees.
- And by holding the red square marker you can move the position of the whole view.

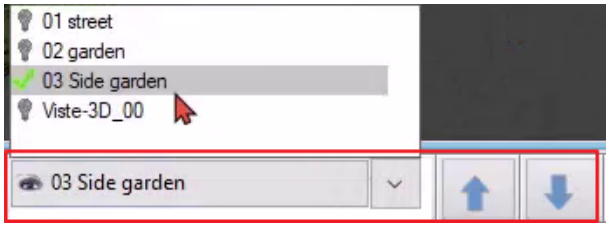
- Save the set view by clicking on the green plus icon!

Views should be created sequentially to follow and understand easily. For example, as you walk around the building. Create several views by typing in the view number first, then the location name (e.g. 01_street). If you follow this method, you will have views that are easy to navigate.

When setting the perspective, ensure that the camera and the subject are at the same height. The recommended height is 1.6 m -1.8 m. The camera angle of view should be 50-70 degrees. Only deviate from this rule if there is a good reason.

***Navigate between views***

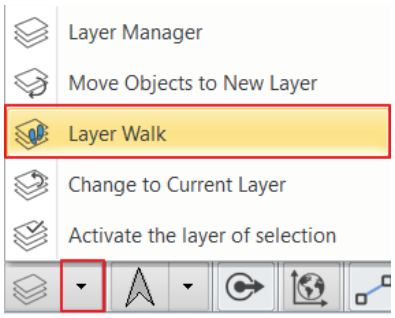
- You can navigate between views using the jump list at the bottom, or the up and down arrows next to it.

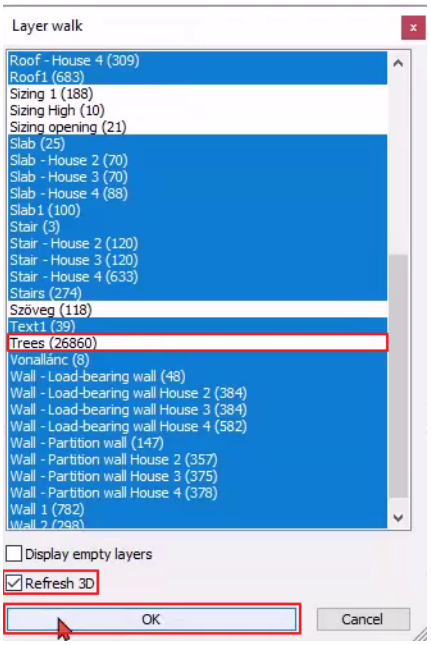



## 8.1.2. Layers

Let's look through the layers of the project and turn off the additional layers so that only the architectural elements remain!

The Layer Manager is on the bottom status bar. Click on the arrow next to the Layer Manager icon and select the Layer Walk command.




- A window with the layers will then appear. Hold down Ctrl to deactivate the layers you don't need: Curtain, Decoration, Other object, Trees.
- Turn on the Refresh 3D command, and the program will automatically refresh the 3D model.

***In summary:***

You should create layers to handle different elements, objects and accessories separately. Some of these elements (e.g. the accessories here) should be turned on in the final rendering, but in the meantime, it will speed up the work if you can turn them off.

If you do not deal with a layer (do not create a new layer) during the work (e.g.: walls, slabs), the program automatically places these items on a pre-created layer. You can also turn them off and on.

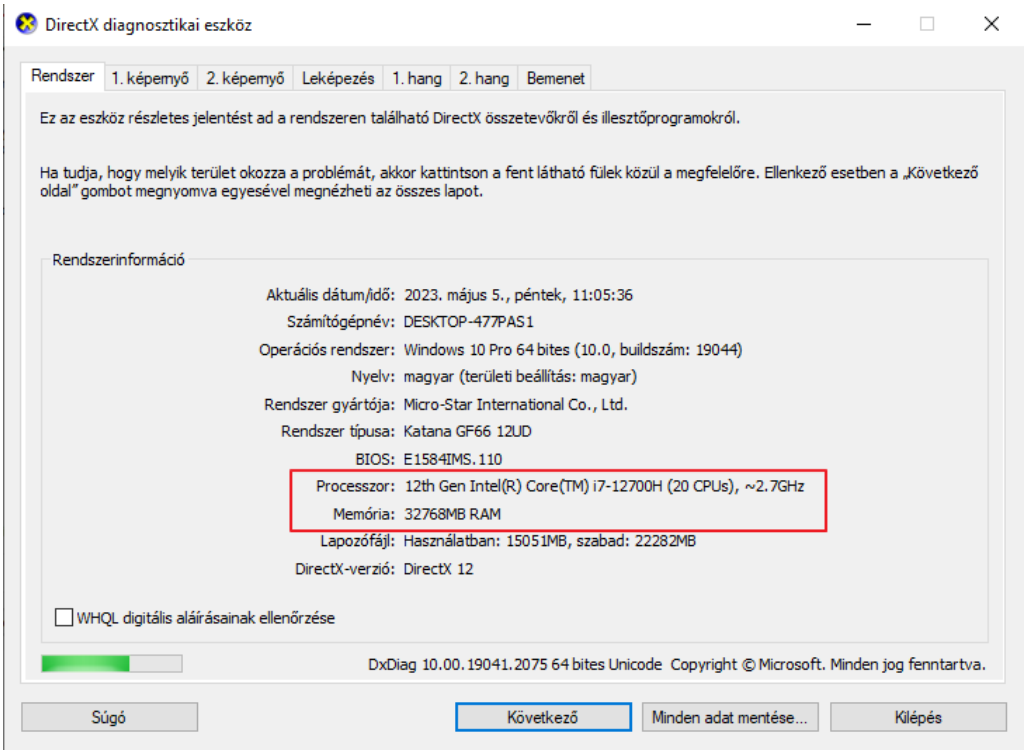
! The 3D and the 2D can have different layer lists so we have to change the layer settings on the floor plan.

# 8.2. Render settings

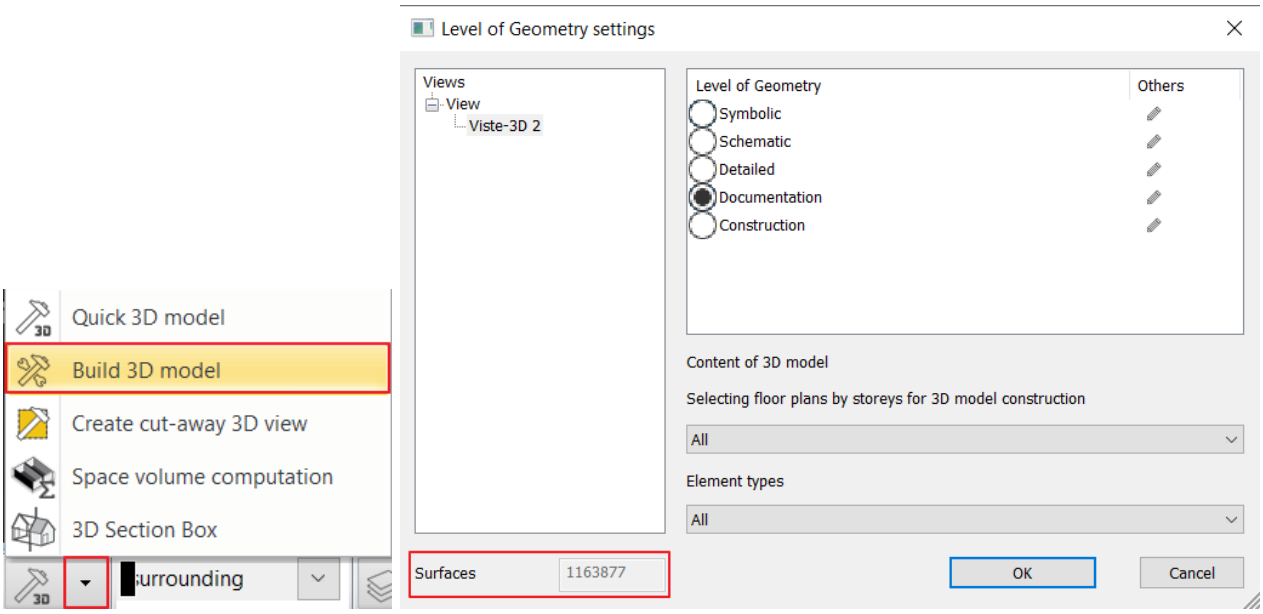
## 8.2.1. Render time

Which factors define the render time?

1. **The computer you are working on** (processor speed, memory size).
   There are several ways to get information about your computer's parameters in Windows.
   One option:
   Click the Windows start icon and type **DXDIAG**, then run the command. (Do not request online access.) In the System window that appears, you will find detailed information about the processor and memory:




2. **Project size (number of surfaces)**
   You can check the model surface area by clicking on the Build 3D model command.




