ALLPLAN 2020
Architecture Tutorial

Architecture Tutorial

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Welcome

Welcome to Allplan 2020, the high-performance CAD program for architects.

In this tutorial workbook, you will learn about the most important tools in Allplan 2020.

You will find that within a short time you will be in a position to use Allplan 2020 effectively in your daily work.

This chapter covers the following:

- Contents of this tutorial
- Documentation for Allplan 2020
- Additional help on Allplan 2020
- Where to turn for training, coaching and project support

Introduction

The Architecture Tutorial expands on the Basics Tutorial. Based on six examples, the Basics Tutorial explains the principles of drafting and designing in 2D. In addition, you will learn how to get started in 3D modeling.

The aim of the Architecture Tutorial is to guide you with easy-to-follow steps from the planning of a residential building through construction in 3D to analyses of the building data. The Architecture Tutorial consists of 17 exercises, which are divided into nine units.

This tutorial will provide you with a sound introduction to Allplan 2020. As it only touches on the possibilities of some of the tools, please consult – especially later when you use Allplan 2020 – the **F1** Help as an important source of information.

You can download two project templates from Allplan Connect:

- A project template with the structures and settings (but not the design!) used in this tutorial.
- A project template with the data used in this tutorial so that you can compare your result with the data provided by us.

To find out how to install the project templates, see "Exercise 1: installing the project template and starting Allplan (on page 9)". To find out how to download the project templates from Allplan Connect, see the section "Project templates on the internet (on page 493)" in the appendix.

This tutorial assumes that you have a working knowledge of Microsoft® Windows® programs. Basic CAD-knowledge is helpful; however, this tutorial will provide both the experienced CAD user and the newcomer to CAD with a solid foundation in the methods used by Allplan 2020.

We would like to express our gratitude to the AIC architectural practice in Schöneich for providing us with one of their projects for this tutorial.

Sources of information

Documentation for Allplan consists of the following parts:

- The Help is the main source of information for learning about and using Allplan.
  While Allplan is running, you can get Help on the current tool by selecting F1, or activate **What's This** in the **Help** drop-down list (right side of the title bar) and click the icon on which you need Help.
- The **Manual** consists of two parts. The first part shows how to install Allplan. The second part is designed to provide an overview of basic concepts and terms in Allplan and introduce approaches for entering data in Allplan.
- The **Basics Tutorial** guides you step by step through the most important tools for designing and modifying elements in Allplan.
- The **Architecture Tutorial** guides you step by step through the process of designing a building. In addition, you will learn how to analyze the building data in reports and to print the results.
- The **Engineering Tutorial** guides you step by step through the process of creating key plans, general arrangement drawings and reinforcement drawings and shows you how to print the results.
- **New Features in Allplan 2020** provide information on what's new in the latest version.
- Each volume in the **Step-by-Step** series deals with a specific concept or series of tools or modules in Allplan in detail. The areas covered include data exchange, system administration, geodesy, presentation, 3D modeling and so on. As a Serviceplus member, you can download these guides as PDF files from the Training - Documentation area of Allplan Connect (http://connect.allplan.com).
- You can also find numerous publications on social networks.

Additional help

Tips for efficient usage

The **Help** drop-down list (right side of the title bar) provides **Tips for Efficient Usage**. This topic provides practical tips and tricks showing you how to use Allplan efficiently and how to carry out everything with ease.

User forum (for Serviceplus customers)

Allplan forum in Allplan Connect: Users exchange information, valuable tips relating to everyday work and advice on specific tasks. Register now at
connect.allplan.com

On the internet: solutions to frequently asked questions

You can find solutions to numerous questions answered by Technical Support in the comprehensive knowledge database at connect.allplan.com/faq

Feedback on the Help

If you have suggestions or questions on the Help, or if you come across an error, send an email to:
dokumentation@allplan.com

Training, coaching and project support

The type of training you are given is a decisive factor in the amount of time you actually spend working on your own projects: A professional introduction to the programs and advanced seminars for advanced users can save you up to 35% of your editing time!

A tailor-made training strategy is essential. Our authorized seminar centers offer an extensive range of programs and are happy to work out a custom solution with you that will address your own needs and requirements:

- Our **sophisticated, comprehensive seminar program** is the quickest way for professional users to learn how to use the new system.
- **Special seminars** are designed for users who want to extend and optimize their knowledge.
- **One-on-one seminars** are best when it comes to addressing your own particular methods of working.
- One-day **crash courses**, designed for office heads, convey the essentials in a compact format.
- We are also happy to hold seminars on your premises: These include not only Allplan issues but also analyses, process optimization and project organization.

For more detailed information on the current training program, please consult our online seminar guide, which you can find on our home page (http://www.allplan.com/training).

Feedback on the documentation

We are always trying to improve the overall quality of our program documentation. Your comments and suggestions are important to us, and we welcome feedback.

Please do not hesitate to contact us to express criticism or praise concerning the documentation. Feel free to contact us as follows:

Documentation

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Unit 1: Basics

You will start this unit by installing the **Allplan 2020 Architecture Tutorial** project template. After this, you will start Allplan, create a new project and make a few basic settings.

The **Allplan 2020 Architecture Tutorial**, which you can download from **Allplan Connect**, comes with a building structure consisting of structural levels and assigned drawing files. It provides predefined objects derived from the building structure, such as views, sections and reports. The project template contains four print sets. While working on the project, you can use these print sets to control which layers are visible.

By creating the project based on the project template, you can start designing the building right away without having to prepare anything.

If you want to create the project along with the building structure and print sets yourself, you can find a detailed description of the necessary steps in the appendix (on page 441) to this tutorial. The appendix also provides information on various interesting topics, such as layers, ProjectPilot, Actionbar configuration, building structure and many more.

If you do not want to work through the entire tutorial step by step, you can download the **Allplan 2020 Architecture Tutorial (with model)** project template from **Allplan Connect**. This project template contains the data of the finished project with all the drawing files, views, sections and various reports.

Look in the appendix for information on how to download project templates. Read the section ''Project templates on the internet (on page 493)''.

At the end of this unit, you will find a short troubleshooting section that you might find helpful.

Exercise 1: installing the project template and starting Allplan

Installing the project template

After having installed and configured Allplan 2020, you can install the **Architecture Tutorial** project template (with or without the model).

To install the project template

➲ Allplan 2020 must be installed, registered and configured correctly. After having installed Allplan, start Allplan to check whether it works properly.

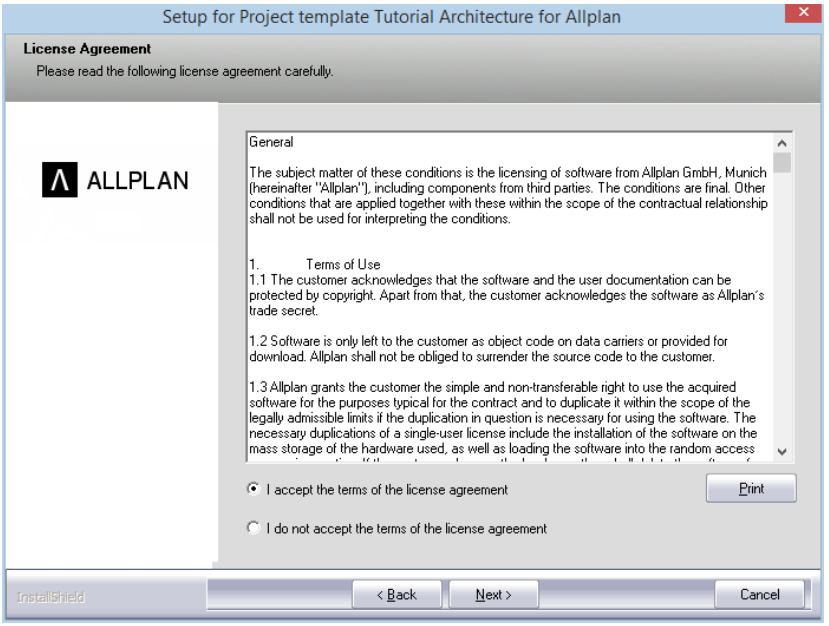
➲ You downloaded the **Allplan 2020 Architecture Tutorial** project template from Allplan Connect. You saved it to a folder of your choice and extracted it.

1 Close all running applications.

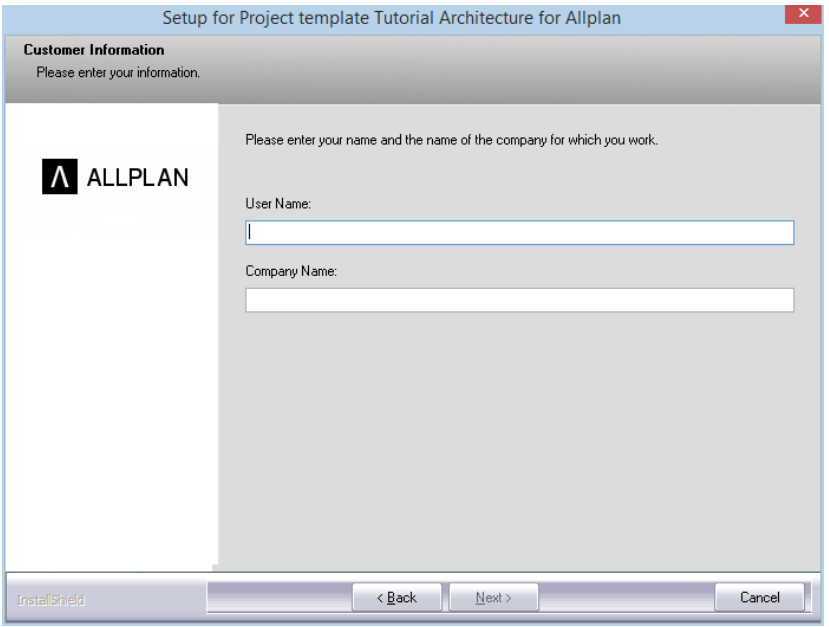
2 Double-click the extracted application and click **Run** in the dialog box.

3 Click **Next >** to confirm the Welcome screen.

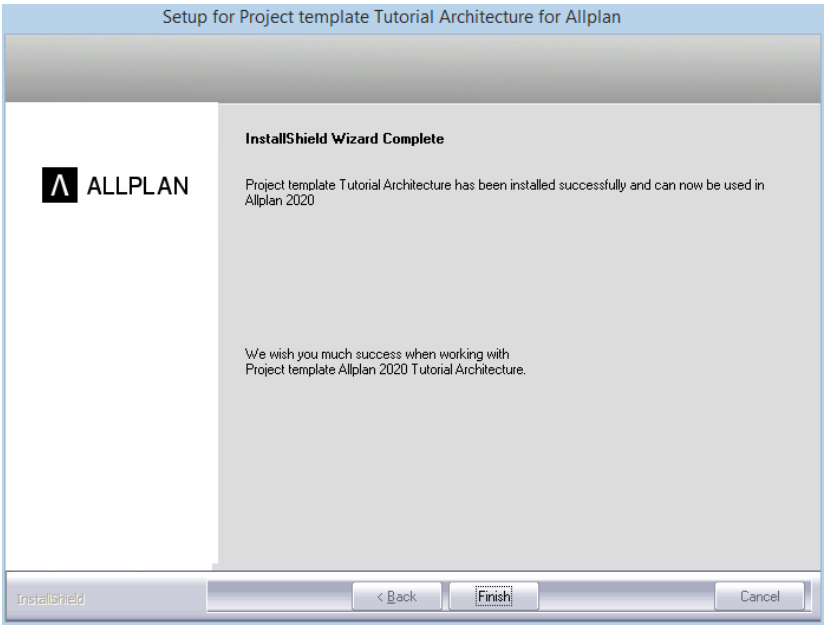
4 Read the license terms carefully and accept them. Click **Next >**.



5 Enter your name and that of your company.
Click **Next >** to confirm.



6 Finally, click **Finish**.



Starting Allplan and creating the project

You have already installed Allplan 2020 and the **Architecture Tutorial** project template on your computer. Now you want to start working.
To do this, start Allplan 2020 and create the project.

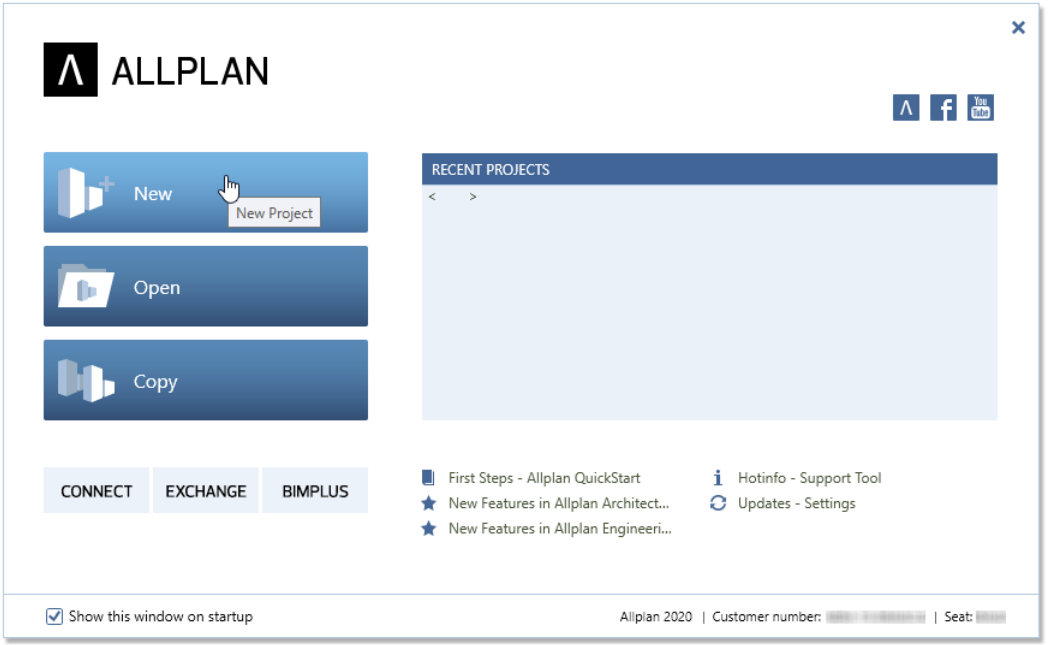
To start Allplan and use the project template

1 Go to the Windows Start menu, point to **Allplan** and click **Allplan 2020**.

Or

Double-click **Allplan 2020** on the desktop.

2 After having started Allplan 2020, you can create a project straight from the **Welcome screen**. Click the corresponding tool.



If you have turned off the Welcome screen, click **New Project, Open Project** on the Quick Access Toolbar. The **New Project, Open Project** dialog box opens. Click **New Project**.

3 Enter **Architecture Tutorial** for the project name. If you want, you can choose your country in **Country-specific templates**. Select the **Allplan 2020 Architecture Tutorial** project template and click **Finish**.

The project opens.

Basic settings

Settings on the Actionbar

The Actionbar configuration is the default setting in Allplan 2020. This configuration shows the **Actionbar** above the workspace. In addition, you can see the **Properties**, **Wizards**, **Library**, **Objects**, **Planes**, **Task Board**, **Connect** and **Layers** palettes on the left side.

Note: You can find detailed information on the Actionbar configuration in the appendix (see "Actionbar configuration" on page 479) to this tutorial and in the Help for Allplan 2020.

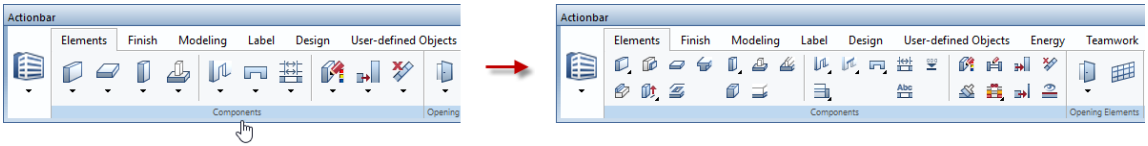
You will use the tools in the **Components** task area for the first exercises. Start by making settings on the **Actionbar**.

To make settings on the Actionbar for the exercises that follow

1 Select the **Architecture** role.

2 Open the tab of the **Elements** task.

3 The **2D Objects** task area is still minimized. Maximize this task area so that you can access its tools quickly.
To expand the task area, double-click within the name line of the task area.



Note: You can maximize or minimize **all** task areas of the task currently selected by selecting and holding the Ctrl key while double-clicking within the name line of a task area. You can expand or collapse **all** areas **across tasks and roles** by selecting and holding Ctrl+Shift while double-clicking within the name line of a task area.
The width of the Allplan window defines how many task areas

can be maximized. If the window is not wide enough, Allplan starts on the left side, maximizing as many task areas as possible.

Note: The **Actionbar** is docked to the top of the working area. If you want, you can drag the Actionbar to the bottom and dock it there. You can also make the **Actionbar** float anywhere on your screen. By double-clicking, you can dock it to the place where it was docked last.

Track tracing

Track tracing helps you design intuitively. You work with fixed measurements in most of the following exercises. Therefore, you can turn off track tracing, which is on by default.

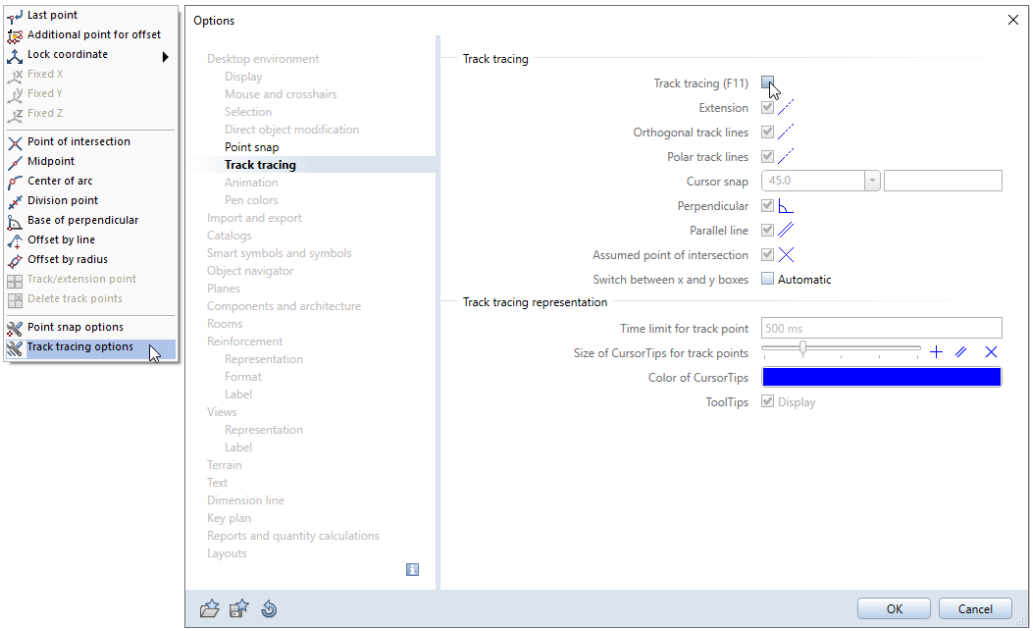
To turn track tracing on and off

1 Click **Line** (**Draft** role – **Design** task – **2D Objects** task area or **Architecture** role – **Elements** task – **Quick Access** task area).

2 Right-click in the workspace and select **Track tracing options** on the shortcut menu.

Tip: You can quickly turn track tracing on and off at any time while entering points. Just select the **F11** key or click **Track line** in the dialog line.

3 Turn **Track tracing** off.



4 Click **OK** to confirm the settings and select ESC to close the **Line** tool.

5 Repeat these steps if you want to turn track tracing on again.

How to

Sometimes, things will not immediately work out as required. This list helps you succeed.

What if ...

- **... I have selected the wrong tool?**
  Select the ESC key and click the correct icon.
- **... I make a mistake as I go along?**
  Select the ESC key to cancel (you might have to do this several times).
  Click **Undo**.
- **... I have inadvertently deleted the wrong elements?**
  If **Delete** is still active, right-click twice.
  If no tool is active, Click **Undo**.
- **... I have unintentionally opened a dialog box or entered wrong values?**
  Click **Cancel**.

And what if ...

- **... the workspace is empty but you are sure the drawing file contains design data?**
  - Click **Zoom All** (viewport toolbar).
  - Click **Plan**.
- **... the workspace is suddenly divided into a series of different viewports?**
  Click **1 Viewport** (**Window** drop-down list on the Quick Access Toolbar).

Tip: Check whether the relevant layer is visible.

- **... specific kinds of elements such as text or hatching do not appear in the workspace?**
  Click **Show/Hide** (**View** drop-down list on the Quick Access Toolbar) and check that the relevant element type is selected.

Unit 2: Building Design

➲ The exercises in this unit require the **Architecture** role on the **Actionbar**.

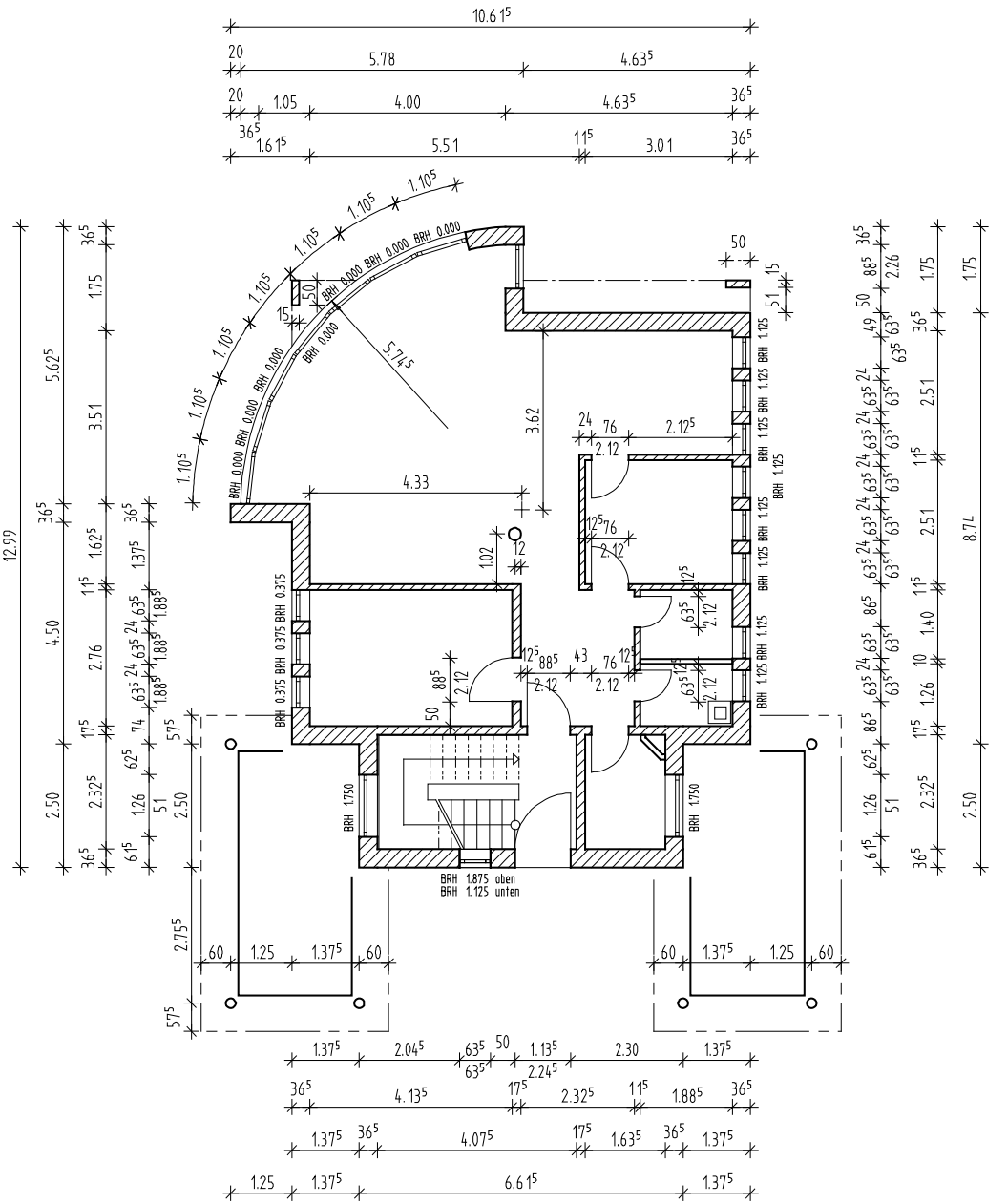
In this unit you will draw a residential building in 3D. Allplan will generate the three-dimensional building model as you work.