A medium-performance computer can work efficiently up to about 1 million surfaces. Once the number of surfaces exceeds 2 million and then 5 million, the program sends a warning. At this point, it makes sense to replace objects with a large number of surfaces for optimal performance.

3. **The complexity of the materials**
4. **The complexity of the lights**
5. **The render settings**

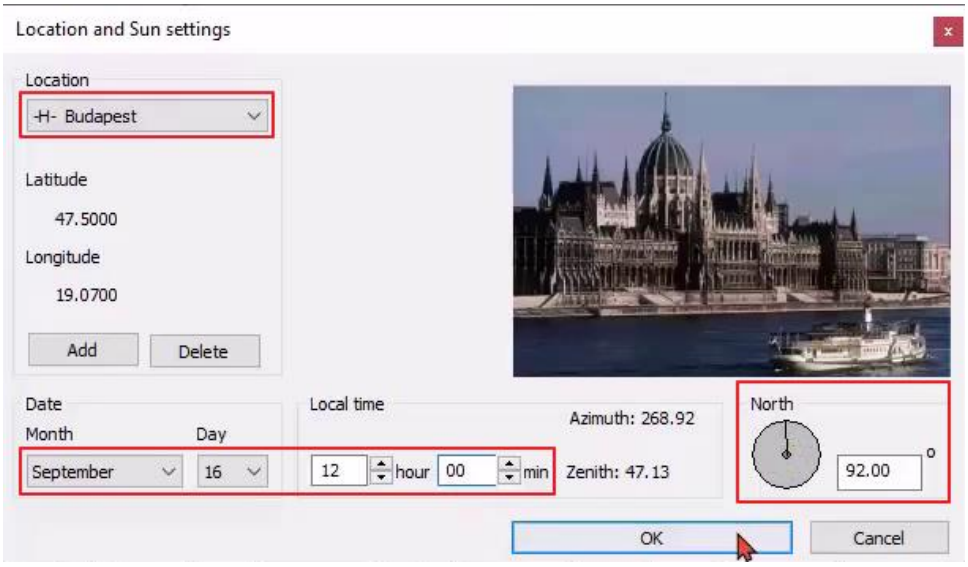
When rendering, it is recommended to turn off any other buildings or environmental elements, except the currently rendered building. This will save you a considerable amount of render time, as the program does not need to calculate items which are not displayed in the final result.
The rendering workflow is divided into 2 phases:

**Phase 1:**
With the help of the layers, we display only the architectural elements, starting with their rendering. The render will be done quickly. Then we make the necessary changes.
**Phase 2:**
We also turn on the additional elements, so plants, cars and other outdoor elements are displayed in the rendered image. Depending on the complexity of the model, the render time can increase significantly.

## 8.2.2. Sun settings, shadows

Set the sunlight (shading) and the north direction for natural lighting. Adjust the sun to come from behind you, not from the front. The geolocation is also an important basic setting for the right light effects, so let's start with it.

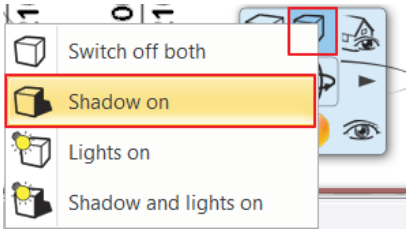
- Activate the 3D window.
- Select **Ribbon bar / View / Sun / Sun position** command.
- In the appearing dialogue window choose "H-Budapest" for location and set date and time: 16. October 12 h.
- Here you can also set the North direction relative to the floor plan. Now we don't modify it. Close the dialogue by pressing".




We had defined the location on Earth with orientation as we wanted to see the sunlight effect on a specific date and time. We can display the sunlight and shadows with proper settings and then adjust the sunlight effect periodically by changing the date and time.

Let's check how this change affects the model.

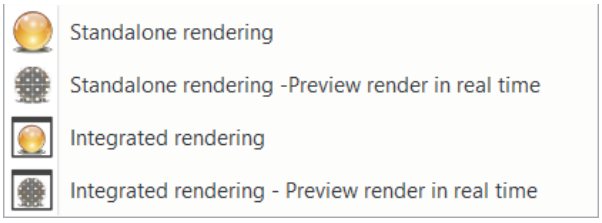
- The 3D window is the active window.
- In the Navibar, turning on the *Shadow on* option will make the shadow visible.



- Turn off the shadow by clicking on the *Switch off both* options.

## 8.2.3. Main settings

To start the rendering click on the yellow orbit icon on the Navibar or **Ribbon bar / View / Rendering**.




You have two main choices: you can start a standalone or an integrated rendering.

The **Integrated rendering** appears as a drawing in the project and you can handle it as the drawing windows.

The **Standalone rendering** opens an application that is connected to the program but runs separately.

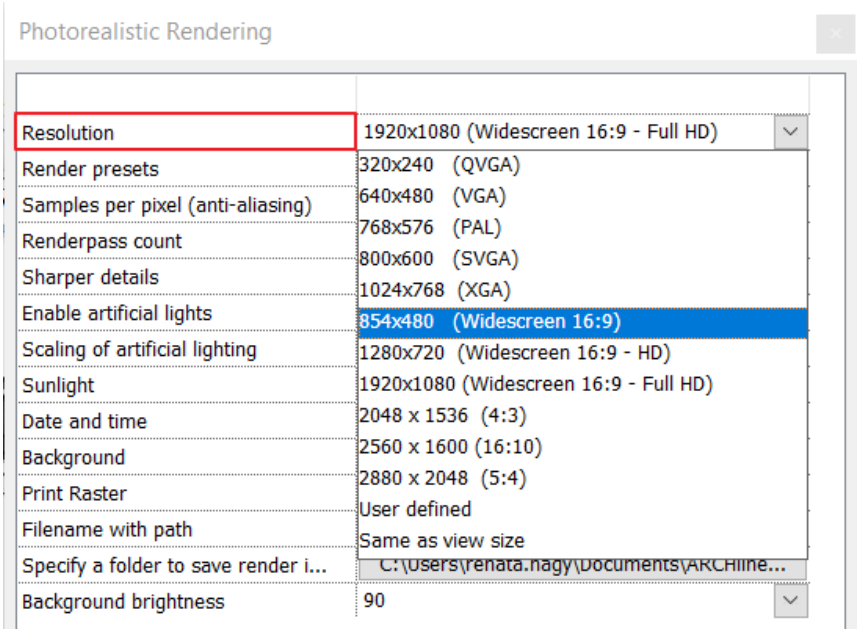
You can start these two modes as real-time draft, which are in a live connection with the content of the 3D window and can react immediately to several modifications and display the draft of the result in a short time.

The *Integrated Rendering – Preview render in real time* mode does not work on all computers that meet the system requirements. In this case, it is recommended that you use the *Standalone Rendering – Preview render in real time*. The result differs from the previous one in that the render window cannot be inserted between the ARCHLine.XP windows, but can be accessed by clicking on the Render icon in the taskbar, but we see the same fast rendering image that always matches the current scene.

Click on the **Integrated rendering – Preview render in real time** and check its settings.

### *Resolution*

The first important setting is the **Resolution**. You can select from the list or define an individual resolution.




Among the predefined options, there are low-resolution, so-called work sizes; and are higher resolutions that can be presented to the client.
It is recommended to use sizes smaller than Full HD in the inter-work condition. It is advisable to give the customer Full HD or larger.

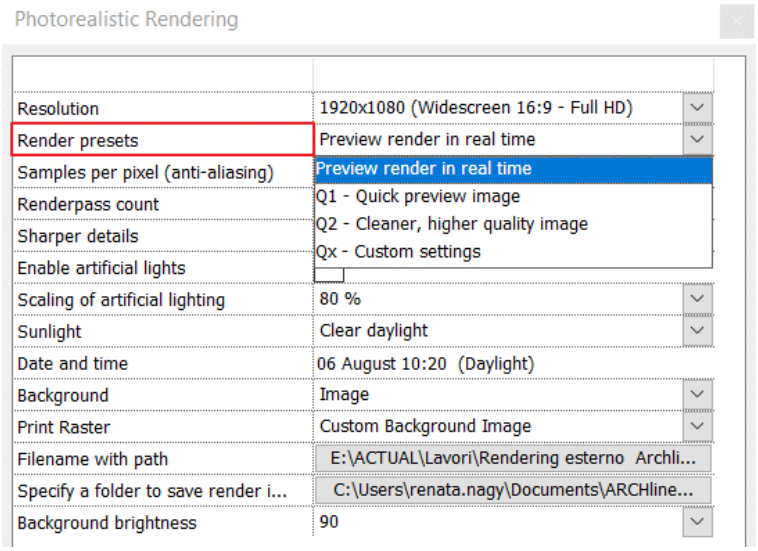
- Select 854x480 resolution.