You will create the ground floor, the upper floor and the basement one after the other.

This unit teaches you how to handle the most important tools (wall, column, door, window and slab) in architecture. You will also find out how to apply SmartParts and how to dimension the floor plan.

Work your way through the exercises step by step.

Exercise 2: ground floor



Settings

When creating components, you must define a number of settings, for example, **Fixed pen for component hatching** (**Fixed pen for surface elements of archit. elements** option).
You can find these settings in the **Options** on the **Components and architecture page** in the **Architectural settings across modules** area.

To define basic settings

➲ The **Architectural Tutorial** project is open.

➲ **Options** (**Default Settings** drop-down list on the Quick Access Toolbar) – **Desktop environment** page – **General** area: The **Enter lengths in** option shows the unit **m**.

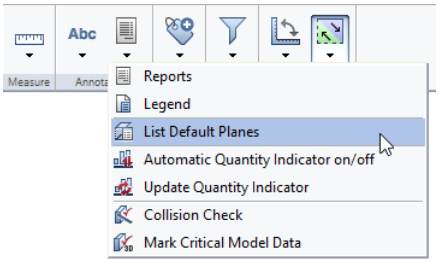
➲ **Actionbar**: **Architecture** role – **Elements** task.

1 Click **Open on a Project-Specific Basis** (Quick Access Toolbar).

The **Building structure** tab is open.

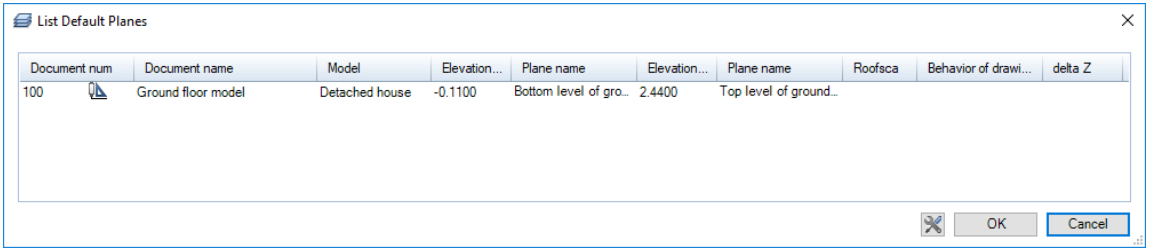
2 Make drawing file **100 Ground floor model** current and close all the others. Click **Close**.

3 Check the height of the drawing file. Click **List Default Planes** (**Annotations** task area).



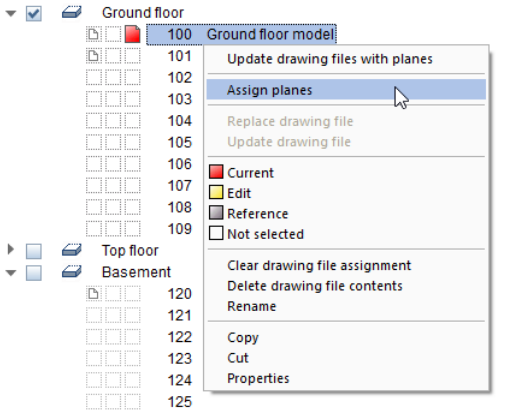
The **List Default Planes** dialog box opens. Check the height settings of drawing file **100**:

- **Elevation at bottom**: -0.1100
  Plane name: Bottom level of ground floor
- **Elevation at top**: 2.4400
  Plane name: Top level of ground floor

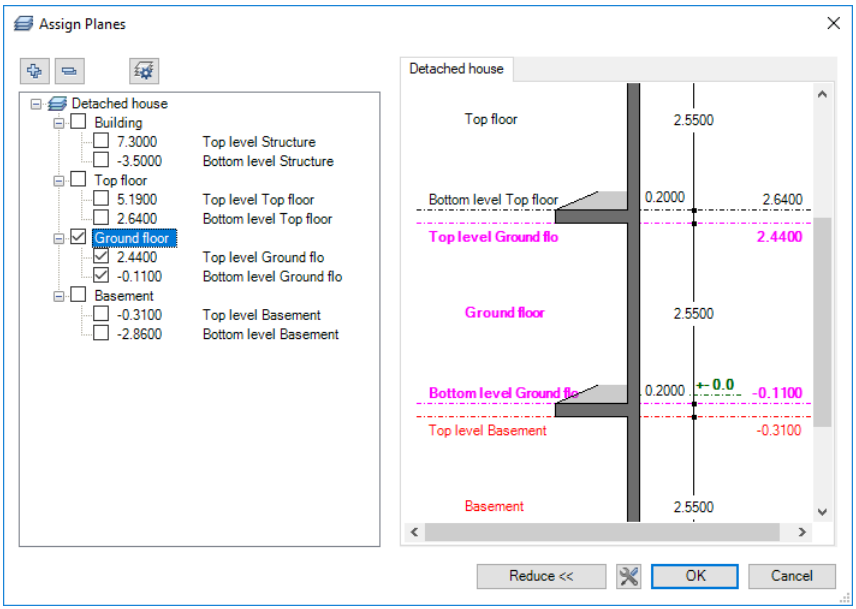


4 Close the **List Default Planes** dialog box.

Note: If the height settings of the drawing file are **not** correct, click **Open on a Project-Specific Basis** and select the **Building structure** tab. Open the shortcut menu of drawing file **100** and click **Assign planes**.



Make height settings for the ground floor in the **Assign Planes** dialog box.



Click **OK** to close the **Assign Planes** dialog box.

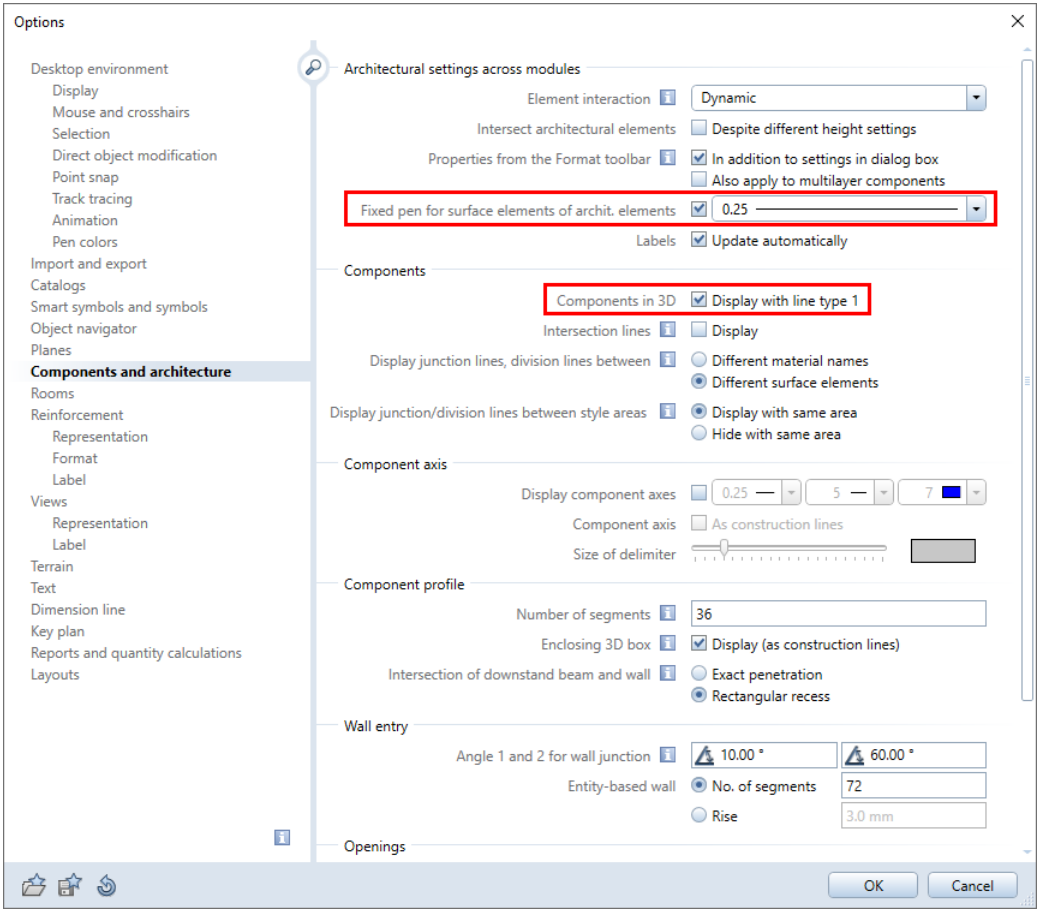
Click **OK** to confirm the **Behavior of drawing files** dialog box without activating an option, as the drawing file is still empty.

Close the **Open on a project-specific basis: drawing files from fileset/building structure** dialog box.

5 Open the **Default Settings** drop-down list on the Quick Access Toolbar and click **Options**. Select the **Components and architecture** page.

6 In the **Architectural settings across modules** area, select the **Fixed pen for surface elements of archit. elements** option and select the hatching pen: **10.25**.

7 In addition, select the **Display components with line type 1 in 3D** option in the **Components** area.



8 Click **OK** to close the options.

9 Check the **Reference Scale** (status bar). It is **1:100**.

Walls

Note: The following sections cover the essentials for drawing walls. If you want to skip these sections and just start drawing, continue as described in "Straight exterior walls (on page 28)"

General information

You can use the Wall tool to draw different types of walls:

- Straight walls
  The approach is the same as with the Line tool in 2D design.
- Rectangular walls
  You can create four straight walls in a single operation – this works just like the Rectangle tool in 2D design.
- Curved walls
  A polyline is used to approximate the circle: This results in short, straight wall sections that can be addressed as a single entity.
- Circular walls
  Use this to draw walls as you would a Circle in 2D design. You can enter full circles and arcs. A polyline is used to approximate the circle.
- / Polygonal walls
  As with curved walls, you can use this to draw walls with any number of corners, delimited by an arc. A distinction is made between walls that are "inscribed in" and "circumscribed about" an imaginary circle.
  Inscribed means that the first segment and last segment have half the length of a segment. The division is at a tangent to the circle you enter when defining the geometric outline.
  Circumscribed means that the first segment and last segment have the length of a normal section. The division is on a secant with the circle you enter when you define the geometric outline.

- **Entity-based walls**
  This draws walls based on 2D entities (for example, lines, polylines, splines) or composite elements. The wall is drawn along the donor element, which has no effect on the donor element itself.
- **Spline-based walls**
  Use this to draw walls as you would a **Spline** in 2D design.

Clicking **Properties** displays a dialog box in which you can define the walls more precisely. Enter values for the height of the wall, its thickness and elevation. You can also define additional properties such as the building trade, material, priority rating, element interaction, format properties (pen, line, color) and surface properties (hatching style, pattern or fill).

Previews keep you informed about the wall structure, showing how the wall looks in the standard views and in the **Wireframe**, **Hidden** and **Animation** view types.

Note: To save time, define the materials and other attributes when you enter the walls. Allplan uses the information you define here for subsequent analyses and reports based on the building model. Of course, you can also assign materials and attributes at a later time. Materials can be transferred directly from applications used for tendering, awarding and invoicing.

Walls are generally drawn like the base 2D entities. For example, you draw a straight wall just as you would a straight line – all the construction aids available when you draw a line are also available when drawing a wall.

The only other thing you need to do is define the wall's offset direction and enter **Properties** for the wall in the dialog box. The standard approach is to define the height of the wall based on reference planes: Define the height of the default planes once. All the walls associated with these planes are automatically correct.

Other wall types

The wall types listed are complemented by walls of a freeform outline or cross-section (profile walls). Moreover, various automation tools are available. You can use these tools to generate walls with one or more construction layers on the basis of lines (sketches, for example), parallel lines (for example, 2D outlines) or based on rooms that you have already defined by using 2D floor plans or scans of drawings. Thus, you can quickly convert a 2D design to a complex 3D building model.

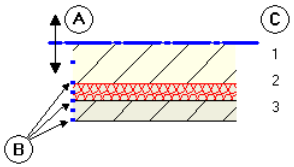
Component axis

Components are entered along their **component axis**. The wall's **offset direction** depends on the position of the component axis, the direction in which the wall is entered and the position of the first construction layer in the wall.
Click **Reverse offset direction** (**Wall** Context toolbar) to change the wall's offset direction.