### *The render presets*

We can influence the quality of rendering with render presets. The presets produce images of increasingly higher quality and less noise. Each preset is expected to take three times longer to render than the previous one.

Presets:

- ❖ Preview render in real time
- ❖ Q1 – Quick preview image
- ❖ Q2 – Cleaner, higher quality image
- ❖ Qx – Custom settings




**Preview render in real time**

The *Preview render in real time* option produces a reduced, but almost instantly rendered image. It aims to display the inter-working status quickly. Its speed makes it a good tool for creating *work renders*. It can save you a lot of time when setting up materials. The renderer automatically tracks the changes in the project and the image is regenerated.
For the final render to be provided to the client, you will have to choose from the other options:

**Q1 – Quick preview image**

It is recommended to use this setting at the beginning of the render process with a low resolution (e.g. 800*600 pixels) which quickly produces a work-quality image.

**Q2 – Cleaner, higher quality time**

The next stage of the render process is setting for scenes approaching the final image at a medium resolution (e.g. 1280*720 pixels). It is also suitable for final rendering at high resolution.

**Qx – Custom settings**

The setting can be adjusted to the user's needs, values can be specified individually based on the number of light sources and the complexity of the model. The basic setting (Pixel 10, Renderpass 30) is suitable for creating the final image at FullHD or higher resolution (1920*1080 pixels).

- Choose the Preview render in real time option.

### *Samples per pixel:*

The number of ray-tracing samples is computed per pixel of the output image.
Adjusts anti-aliasing, which will smooth away the "jaggies" you see along the edges of objects and shadows.
Increasing Pixel Samples will result in a cleaner, higher quality image.
**Proposal:**
Higher value ( > =10): useful for final scenes with complex lighting, and fine textures.
Lower value (< 5): useful for preview or quick scenes.
Samples per pixel and Renderpass count are the most important settings for quality rendering.

- You can only change the samples per pixel value when selecting Qx - Custom settings

### *Renderpass count:*

The render engine uses a progressive rendering method to refine the generated image during each rendering pass.
Increasing the render pass number will increase the time required to perform rendering but will also increase the image's quality per each single pass.
The required number of passes is highly dependent on the kind of scene that is being rendered.

**Proposal:**
Higher sampling settings ( > 10): Useful for scenes with complex lighting. The recommended value is 30 for scenes intended for the final version.
Lower sampling settings (< 10): useful for scenes that require detailed geometry, and fine textures without complex lighting. Useful for previews or quick scenes.

- You can only change the number of renderpass count when you select Qx - Custom settings.

### *Sharper details:*

Reduce noise and get the sharper details in your rendered image. It removes image noise while recovering and enhancing details. Its effect is immediately visible in the picture.

- Enable the sharper details option.

### *Enable artificial lights:*

This a master switch allows you to turn off all the lights regardless of whether any were turned on. This option should now be disabled.

### *Scaling of artificial lights:*

Control the intensity of artificial lighting. We don't change this now.

### *Sunlight:*

The Sunlight setting is a fundamentally determines the nature and intensity of the external light effects in the scene.

*Clear daylight* means undisturbed sunlight.
Selecting *Cloudy daylight* indicates that the sunlight is less dominant, allowing artificial lights have a stronger effect on the scene, similar to a cloudy day.
In the *Sunset* setting, the red and orange hues of the sky is more pronounced in the atmosphere, just as it would be in a photo taken at dawn or sunset.
The *Outdoor Night* scene is an outdoor night scene lit by dark artificial light.

- Select Clear daylight option.

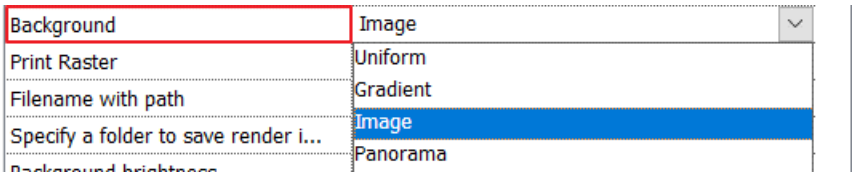
**Night render:**

To set up the night renderer, you need to follow these steps:

1. In the Sun position setting, select Night time.
2. It makes sense to choose a night background image if the scene also shows the external environment.
3. Background Brightness should be set to low.
4. For Sunlight, it is recommended to set the Outdoor night scene.

### *Background:*

You can choose a color or an image as background. There are default images in the program but you can import your own background. You can also select a panorama as a background or import your own. Panorama images completely surround the model and typically have the extension .hdr. These pictures can be downloaded from the internet.




- To continue, now select Image with Custom background image and import the file *\Documents\ARCHLine.XP Draw\2024\Architectural_Course\08_Render\ country_landscape_FHD.jpg*

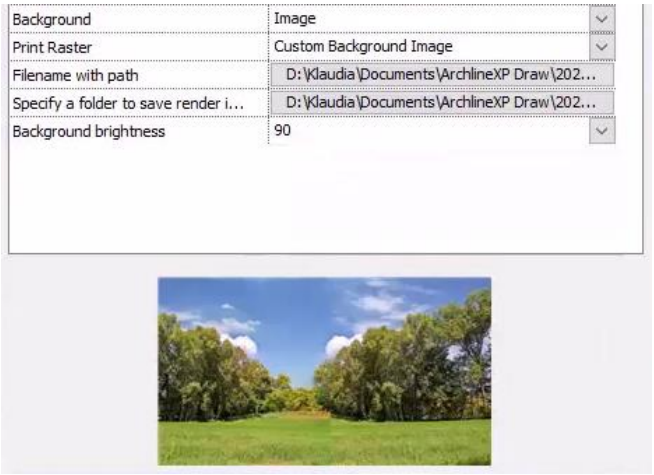
### *Specify a folder to save render images:*

This serves as a back-up save path, where the program creates a back-up of the last state of each image. It is advisable to set the folder, where the project is saved.

### *Background brightness:*

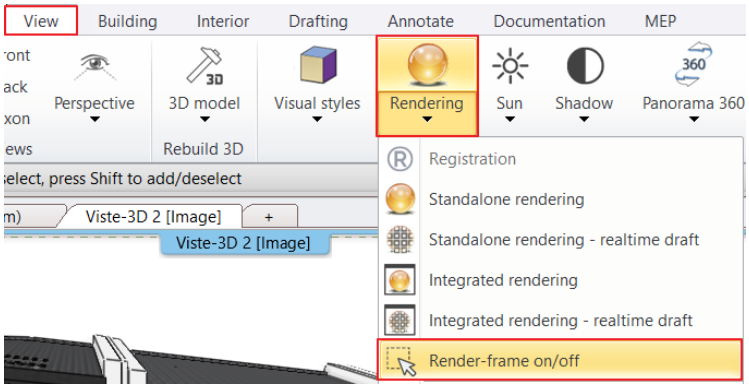
The brightness of the background should be adjusted according to the time of day.
A value of 100 is recommended for a day scene, while a lower value on the scale is recommended for an evening or night scene.

- Set the background brightness to 100.




Accept the settings and close the dialogue.

The render command can be also accessed from the **Ribbon bar**. Click on the **View tab Rendering** icon. The rendering commands are also available on the Navibar appear. However, here an extra option, the **Render-frame on/off** can be found.




Set the 3D window to the maximum size by clicking on the rectangle icon in the top left corner.
Activate the render frame. This will display a grey area on the left and on the right. This shows the image details that will not be included in the final image. The scene inside the dashed line will be the content of the final image.

This function is useful to set the perspectives precisely, as you can define exactly what will be visible in the final render. Turn off the frame.

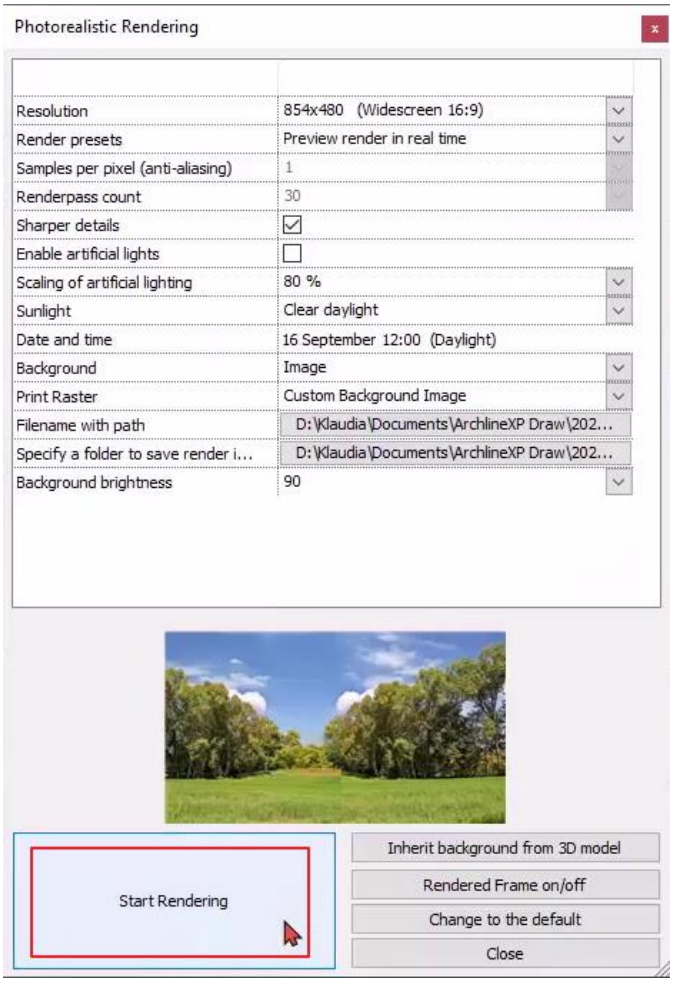
## 8.2.4. Create the first rendered image

We are currently in Phase 1. According to the layers setting, only the architectural layers are switched on. After reviewing the various render settings, start an **Integrated render – Preview render in real time.** You will see the same settings that you have just reviewed and configured.

- Click the Start rendering button.

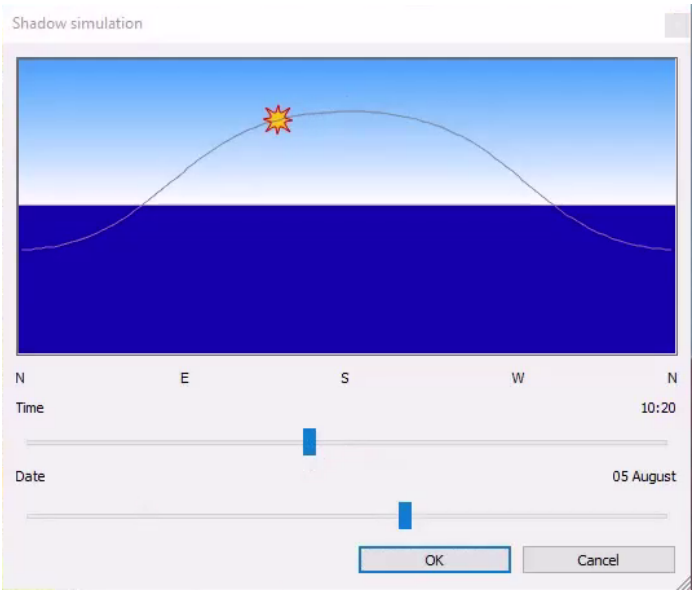
***Denoiser:***

After rendering or when it is stopped, the module denoises the entire scene, enhancing the image quality. Image noise means the graininess or blurriness of the image. Denoising results in a clearer picture, which will allow us to further adjust the material settings.
You can stop the rendering process at any time. If the rendering process has not yet reached 50%, you can turn the noise filter off. If you stop the process, a dialog box will appear asking you if you want to apply the denoiser. Selecting NO, the rendering process will stop immediately.



We want to achieve a more contrasting light-shadow than this, so we will change the position of the sun. Since we've started a real-time render, we can easily change this.

- Activate the 3D window.
- Click on the **Ribbon bar / View / Sun / Sun and Shadow simulation** button and with the slides, modify the date and time. Set the time to 5. August, 10:20 am.
- Hit OK to accept the changes. The changes immediately appear in the render dialog:
- Click OK to apply the changes. The render dialog immediately reflects the adjustments: you'll notice a stronger light-shadow contrast and a more three-dimensional effect.



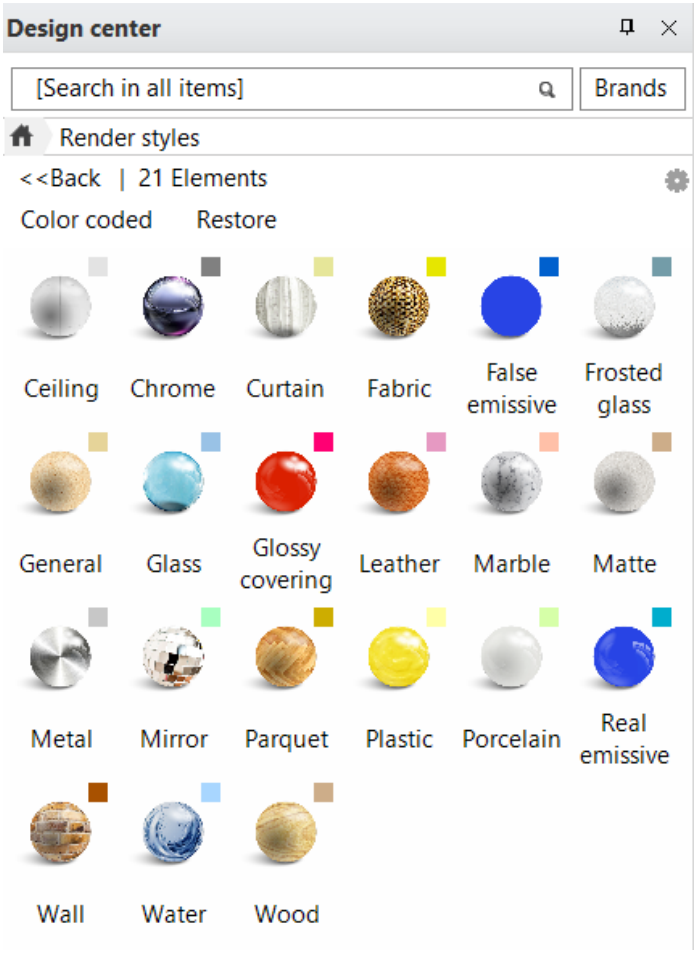
Experiment with several sun settings, compare the results, and choose the best one. Ensure that the setting creates a contrast between light and shadow, without being too strong. Aim to find a good balance between light and shadow.

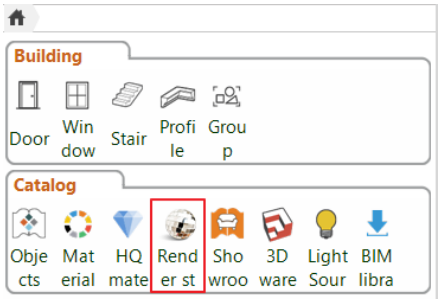
Always ensure that if there are large bright surfaces in the project, complement them with other accessories such as trees, plants or a vehicle. Here we will place a car to solve this large bright surface in front of the building.

## 8.3. Render styles

To produce a high-quality, lifelike photo-realistic image, it is essential to set the materials correctly used in the project. Setting up materials is not always easy and often a time-consuming process.
Using Render styles can simplify and shorten this process.

We have categorized various materials such as metal, glass, brick, mirror etc. into different groups. And set their most characteristic properties. That's how we created 21 unique Render styles. These are the following:




Features of Render Styles:

- Can be assigned to any material.
- Available from the Design Center. From here, you can "Drag and Drop" to the selected surface in the 3D view. The effect is shown in the internal Rendering application.
- Do not change the size and texture of the materials, only change the material properties.
- Each render style can be applied to a surface only once. If the same material is used on multiple surfaces in the project, the program will change all materials to the render style.
- After using the style, a customized style setting can be created.

Considering these points, we recommend the following method for achieving the ideal material settings.

1. Assign the appropriate Render style to the different types of materials in the project.
2. Create a test render.
3. Refine the material settings depending on the result.