You can position the **component axis** as follows:

- Centered in or on the sides of the entire component (wall as a whole)
- Centered in or on the sides of each construction layer
- At a freely definable distance to a component edge (wall edge)

Small boxes in the preview indicate the positions you can select.



A Component axis
B Possible positions on the sides of or centered in the layer or entire wall
C Number of layers

You can place the component axis in several ways:

- Intuitively
  Use the mouse to move the axis: The cursor becomes a double arrow, and the component axis will snap to the positions marked by small black boxes. The values to the left side of the preview show the distances to the edges.

  The following positions are predefined:
  Left edge of component or layer
  Right edge of component or layer
  Center of component or layer
- Freely by entering values
  Click one of the boxes to the left of the preview. Enter any value defining the distance between the axis and edge of the wall. The program automatically calculates the value for the other side.

Offset direction of components, single-layer walls

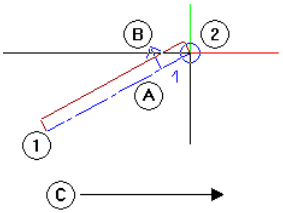
Components are entered along the component axis. Depending on the **axis' position within the component**, you can use the offset direction to specify on which side of the component axis (relative to the direction in which the component is entered) the component is drawn. With **Reverse offset direction**, you have the option to "tilt" the wall or to reverse the setup of the construction layers.

Tip: By means of the offset direction, you can quickly switch between inner and outer dimensions when entering walls.

The direction is indicated by an arrow and the position of the first construction layer. You can turn these symbols on and off by using the **Symbols when entering walls** option in the **Point snap options** – **Point snap representation** area.

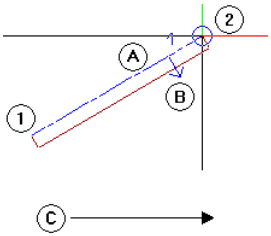
Depending on the position of the component axis, the following options are available:

- Single-layer wall, lateral component axis:



1 Starting point of component
2 End point of component
A Component axis
B Offset direction
C Direction in which you enter the component

After clicking **Reverse offset direction**:



1 Starting point of component
2 End point of component
A Component axis
B Offset direction
C Direction in which you enter the component

- Single-layer wall, centered component axis:
  Clicking **Reverse offset direction** does not make any difference.

Designing walls

Basically, four factors define the three-dimensional, architectural component called wall:

- Starting point
- End point
- Offset direction defined by the position of the component axis (= line between the starting point and the end point) in the wall
- Height or connection with the default planes

To ensure that the wall is true to scale, you can define its thickness and apply a hatching or fill.
You can also specify additional parameters such as a material and building trade.

Straight exterior walls

The exterior walls on the ground floor will be made of **brick** and will be **36.5** cm thick. Start by defining the component parameters.

You must also define which attributes can be entered for walls and which catalog can be used for the materials. In this tutorial, you will use populated drop-down menus for materials to which you can progressively add entries.

To define properties

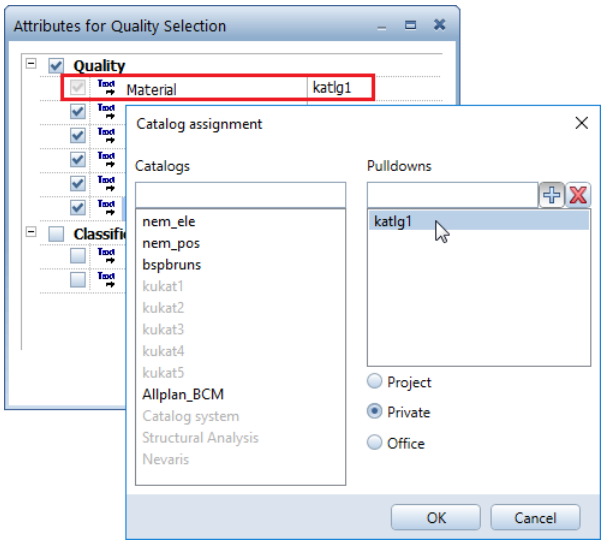
➲ **Actionbar**: **Architecture** role – **Elements** task. The **Components** task area is expanded.

1 Click **Wall**.

2 Click **Properties**.

Tip: You can modify the component properties of walls (and other architectural elements of the same type) at any time. Use the **Apply Archit. Component Properties** tool. You can modify elements in the same way as you create them.

3 Open the **Parameters, attributes** tab and click the button beside **Catalog assignment**.
Material is automatically selected in the **Attributes for quality selection** dialog box; further attributes are not required.
Next, click the **Material** line in the right column and select **katlg1** in the **Drop-down menus** area of the **Catalog assignment** dialog box.
Click **OK** to close the dialog boxes.



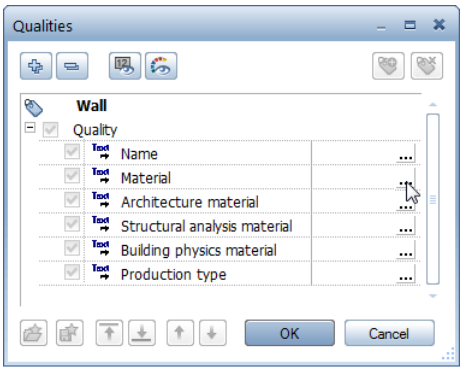
4 Enter the following information:

- In the **Number of layers** area, select one layer.
- In the **Positioning axis** area, drag the component axis to an edge of the wall in the graphic.

The position of the **component axis** controls the wall's offset direction. The component axis can be on a side of the wall or anywhere within the wall.

5 Enter the following information on the **Parameters, attributes** tab:

- In the first row, click within the **Material/qualities** column.
  If multiple **Qualities** are active in the **Catalog assignment** dialog box (see step 3), the following window appears. If only one **Quality** is selected, you can enter the material directly.



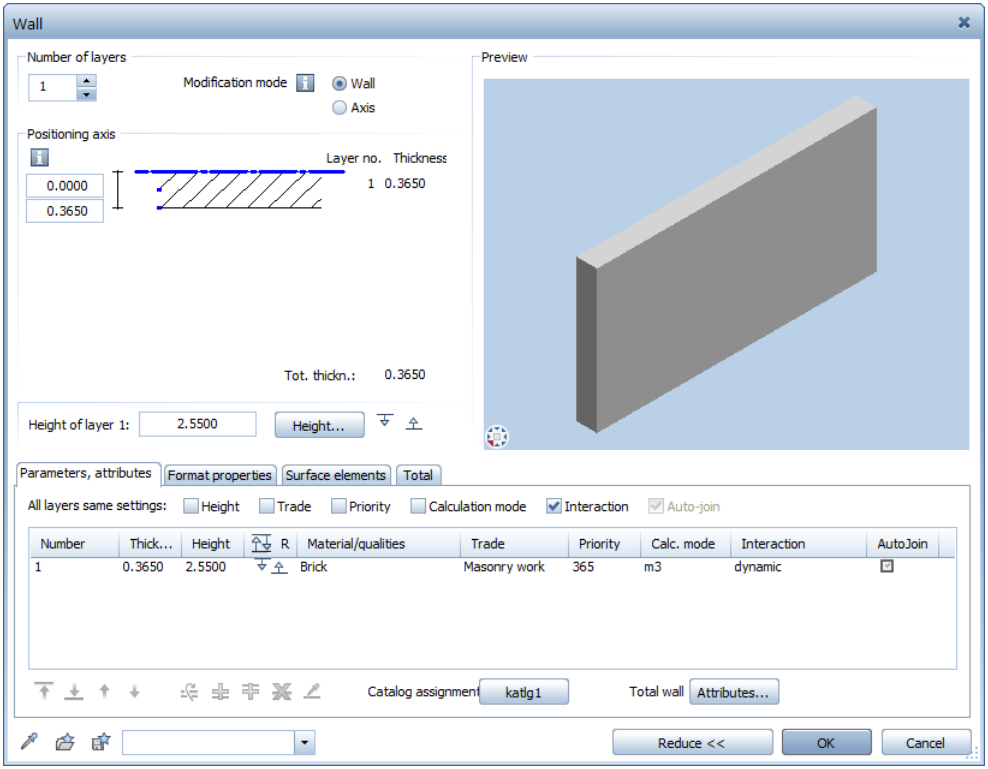
- Click ... in the **Material** row in the **Qualities** dialog box.
- Click in the **Material** list box, enter **Brick** and click **OK** to confirm.
  This selects the entry 'brick' and adds it to the list.
- Click **OK** to confirm the **Qualities** dialog box.
- Enter the **Thickness**: **0.365**.
- Click below **Trade** and select **Masonry work**.
- Click within the **Priority** column, add **365** to the list and select this new entry.

Tip: When defining the wall's **priority** rating: thickness of wall in mm.

The **Priority** rating controls the way components intersect. Components with a lower priority rating have a 'hole' cut in them where they are intersected by other components. This ensures that these areas are not counted twice in subsequent quantity takeoffs.

- For **Calculation mode**, select **m³**.
- For **Interaction**, select **dynamic**.
- Select the **Auto-join** check box.

The **Wall** dialog box now looks like this:

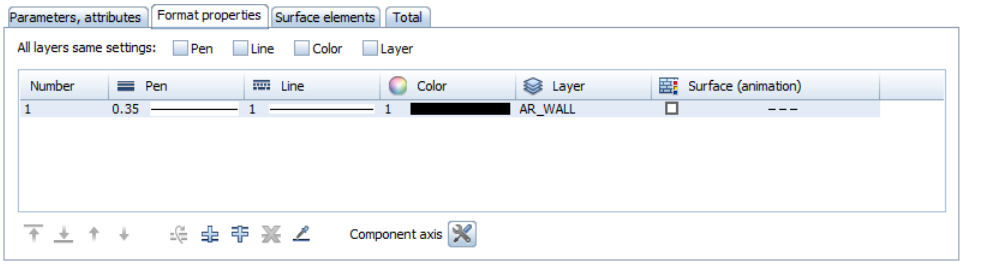


6 Enter the following information on the **Format properties** tab:

- Select pen (2) **0.35** and line type **1**.
- Select color **1** (**black**) and the **AR_WALL** layer.

An **animation surface** is not necessary at the moment.

The **Format properties** tab now looks like this:

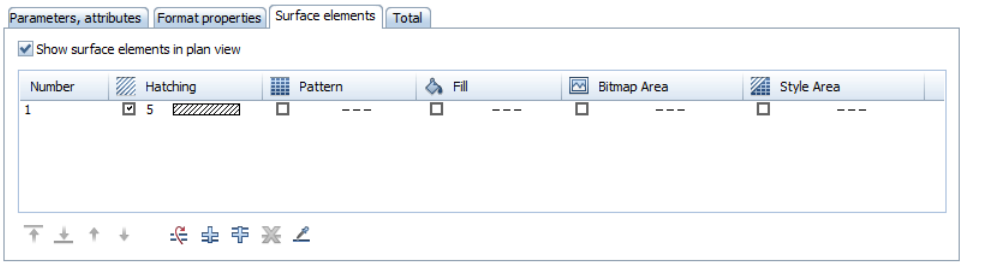


Note: The settings in the **Properties** palette – **Format** area have no effect on the format properties of walls.

7 Enter the following information on the **Surface elements** tab:

- Select the **Hatching** check box.
  Click to the right of the check box in the area with the hatching and select hatching style **5**.

The **Surface elements** tab now looks like this:



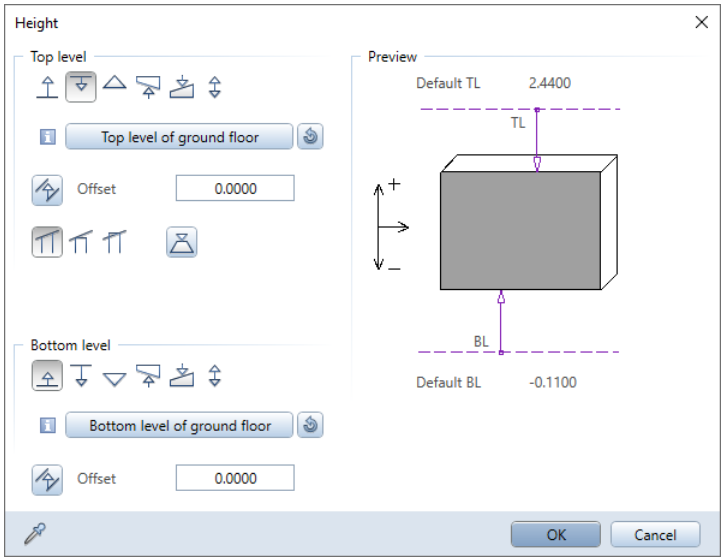
Tip: The parameters you define in this dialog box are valid until you change them.

8 Now click the **Height...** button and enter the height. Define the top and bottom levels of the wall so that they are attached to the upper and lower default reference planes respectively.

- **Top level**: Click **Relative to upper plane** and enter **0** for the **Offset**.
  As a result, the wall is flush with the upper default reference plane. You can ignore the slab for the time being. By using a separate drawing file, you will create it later between the top level of the ground floor and the bottom level of the first upper floor.

- **Bottom level**: Click **Relative to lower plane** and enter **0** for the **Offset**.

Tip: With multilayer walls, attach each layer to the default planes separately. So, you can also define a different offset between each layer and the planes!



9 Click **OK** to confirm the **Height** and **Wall** dialog boxes.

Tip: Select **F1** for more information on the **Wall** tool. This will display the relevant topic in the Allplan Help.

Entering data in dialog boxes

- To enter a value, click in the box. Enter the value at the keyboard and select the ENTER key.
- Existing entries are found during input and proposed in the box. Select ENTER to accept the data proposed.
- To enter and add values in custom list boxes, click first.
- To apply entries, click **OK**.
- To discard entries, click **Cancel** or select ESC.

Drawing straight walls

When all the parameters have been set, you can draw the walls. In this exercise, the values are outside dimensions. Therefore, the wall's offset direction is toward the interior.

To draw straight walls

1 Choose the wall type by clicking **Straight Component**.

2 *Set properties, place start point*
Click where you want the wall to start.

The wall is attached to the crosshairs.

3 Check and define the wall's offset direction:

- You defined a lateral wall axis in the **Wall** dialog box. The axis of a straight wall is simply the line you enter.
- The values are outside dimensions (see illustration).
Start drawing a horizontal wall on the left side. As the starting point is on the outside, the wall's offset direction is upward (= toward the inside; see arrow in the following illustration).
- Check the preview at the crosshairs. The small arrow points upward (= toward the inside).
- If the arrow does not point upward, change the wall's offset direction by clicking **Reverse offset direction** on the **Wall** Context toolbar.

4 Enter the dx length in the dialog line: **1.25**.

Note: If the system prompts you to enter Δy, either click the Δx box or select the TAB key, which takes you to the next box.

Tip: In the section that follows, you will use the keyboard to enter walls alternately in the x-direction and in the y-direction. So that you do not have to select the Tab key to switch between the boxes, you can select the **Switch between x and y boxes automatically** option on the **Desktop environment - Track tracing** page of the **Options**. However, this will only work if track tracing is off.

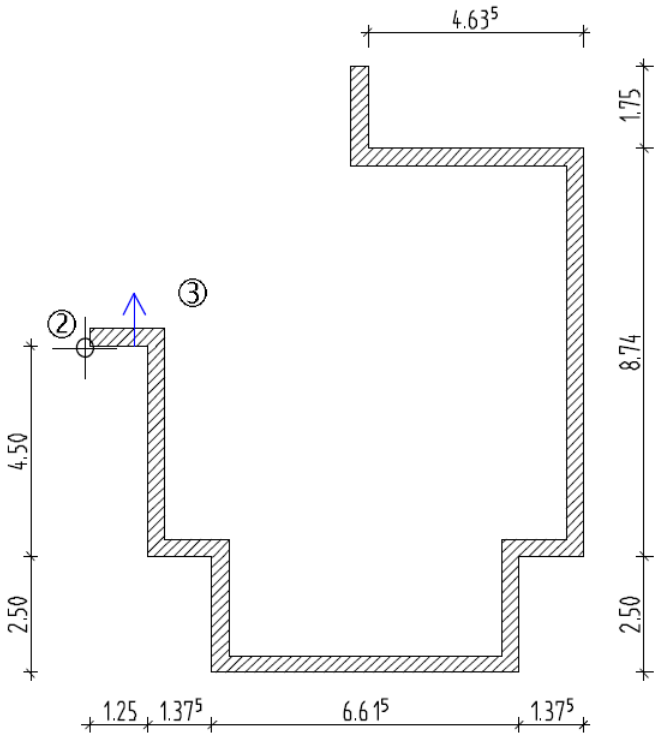
Tip: While entering elements, you can quickly change the component axis by means of **keyboard shortcuts** or **in the dialog line**. Look in the Allplan Help for detailed information on changing the component axis by means of keyboard shortcuts.

Now draw the next walls as you would a polyline, entering values for the length of the walls along the x-axis and y-axis:

Tip: If you cannot see the whole drawing, click **Zoom All** on the viewport toolbar.

5 Enter the following values:

dy:	-4.5	dx:	1.375
dy:	-2.5	dx:	6.615
dy:	2.5	dx:	1.375
dy:	8.74	dx:	-4.635
dy:	1.75		



6 Select ESC to finish entering the wall and to close the tool.

Curved walls

The plan (which is not yet closed) needs to be completed with a curved wall. To do this, you can use the **Curved Wall** tool. A polyline is used to approximate the circle: This results in short, straight sections of linear components that can be addressed as a single entity.

In addition to the wall's end points and its offset direction (as with a straight wall), you need to specify the arc's direction of extension and the radius.

To draw a curved wall

➲ Use to get a close-up view of the area where the curved wall is to be drawn.

1 Use the right mouse button to double-click a wall that you have already drawn. This selects the **Wall** tool and changes the properties to those of the wall you clicked.

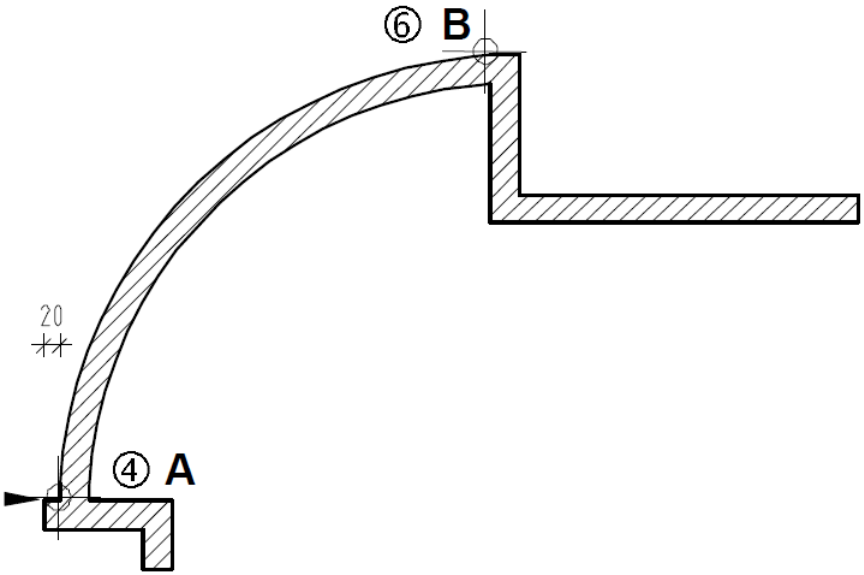
2 Click **Properties**.
Change the **Priority** to **300** on the **Parameters, attributes** tab and click **OK** to confirm.

When walls have the same priority, the latest one has priority over the older one. So that the ends of the curved wall do not "cut off" the ends of the existing straight walls at the points where they meet, define the curved wall's priority rating so that it is lower than that of the straight walls.

3 Select the **Curved Component** wall type. Use the **Division** parameter on the context toolbar to enter the number of segments to be used by the program to approximate a full circle: **120**.

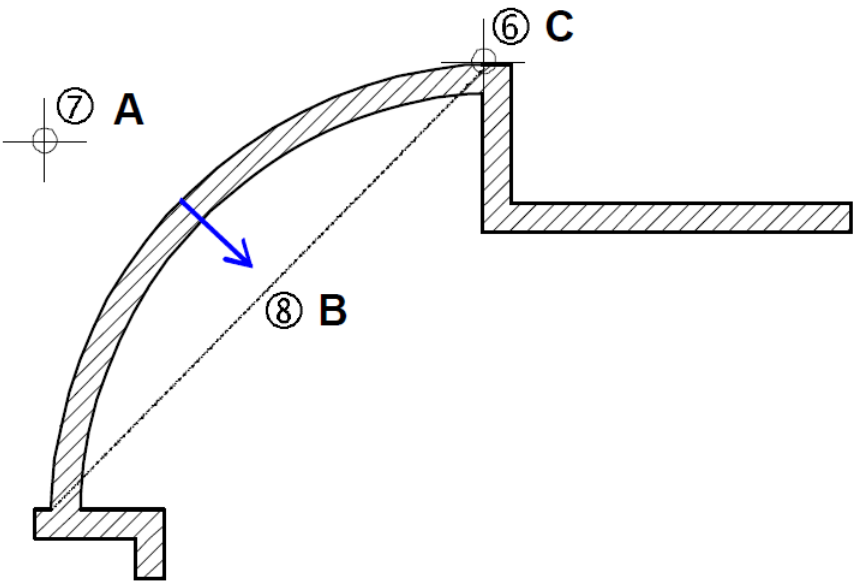
4 To place the starting point (**A**) of the wall, click the wall line (but do **not** click a wall corner!).
You can see reference point.

5 If it is not already there, move the reference point onto the left corner of the wall and enter an offset of **0.2**.



6 Now click the other wall's end point (**B**).
A straight line appears – this will serve as the reference line for the wall's offset direction and the arc's direction of extension.

7 Place a point so that the arc's direction of extension is toward the outside.



A = Arc's extension point
B = Wall's offset direction
C = End point

Tip: When the wall's offset direction and the arc's extension point are on the same side of the secant: The inside of the wall defines the secant.

When they are on opposite sides, the line on the outside of the wall defines the radius.

8 The wall's offset direction is toward the inside. Check the arrow in the preview. If the wall's offset direction is not correct, change it by clicking **Reverse offset direction**.

9 *Parameter, radius, center of circle*
Enter the radius: **5.745**. Select ENTER to confirm.

10 The line representing the outside of the wall appears so that you can check the radius. Select ENTER again.

11 Select ESC to finish drawing the wall and to close the tool.

Defining the radius, center of circle

- Radius: The system will propose the value that was entered last or a value that is equivalent to at least half the distance between the wall's starting point and end point.
- Midpoint: As an aid to orientation, a perpendicular bisector appears on the secant with the proposed center.

Definition options

- Accept the radius proposed by the system by selecting ENTER.
- Enter a value at the keyboard and select ENTER.
- Point and click: Click a point on the perpendicular bisector or another defined point.
  The center then becomes the point at the base of the perpendicular between the point clicked and the perpendicular bisector.
  You can see the radius in the dialog line; select ENTER to confirm.

Note: Look in the Allplan Help for a list of possible combinations of the wall's offset direction and the arc's direction of extension.

Assigning layers

Now it makes sense to mark the center of the curved wall with a symbol and to dimension the center, as you will need this point again.

You will assign a special layer to the center so that you can show and hide it later.

In the case of point symbols and other design entities like lines, rectangles, and circles, layers are not assigned in the **Properties** dialog box (as opposed to walls).

In general, the appropriate layer for the selected tool is activated automatically!
If it isn't, do the following.

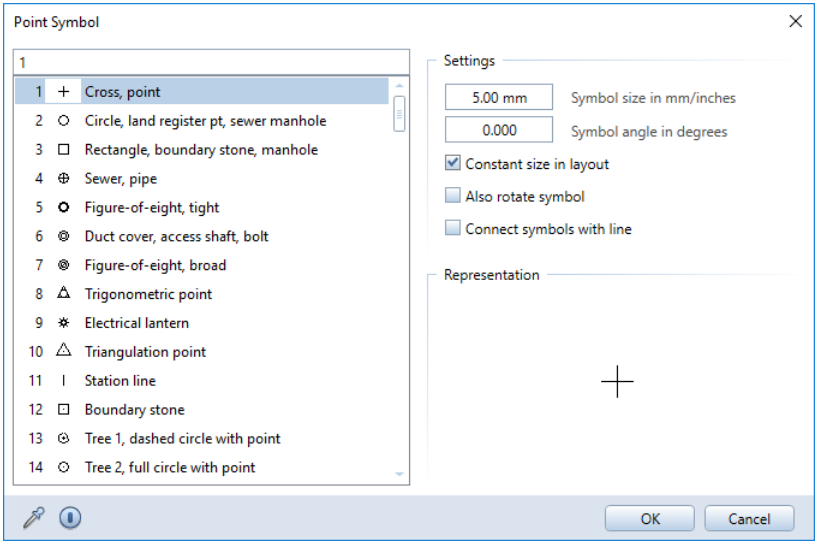
- Open a tool
- Select a layer in the **Properties** palette – **Format** area
- Draw

After you have opened the **Point Symbol** tool, the first step is to select the symbol. Then you select the layer. Finally, you place the point symbol with the layer selected.