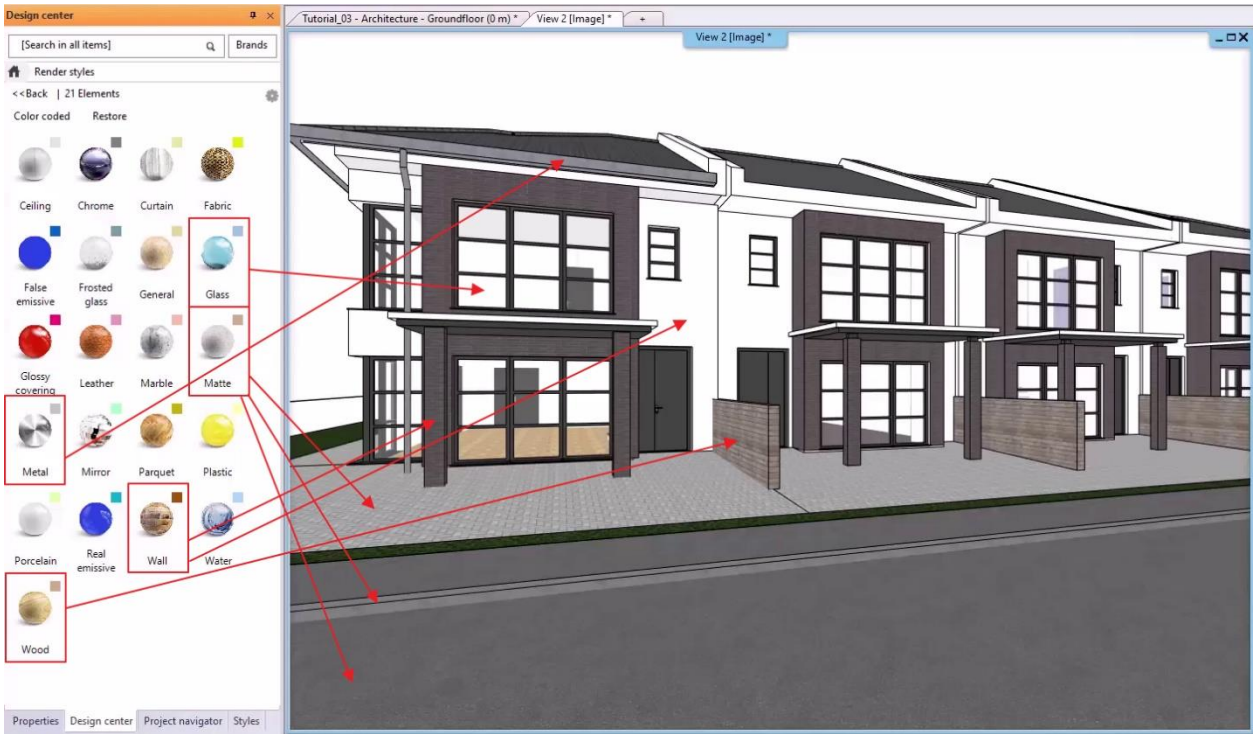
## 8.3.1. Use render styles

Let's see how this works in practice!

***1st step***

As a first step we will drag and drop the appropriate render styles from Design Center onto these surfaces:

- Apply to the brick covering and the white wall the „Wall" render style,
- To the paving area in front of the house, as well as to the concrete and the curb the „Matt",
- To the partition walls „Wood",
- To the gutters „Metal",
- And to the glass surfaces the „Glass" render style.



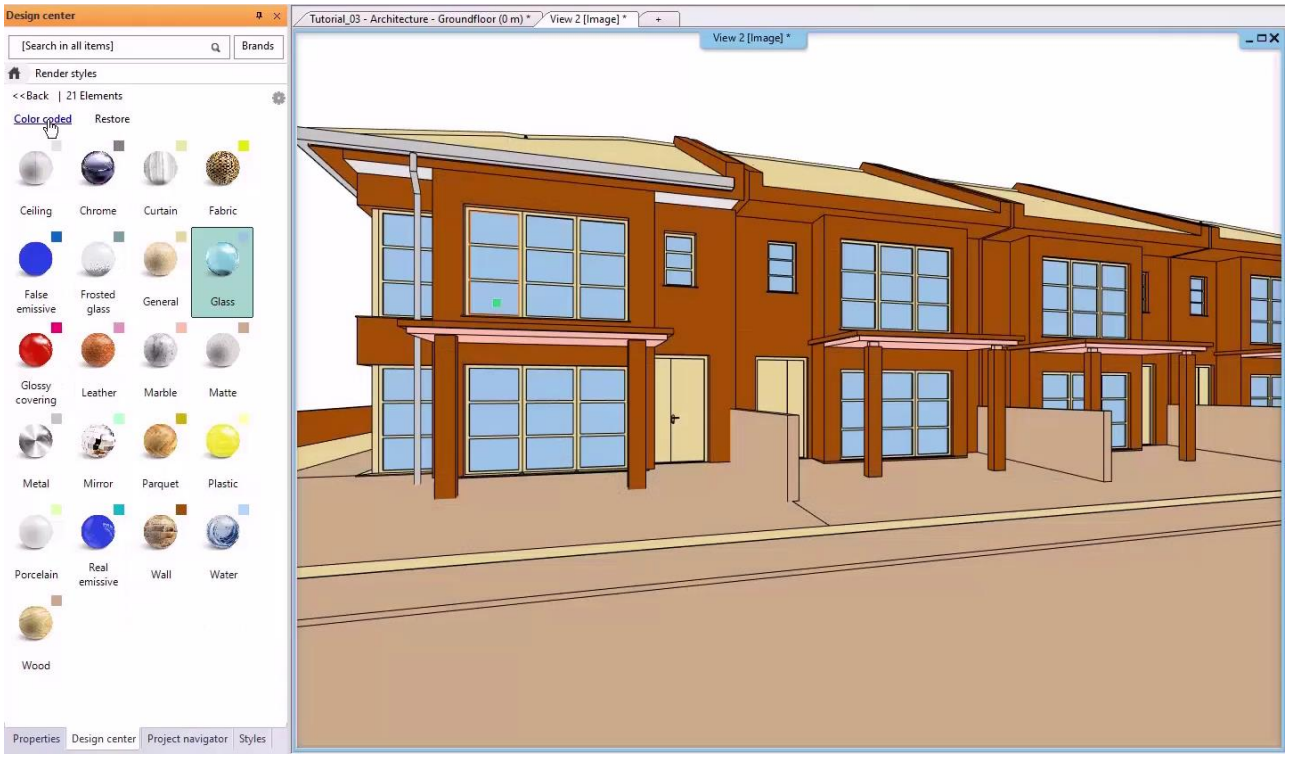

On 3D model using “Color code” representation mode we can quickly check if we didn’t leave any surface out:

***Color coded representation***

The color-coded view enables you to display the render styles in a classified way. The assigned color codes are shown on the top right corner of the render style icons.

Clicking on “**Color coded”** word in Design Center the model appears in the colors assigned to the different render styles. This way we can easily check the currently assigned render styles through colors.

- Click on the word “**Color coded”**. The surfaces appear in 3D view in clear colors assigned to render styles




- Click on “**Restore**” to view the original representation mode.

### *2nd step: Render Test*

Now we choose the *Integrated rendering* command (not in real time!).
The render preset will be **Q1 – Quick, preview image**, the other settings will remain the same. This will take a little more time than the preview render, but you will get a nicer image.

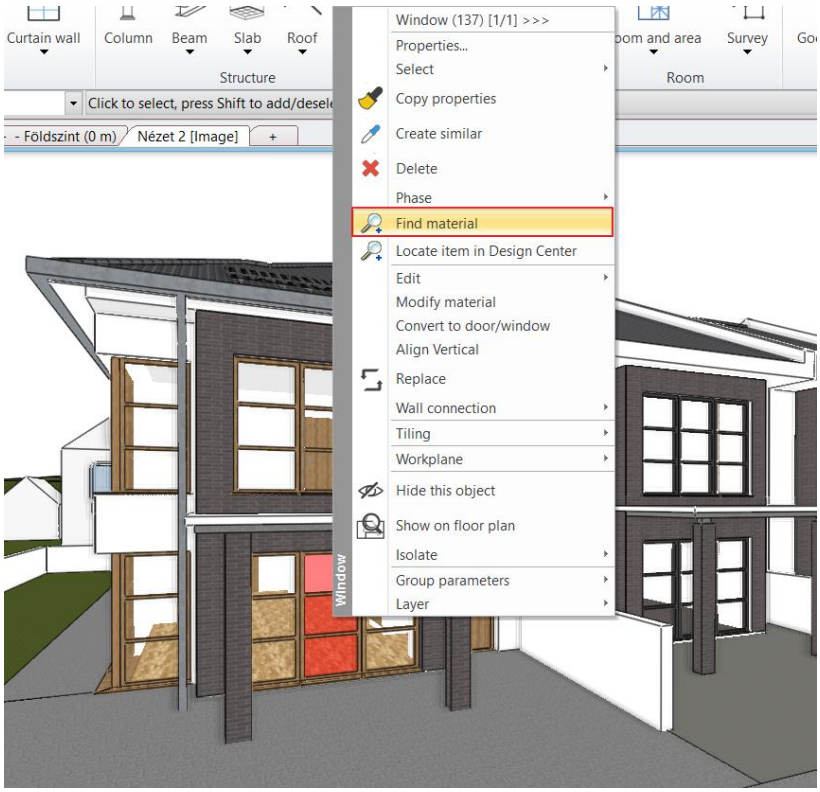
### *3rd step: Refine material settings*