To select the current layer

1 Click **Point Symbol** in the **Quick Access** task area.

2 Select the first symbol (**1 Cross, point**), switch the **Symbol size** to **5 mm** and select the **Constant size in layout** option. Click **OK** to confirm.

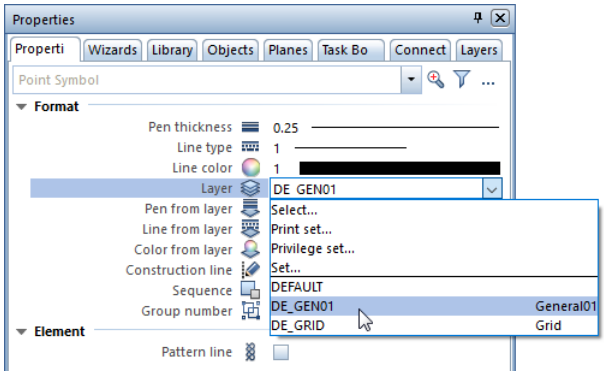


Tip: To get an overview of the layers you have already used, switch to the **Layers** palette, open the shortcut menu and click **List layers used in open documents**. (You can also open the **Select, Set Layers** tool, switch to the **Select Layer/Visibility** tab and select the **List layers used in open documents** option. To access this tool, open the shortcut menu in the workspace.)

3 Open the **Properties** palette.

4 Go to the **Format** area, open the **Layer** drop-down list and select the layer **DE_GEN01**.

5 If you cannot find this layer in the list, click **Select...** and double-click the layer **DE_GEN01** in the **Single layer selection** dialog box.



6 Place the symbol on the center of the curved wall and select ESC to close the tool.

Dimensioning the center of the curved wall

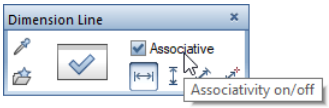
The dimension lines will also get a special layer so that they can be hidden later.

In the case of dimension lines, layers and other format properties like pen, line and color are assigned in the **Properties** dialog box (as with walls or upstands).

To create horizontal and vertical dimension lines

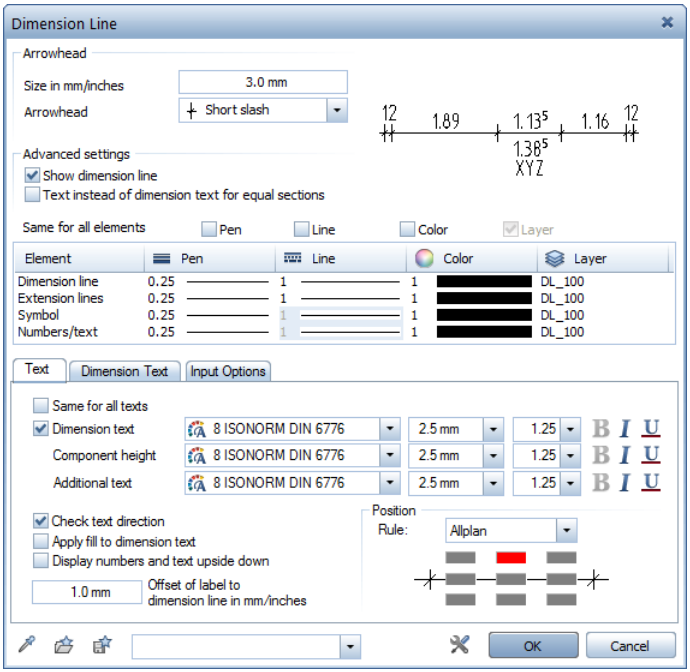
1 Click **Dimension Line** in the **Quick Access** task area.

2 Select the **Associative** option on the **Dimension Line** Context toolbar.
This ensures that Allplan updates the dimensions automatically when you change something.

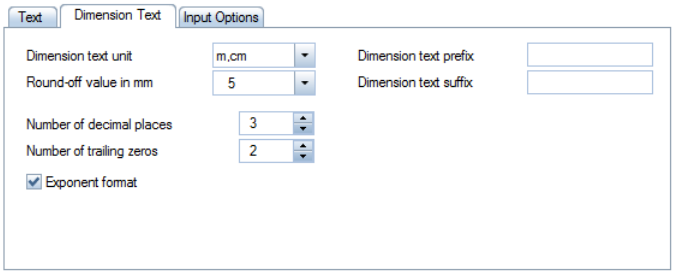


3 Click **Properties** and make the following settings:

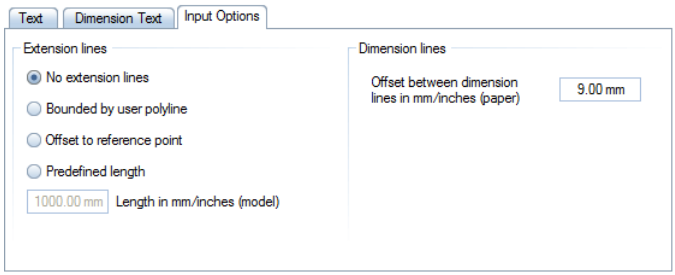
- Select the layer **DL_100**.
- Select the Allplan font **8 ISONORM DIN 6776** (**Text** tab).
- In the **Position** area, select the **Allplan** rule and place the dimension text centered above the dimension line.



- Switch the dimension text unit to **m, cm** (**Dimension Text** tab).



- Select the **No extension lines** option (**Input Options** tab).



- Enter the other settings as shown.

4 Click **OK** to confirm the settings and dimension the center of the curved wall with **Horizontal** and **Vertical** dimension lines. See illustration at the end of the next section.

To dimension the radius

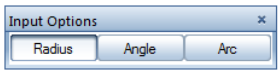
1 To dimension the curved wall, click **Curve Dimensioning** (**Quick Access** task area).

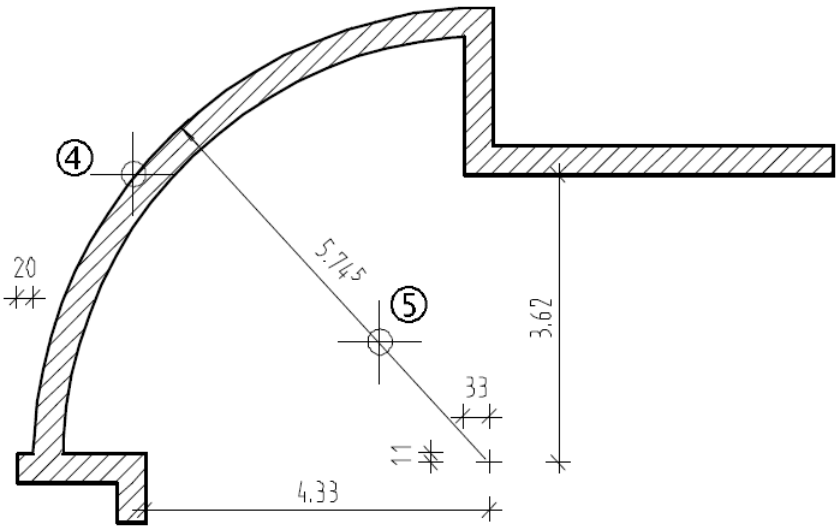
2 Select the layer **DL_100** (**Properties** palette).

3 Select the unit of the dimension text in **Properties** to **m, cm**.
The **Dim. text width** is **2 mm**.

Define the other parameters as for the horizontal and vertical dimension lines.

4 Click the line representing the outside of the curved wall and select **Radius** in the input options.





5 Click a point through which the dimension line is to pass and select ESC twice to close the tool.

Turning layers on and off

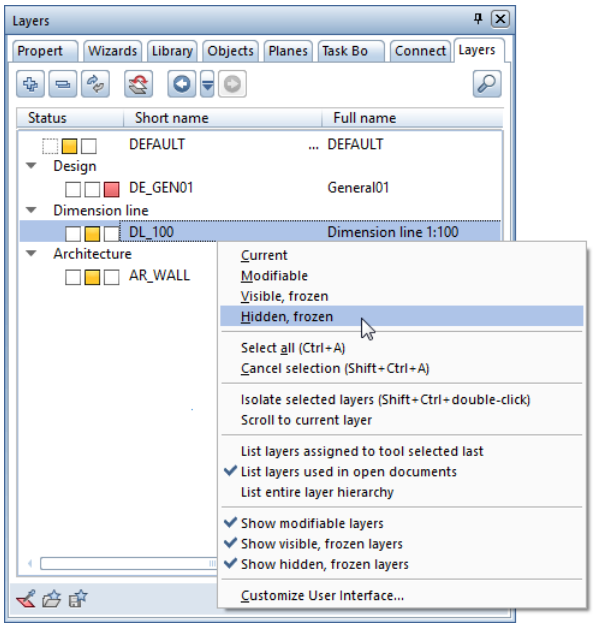
Now you can hide the dimension line layer as the dimensions are not required at the moment.

To hide layers

1 Open the **Layers** palette.

2 Open the shortcut menu of the **Layers** palette and click **List layers used in open documents**.

3 Right-click the **DL_100 Dimension line 1:100** layer and select **Hidden, frozen**.



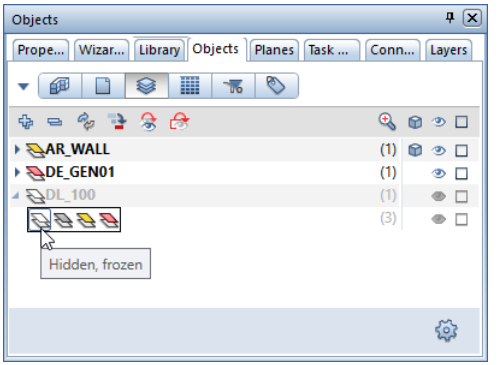
Layers can be made visible in the same way.

The **current** layer (in the **Properties** palette) cannot be hidden. In this case, select a different layer first, for example the DEFAULT layer.

You can also show and hide layers by selecting the **Select, Set Layers** tool on the shortcut menu of a viewport. The shortcut menu of the **Select Layer/Visibility** tab provides the required options.

Tip: When no tool is active, you can also open the **Layer** dialog box by double-clicking the right mouse button in the workspace.

You can also use the **Objects** palette to show and hide layers. Open the **Objects** palette and select **Sort by layer** in the list box at the top. This criterion lists all the layers assigned to the objects and elements in the currently open drawing files (**current** or **open in edit mode** or **open in reference mode**).
In this example, the list includes the **AR_WALL**, **DE_GEN01** and **DL_100** layers. When you point to the icon indicating the layer status in the list, Allplan opens a flyout menu where you can change the status of the layer.



What to do when elements are no longer visible?

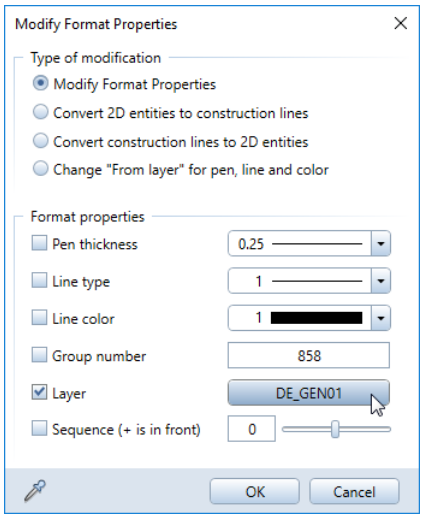
- Make all layers visible. To do this, use the **Layers** palette or the dialog box of the **Select, Set Layers** tool (open the shortcut menu in the workspace) or the **Objects** palette (**Sort by layer** criterion).
- If the elements are still not visible, the selected privilege set might not have the necessary privileges. Select the **Select Layer Privilege Set** tool at the bottom of the **Layers** palette and select an appropriate privilege set or ask your administrator for help.
  You can also select a privilege set in the **Layer** dialog box – **Select Layer/Visibility** tab – **Privilege set** list box.

Which layer is the element on?

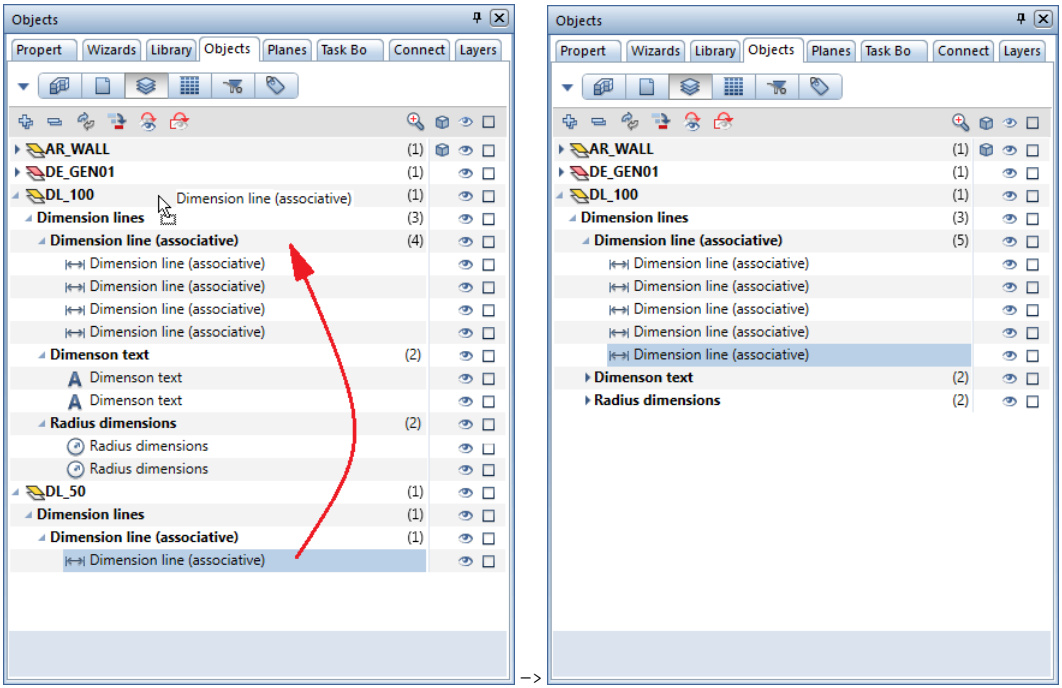
- When you point to an element (without clicking it), a box with **information on the element** opens. You can customize element info to your needs. Open the **Options** on the **Selection** page: **Element name** and **Layer** are turned on by default.
- You can find out which layers individual elements are on by turning each individual layer on in the **Layers** palette.
  You can also use the **Objects** palette. Select the **Sort by layer** criterion, which lists all the layers assigned to the objects and elements in the currently open drawing files (**current** or **open in edit mode** or **open in reference mode**). If you want to know the layer of a particular element, click this element in the workspace.

As a result, this element gets the **Active** icon in the **Objects** palette and you can see the layer to which it belongs.

- You can find out which layer a single element is on by right-clicking the element and selecting **Format Properties**.
  You can see and change all the properties including the layer. You can also change the layer of the current element. The layers of linked components (for example, window openings in walls), however, do not change. We recommend that you use **Modify Format Properties**.
- You can change the layer assignments of one or several elements by using the **Modify Format Properties** tool (**Change** task area). This tool also modifies the layers of linked elements.



- To change the layer assignments of one or several elements, you can also use the **Objects** palette. Select the **Sort by layer** criterion. Open the tree structure of a layer down to its lowest level. There, select one or more elements. You can now drag the elements to another layer (the uppermost level in the hierarchy) in the list.



However, you can reassign the elements only to a layer that is in this list.

Interior walls

For the interior walls you will start by matching all the properties of an exterior wall. You will then modify the thickness, calculation mode and priority rating.

To create interior walls

1 Double-click an exterior wall with the right mouse button.
This selects the **Wall** tool and gets the element's properties at the same time. So, you no longer need to associate the component with the planes (to define its height).

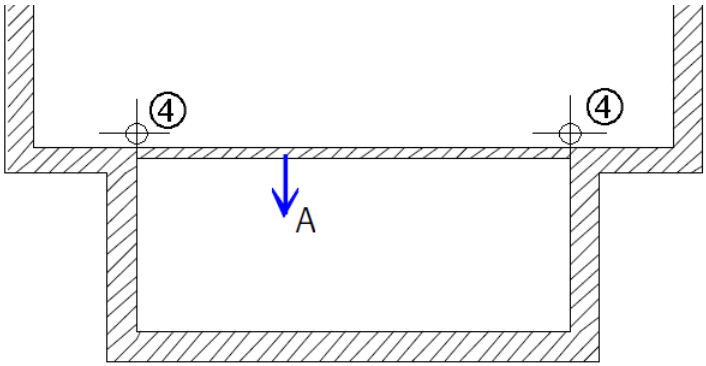
2 Choose the wall type by clicking **Straight Component**.

3 Change the following **Properties** on the **Parameters, attributes** tab:

- Thickness (m): **0.175**
- Priority: **175**
- Calculation mode: **m²**

Then click **OK** to confirm.

4 *Set properties, place start point*
Draw the first interior wall by clicking the inside corners. Check the wall's offset direction in the preview. If it is not correct, change it by clicking **Reverse offset direction**.

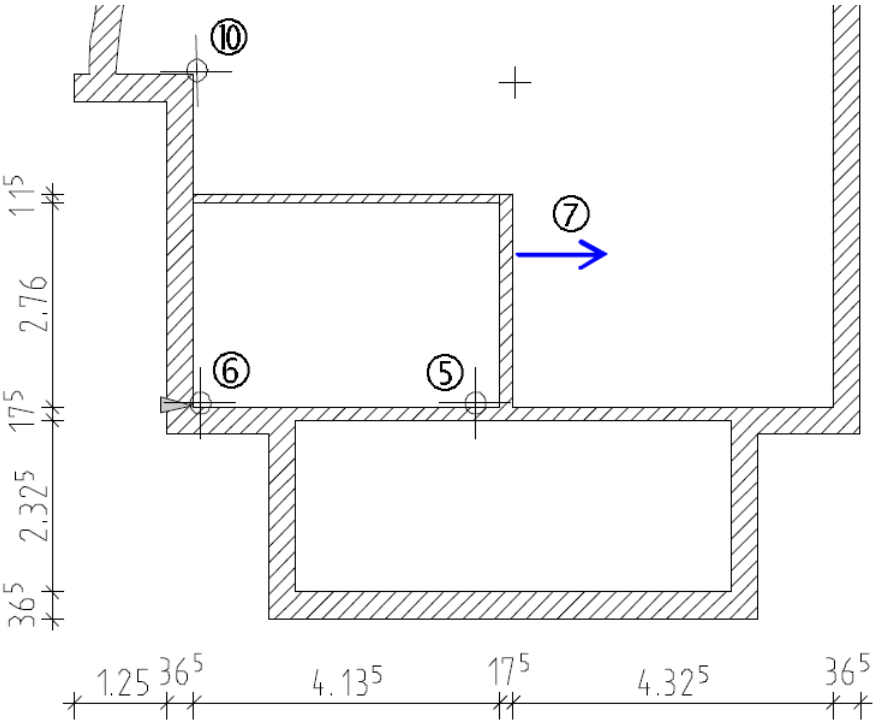


(A) Wall's offset direction

Note: If new walls are fitted in between two existing walls or if the new walls end at wall points you have already defined, you do not have to select ESC to finish entering the walls.

5 To place the starting point of the next wall, click the top line of the new wall. You can see the reference point.

6 Move the reference point onto the corner and enter the distance between the reference point and the start of the wall: **4.135**.



7 Set properties, to point
Enter the length of the wall as follows:
dx: **0**
Tab key
dy: **2.76**.
Offset direction to the right (see arrow in previous figure).

8 Modify the **Properties** (**Parameters, Attributes** tab):

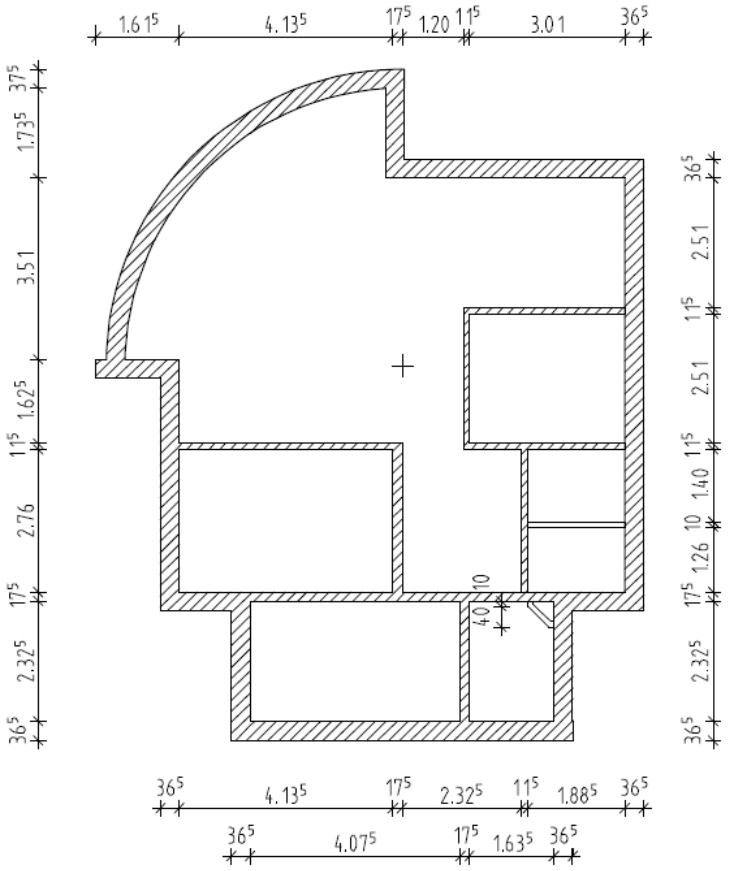
- Thickness (m): **0.115**
- Priority: **115**

Then click **OK** to confirm.

9 Click **Enter at right angles** in the **dialog line**.
If the program expects you to make an entry for the y-direction, just enter **0** for dy in the dialog line.

10 Click the corner of the wall (see illustration) to define the wall's end point.

11 Draw the other interior walls (see figure).
Careful with the two 10-cm thick walls!
For this wall, change the material (plasterboard), the building trade (dry construction work) and the calculation mode (length).
Turn off hatching.



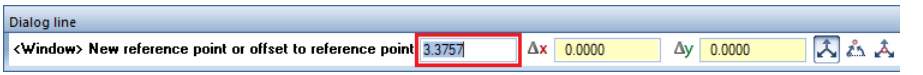
12 Select ESC to close the tool.

Reference point for entering architectural elements

When you insert an opening in a wall, for example, or join an interior wall with an exterior wall, you need to click a wall. The point you click should be near to where the new element is to begin.

Note: If you want to proceed in this way, make sure that **Enter offset directly on/off** is turned off in the dialog line.

The dialog line shows the distance to the nearest reference point (for example, start of wall, wall corner, side of an opening).



The program displays the reference point as an arrow in the construction-line color. The point you clicked (where the new element is to begin) is marked by a square in the construction-line color. The tip of the arrow points to the point you clicked.

Tip: For precision drafting you do not need to click **exactly** where the new element is to begin. Just enter the precise value in the dialog line.

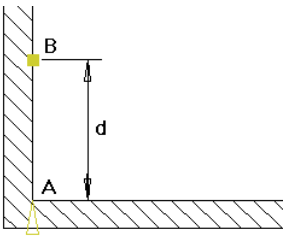


Figure: entering architectural elements by using reference points

A Reference point; arrow points toward the point where the new element starts

B Starting point of the new element; click the wall to define this point

d Distance to reference point in the dialog line

You can use the distance to the reference point as follows:

- Accept the value in the dialog line by selecting the Enter key.
- Enter a new value in the dialog line and select ENTER to confirm.
- To change the position of the reference point – because the distance to another corner on the wall is a known value – just click the other point. You can see the new distance in the dialog line.