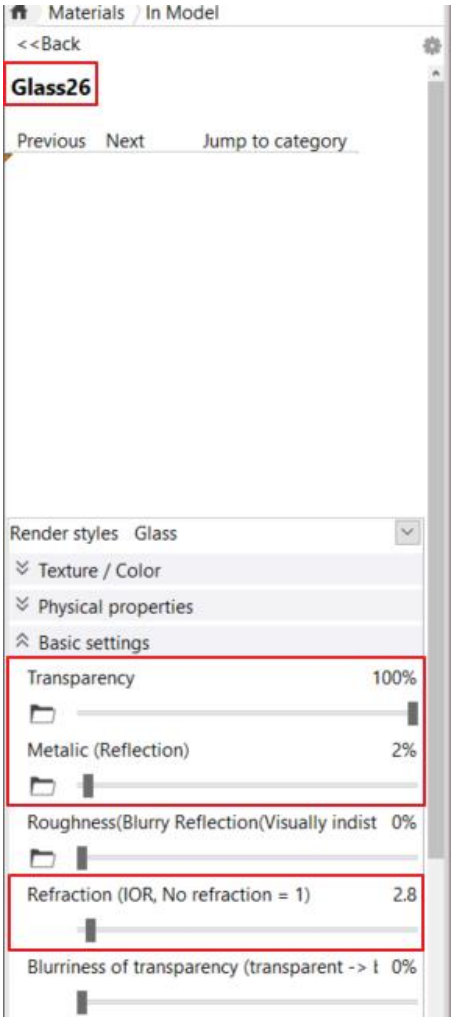
The test render is now ready. Here we can see the materials that we will fine-tune in the 3rd step.
We need to modify the properties of the, as it is now very reflective. So, we will modify its reflection and its transparency.
If you get too bright surfaces in external scenes, you should also modify them by reducing the materials brightness.

To fine-tune the materials, do the following steps:

- Activate the 3D window.
- Right-click on the surface you want to change the material of.
- From the Local menu, select Find Material.

Let's start with the glass!




On the left the Glass26 appears with its properties, which can be modified.

- Scroll down the list and increase the Transparency to 100%.
- Set Metalic (Reflection) to 2%.
- Also change the Refraction to 2.8.

That's done, now let's change the walls!

- Right-click on the wall, then select Find Material.

We want to make the wall a bit greyer, so:

- change the Color (to 241).
- Adjust the brightness of the materials using Texture (albedo). Set this to 65.
- Set Reflection to 3% and Roughness to 5%.

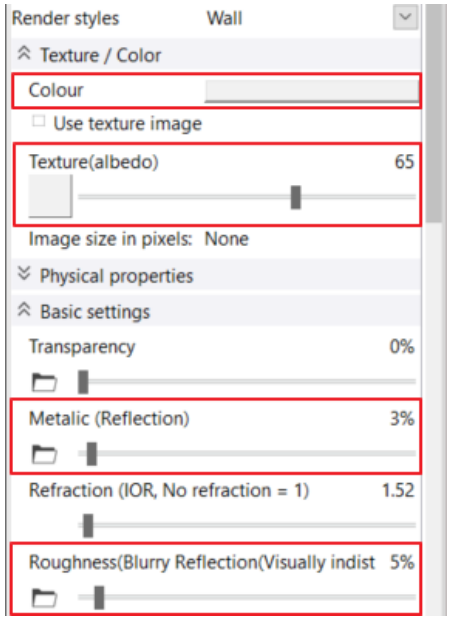
Once we've done that, let's change the darkness of the concrete!

- Set Texture (albedo) a value of 20.

Before we go any further with the fine-tuning of the materials, let's run a test render to check the changes we've made so far!

- We choose Q1 – Quick preview image again.

A higher quality image makes it easier to decide whether the material adjustment successful or whether you need to refine it further.
The render is now complete and you can see that the glass is now completely transparent.



For exterior renderings, if the interior is not furnished and visible through the glass, consider putting up a curtain so that the empty building is not so visible.

Further fine-tuning will include the following changes:

- Lightness of the wood partition walls: set the Texture (albedo) value lower, from 60 to 40.
- Gutters reflection: lower the Reflection from 40% to 20%.
- Brightness of the paving in front of the house: set Texture (albedo) to 20.
- Brick covering of the house: set the Texture (albedo) back to 40 to get a darker result.

All the settings and fine-tuning are complete, let's start another test render! Similarly, select Integrated rendering, Q1 - Quick preview image.

Now compare the two pictures!
The left is the final render image before fine-tuning, the right is the final render image after fine-tuning:

The change is most visible in the reflection of the glass surfaces and the lightness/darkness of the coverings.

Materials have additional properties depending on their type and render style. As you gain more experience in rendering images, it is worth getting to know how they work and how they interact. Until then, you should use only the settings provided by the render styles.

### *More material settings - optional*

Here, we gathered the most important information about material properties:

**Transparency**

The left side of **Transparency** slider is where the material is not transparent at all, while we set it to 100% the material almost disappears.

**Brightness/Albedo**

The starting state of the Brightness slider is 50%. If we decrease this value the material will be darker, and if we increase it the material will be brighter.

**Refraction**

It depends on the type of material we have chosen.

**Bump mapping**

For some materials, you can set a bump amplitude, which depends on the nature of its texture. It is recommended to smooth it a little afterwards (**Bump softness**).

**General type**

If you need material setting that doesn't appear within the properties of any render styles, then use the **General render style**. In this case to modify the materials all the necessary settings will appear. This universal style serves as the foundation upon which other styles can be created. Render Styles are also available on the Material properties tab.

## 8.3.2. Display of accessories

So far, only the architectural elements are shown in the render image. If we are satisfied with the settings so far, we can move on to phase 2, where we will adjust the accessories.

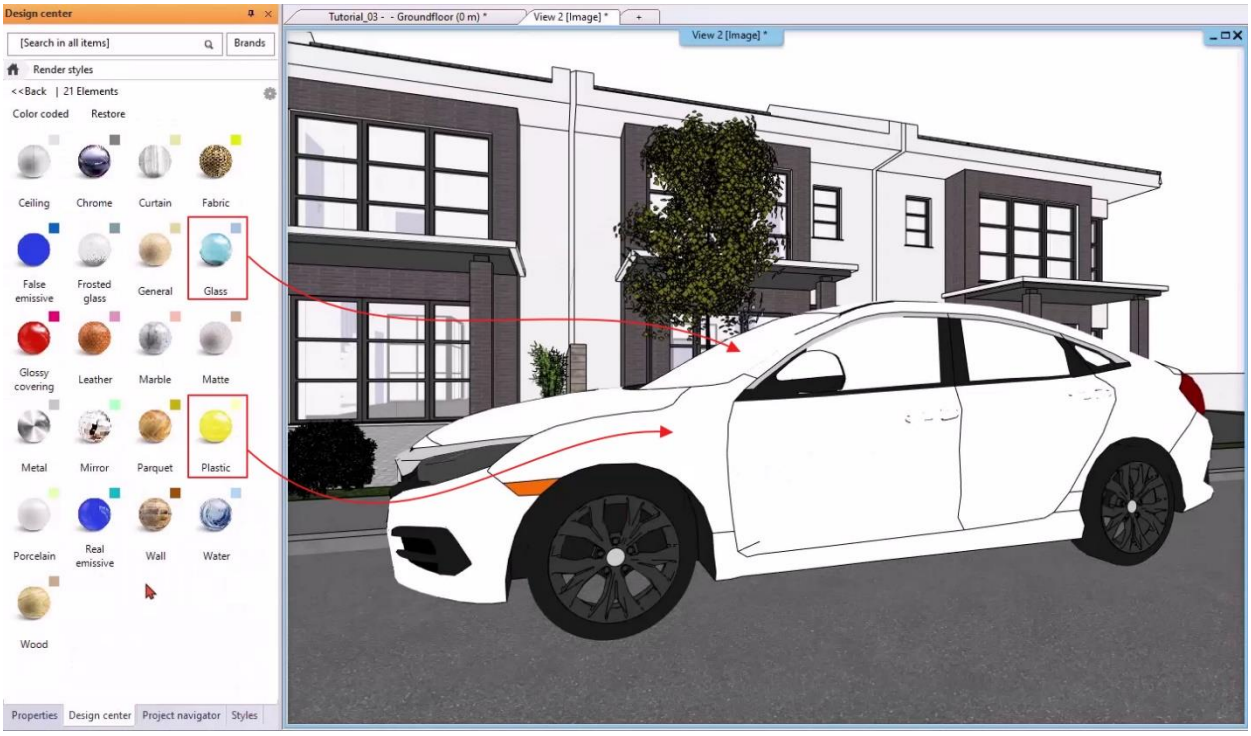
- Activate the 2D floor plan and use the Layer Walk command to turn back the Curtain, Decoration, Other object, Trees layers.
- Activate the Refresh 3D command, then click OK to accept the settings.

In phase 2 we follow the same 3 steps as before: first apply the render styles, then create a test render and fine-tune the materials.

### *1st step*

Drag and drop the appropriate Render styles from the Object Center onto the car surfaces.
Try several render styles!

- On the car's polish, use "Plastic"
- On the windshield, use the "Glass" render style.




Then, run a test render!

### *2nd step: Test Render*

When working with accessories, it's a good idea to zoom in fully on the object so that it fills the whole screen, so you can get a good quality render even at low resolutions.

- Start the Integrated rendering command.
- The resolution should remain 854x480 and the render preset should be Q1 - Quick, preview image.

- The result is very bright, so we activate the 3D window and apply the " Glossy Surface " render style to the surface.
- Let's start another test render!
- With this solution you get a much nicer result, so let's start fine-tuning it.

### *3rd step: Fine-tuning material settings*

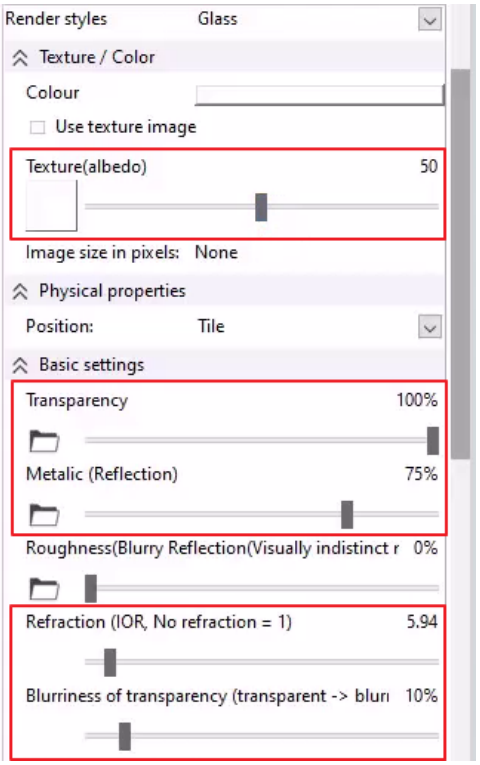
To fine-tune the materials, do the following:

Start with the paint!

- Activate the 3D window.
- Right-click on the car's paint, then select Find Material.
- Lower the Reflection to 20%.

Let's continue to fine-tune the glass surfaces!

- Right-click on the windshield, then select Find Material.
- Set the Texture (albedo), that is, the brightness, to 50%.
- Transparency to 100%,
- Reflection to 75%,
- Refraction to 5.94,
- and Blurriness of transparency to 10%.




We're done with the fine-tuning, let's run a final test render on the car!

This is the desired result. This completes the fine-tuning of the accessories.

### *Standalone rendering - Q2 - Cleaner, higher quality image*

Let's move on to the Q2 preset! Here we use the Standalone rendering.

- Activate the 3D window, then select the 01_street view.
- Select the Rendering - Standalone rendering command.
- Change the Resolution to 1920x1080 Full HD,
- And the render preset to Q2 - Cleaner, higher quality image.
- Start rendering!

# 8.4. Render effects

While the program is rendering, all the setting that influence the brightness, contrast and other settings of the final image can be modified on the **Effects** tab. It's best to start adjusting effects when the image is not so grainy and you can see what the effect of the adjustment will be on the image. These settings can be modified on the final result as well.

It is recommended to set the **Exposure** first, then the other values. Exposure should always be set so that the image is not overexposed out at any point. This modification is immediately visible during rendering.
Be careful using these effects, because setting them too high or low can result in an undesirable final image. For this reason, the values are only slightly adjusted in the first round.

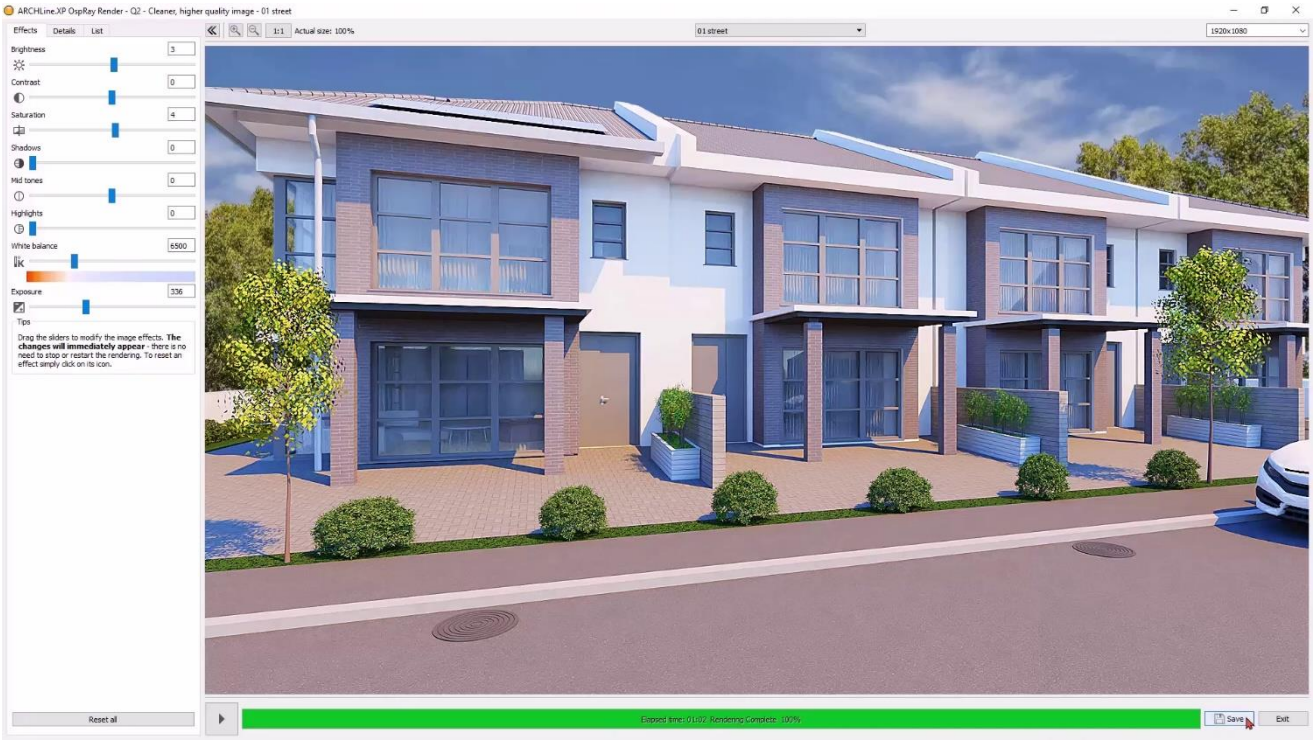
We can adjust the brightness of the image with the **Brightness**, lighten or darken it with **Contrast**, and enhance or diminish its vibrancy with **Saturation**.
The next three values are Shadows, Mid-tones and Highlights. These will only affect one value at a time.

- **Shadows** light up the dark parts.
- **Mid-tones** lighten or darkens the mid-tone parts. The effect is barely noticeable in the image.
- **Highlights** darken the bright parts.

The last value is **White balance**, allowing you to adjust whether the render image should have a cooler or warmer effect.

If you want to return to the default value at any of the settings, you just have to click on the icon of the setting next to the slider. To reset all the values, click on the **Reset all** button at the bottom of the tab.

In the sample project, apply the settings shown in the picture to get a great result:

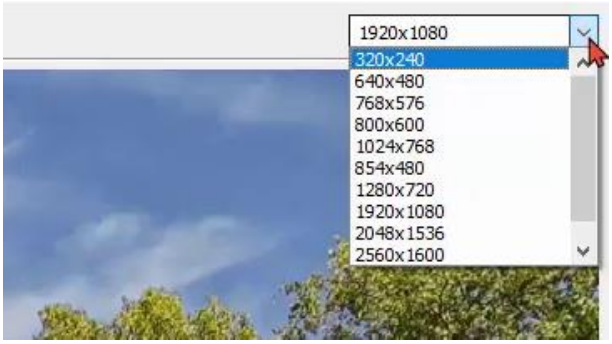



If you are satisfied with the result, you do not need to go further to the Qx render. Only choose the Qx render if justified, for example if there are many parallel elements close to each other in the project (e.g. thin decorative strips).
Save the render!

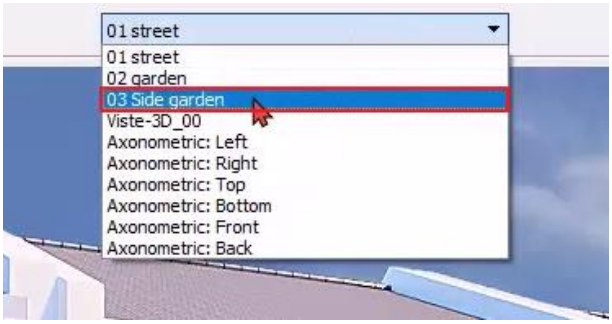
### *Resolution of rendering, different views*

Even if we want to create additional renders in other resolutions or views, we don't need to exit this render window.

- You can change the resolution by clicking on the arrow in the top right corner. The final render should be Full HD (1920x1080) resolution.



In the middle, you can select which views you want to render. That's why it's also worth saving views in the project in advance.

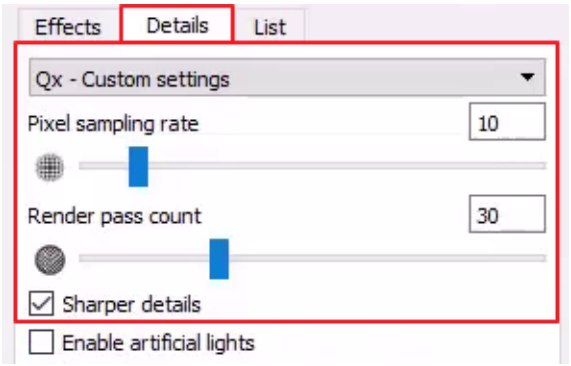



- Select the 03_side_garden view! The program will immediately start rendering.

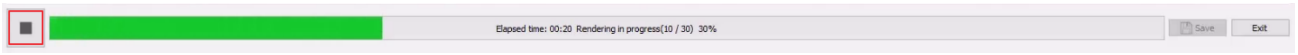
## 8.5. Rendering details

The *Details* tab in the top left corner has the same settings as the dialog at the beginning of the render.

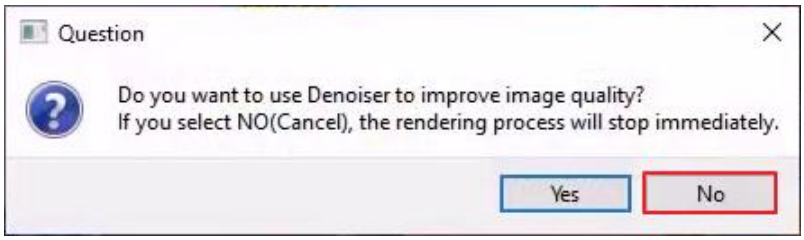
- Select Qx - Custom settings. Leave the Pixel sampling rate at 10 and the Render pass count at 30.
- With the Sharper details option turned on, we can immediately see the effect this setting has on the render.




- If the previous render has not been completed, click the "stop" button to stop it.




If a rendering is stopped before it reaches 50% completion, the program asks if you want to apply the noise filter. Now choose "No"!



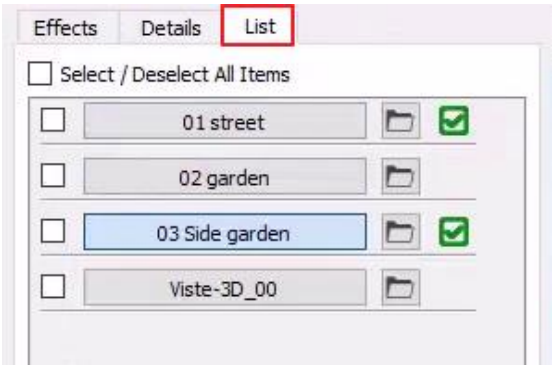

- Restart the rendering with these new settings by clicking on the Start button.

Click *Save* to save the finished image with a new name to a folder of your choice. You have the option to save multiple images of rendering stages with different settings, and you can also choose the format before saving. For your customers, it is recommended to send a JPG format file.

## 8.6. Render list

There is a third tab in the render window, the Render list. Creating the final images is a long process per image, and it is time consuming to save images and to switch to new ones, then launching a new rendering. Essentially, this process is automated by the rendering list.

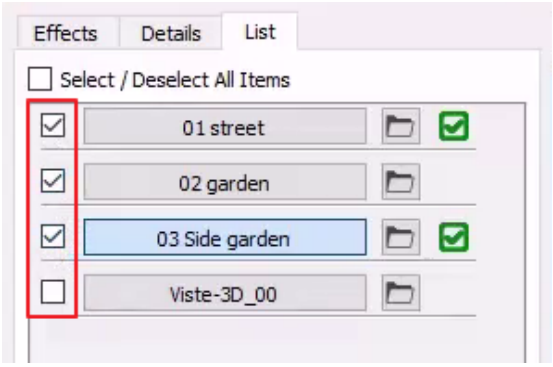
- Click on the **List** tab, this is a render list.
- The previously saved perspective views appear here.




- If you click on the name of another view, the program will start to render that view (image) with the current settings.
- If you go back to the **Effects** tab, you can change the settings of the current image.
- If you switch back to an image that you have already created (indicated by a green tick next to its name), the rendering will not start from the beginning, but will display the finished render with the settings you have already specified. Here you can further adjust the settings or change the resolution, then click "start" and the program will start creating the image again.

It is important to know that each given setting on Effects and Details pages and the image resolution can be independently defined for each view. Therefore, you can set different backgrounds or exposure; likewise, to real photography due to different materials and light conditions that might be necessary.

Once you have specified the effects, resolution and other settings for the views, you can start rendering multiple views at once in the Rendering list by selecting the checkboxes in front of the views and clicking START at the bottom.




The selected images are rendered with the settings and resolution previously selected for each image.

It is recommended to leave the computer “alone” after starting the final render list. No other programs should be run during the rendering process because it will increase the render time.

Let's take a look at the final render images!

Final render - Clear daylight

Final render - Cloudy daylight

Note the difference in light-shadow contrast on the building between the two images. In the first picture, taken with a clear daylight sky, the shadows are much more pronounced.

## 8.7. Rendering guide

As we have seen, creating a good photo-realistic image requires a longer process. You can create attractive, realistic images with a series of steps below.

1. Use the layers. Architectural elements and additional objects and elements should be on separate layers.

2. Set up 2-3 perspective views from which the scene can be well presented.
   Recommended values: Camera and subject at the same height (between 1.60 and 1.80 m), with an angle of view between 50 and 70 degrees.

3. Set a clear sun position. Turn on the shadows to display clear shadows, but not too strong. Make corrections. Run a quick preview render and if you don't like the scene, adjust the sun position.

4. Turn off all layers until you have a clean architectural model (phase 1). These will be the large surfaces in the scene, so you need to set their rendering first.

5. Use the drag and drop method to assign render styles to them as a starting point.

6. Create preview render. Based on the result, fine-tune the materials of the architectural elements.

7. Start the first standalone rendering. Use low resolution (max 800x600) in Q1 mode for a quick, preview image.

8. Focus on setting white surfaces.

9. Turn on the layers containing the accessories, small elements (phase 2) and do the same assignment.

10. Zoom in on the additional elements (e.g. car) and fine-tune the material properties if you don't like the result. Adjust brightness, reflections, and refraction, which should be fine-tuned initially. Always check the new setting with a new rendering.

11. If the test render is successful, it's time for the final render image!
    Choose a high resolution (Full HD, 1920*1280 or higher) and the Q2 preset, using QX if necessary: adjust the values according to the complexity of the scene. Rendering can take up to 60 minutes depending on your computer, the scene, and the chosen resolution. Higher resolution increases rendering time.

12. Use effects! Post-production is a key step in the rendering process performed by professionals. Adjusting parameters such as brightness, contrast, saturation and white balance can significantly improve the quality of the final image, for example, by making it warmer or cooler. Small changes of 5-10% can have a significant impact on the final scene.

13. Try out the sharper details function! Enabling the effect can create impressive, highly detailed images. Disabling it results in a softer, more subtle appearance.

Anyone who follows the above workflow will be able to generate high-quality photorealistic images. Of course, this guide cannot cover all the details, as rendering is a process that requires learning and experimentation with any rendering program.
However, the result will be a satisfied smile on the client's face, making it worthwhile to dive in.