Note: Allplan always defaults to the nearest reference point.

A note on multilayer walls

Note: The following sections cover the essentials for drawing multilayer walls.
If you want to skip these sections and continue drawing, go to "A note on views and viewports (on page 64)" or "Axis grid (on page 72)".

Walls with multiple construction layers are defined in the same manner as simple walls with a single construction layer. However, the following differences apply:

- You can define up to 20 construction layers.
- You need to enter the material, thickness, building trade, format properties and surface elements (hatching, pattern and fill) separately for each of the construction layers in the wall. To do this, you can find one line per construction layer on the **Parameters, attributes**, **Format properties** and **Surface elements** tabs.
- Also enter the **height** and **priority** layer by layer (depending on which check boxes are selected in the **All layers same settings** area on each tab).
- You can select different layers for each construction layer (**Format properties** tab).

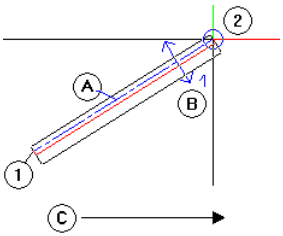
- The component axis can be positioned freely; for example, centered in each construction layer (**Preview** area).
- Pay attention to the way walls or construction layers intersect, which is controlled by the priority rating.
- You can assign a different priority rating to each construction layer.
- Attributes (for example, position, type) can also be entered for the entire wall.

Offset direction of components, multilayer walls

You have already encountered the offset direction of components; this topic was already covered in the "Offset direction of components, walls with a single construction layer" section. In the case of multilayer walls, the position of the component axis is particularly important when the component axis is not on the side of the component edge but centered in the component or off-center. Pay special attention to the position of the first construction layer you can see in the preview.

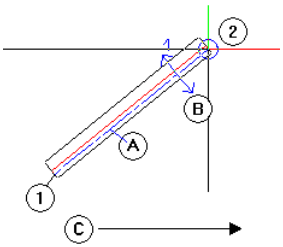
Depending on the position of the component axis and the number of the construction layers, the following options are possible:

- Multilayer wall; lateral component axis within the component (between layer 2 and layer 3):



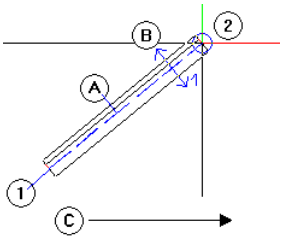
1 Starting point of component
2 End point of component
A Component axis
B Extension to both sides of the component axis; not centered, first layer on the right
C Direction in which you enter the component

After clicking **Reverse offset direction**:



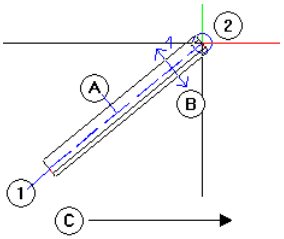
1 Starting point of component
2 End point of component
A Component axis
B Extension to both sides of the component axis; not centered, first layer on the left
C Direction in which you enter the component

- Multilayer wall, component axis centered in the component:



1 Starting point of component
2 End point of component
A Component axis
B Extension to both sides of the component axis;
first layer on the right
C Direction in which you enter the component

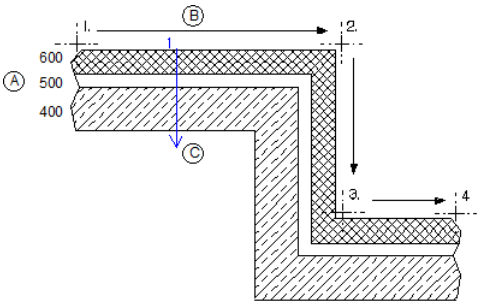
After clicking **Reverse offset direction**:



1 Starting point of component
2 End point of component
A Component axis
B Extension to both sides of the component axis;
first layer on the left
C Direction in which you enter the component

Priority rating with multilayer exterior walls

If the first construction layer in a multilayer wall represents the exterior side, give this layer the highest priority rating so that Allplan correctly intersects the various layers at corners.



Legend:

1 – 4	Direction in which you enter the straight wall
A	Exterior wall's priority ratings: Layer 1 = 600 Layer 2 = 500 Layer 3 = 400
B	Exterior side
C	Lateral offset direction (in this example, to the right)

Figure: priority rating with multilayer exterior walls

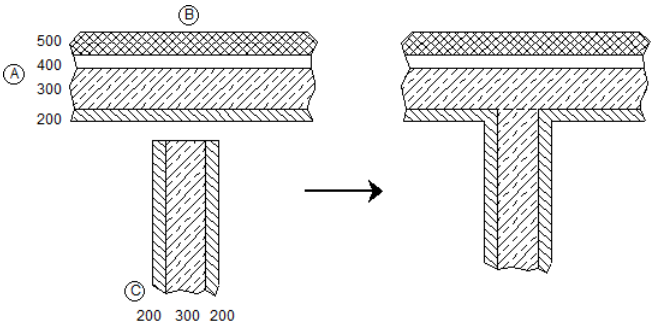
Priority rating at T-connections

To obtain correct results with T-connections, assign the same priority rating to the construction layers that are to intersect.

This applies both to connections obtained as you draw and to connections that arise as a result of the

Join Linear Components and

Join Linear Component with Line tools.



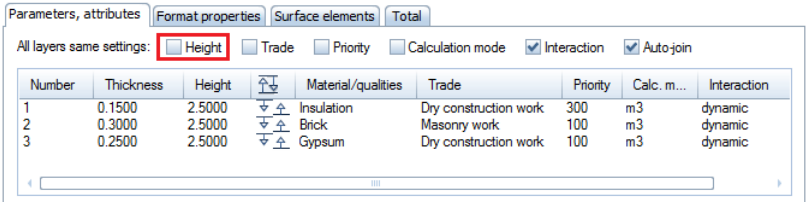
Legend:

A	Exterior wall's priority ratings: Layer 1 = 500 Layer 2 = 400 Layer 3 = 300 Layer 4 = 200
B	Exterior side
C	Priority ratings of interior wall: Layer 1 = 200 Layer 2 = 300 Layer 3 = 200

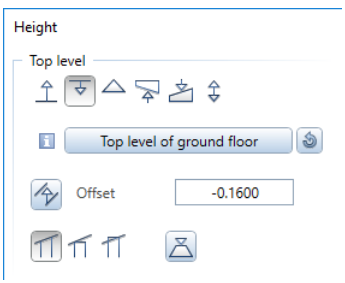
Figure: priority rating at T-connections

Multilayer walls with different height settings

The height of multilayer walls is defined in the same way as the height of single-layer walls. If individual construction layers are to be lower (because of a floor slab, for example), check that the **Height** option in the **All layers same settings** area (**Parameters, Attributes** tab) is not selected. You can then assign a different height to each of the construction layers in the wall.

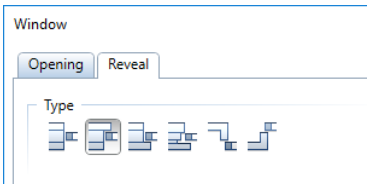


Associate the height of the individual construction layers with the upper or lower default reference plane and, for the layers that are lower, enter the thickness of the slab as a negative value in the **Offset** box.



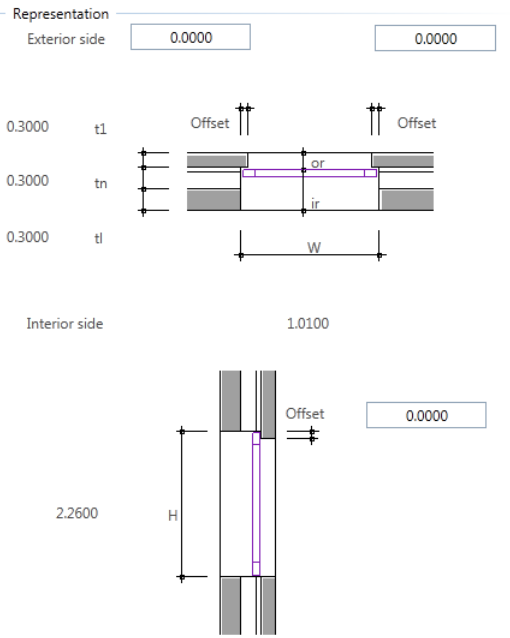
Window openings and door openings in multilayer walls

To insert window openings and door openings in multilayer walls, proceed as you would with single-layer walls. In the **Properties** dialog box, however, you also need to switch to the **Reveal** tab.



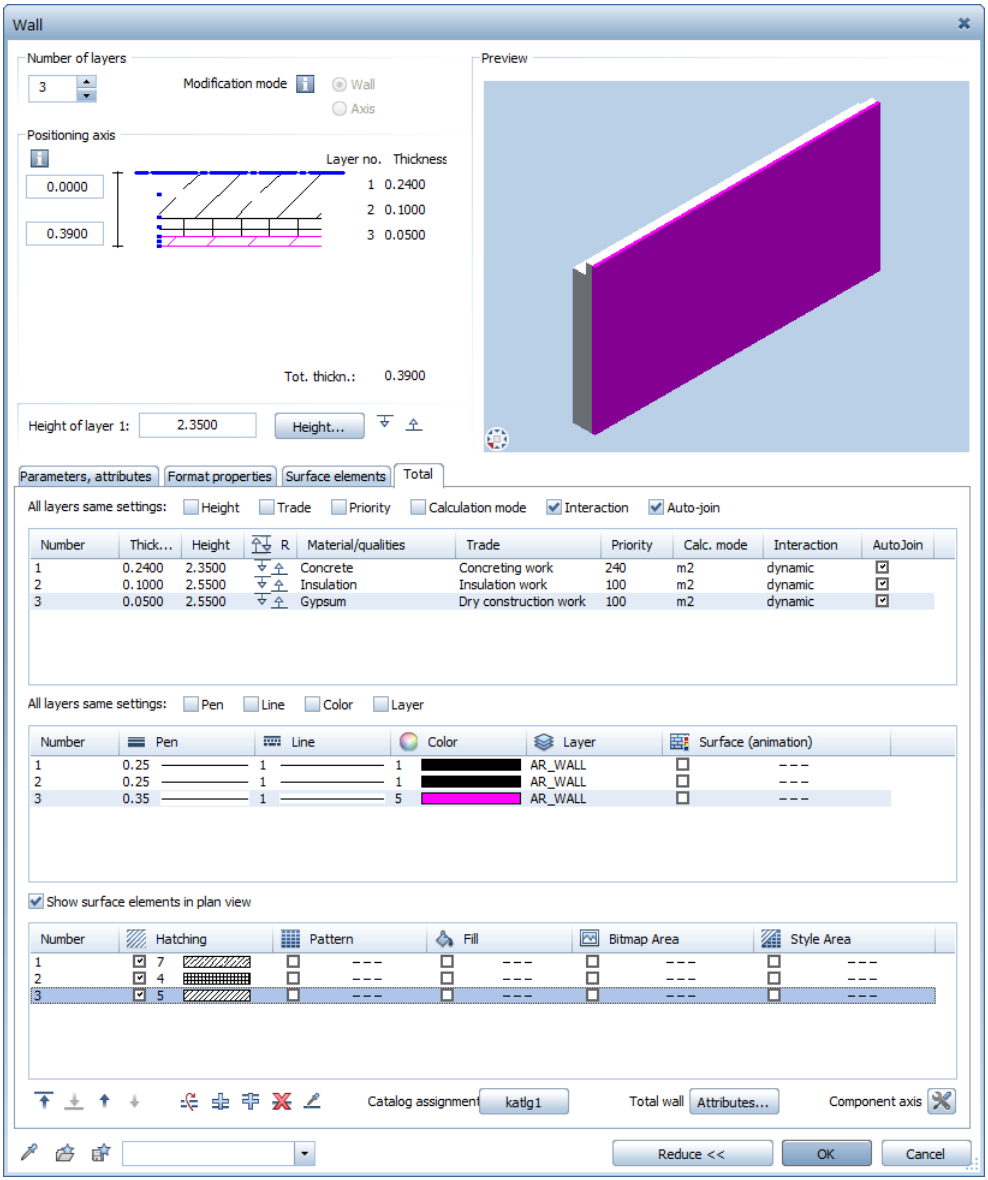
Here – depending on the number of construction layers defined (at least two layers) – you can choose from different types and enter values for the **offset**.

Tip: You can use the Opening Designer to design door and window openings by entering parameters for facing blocks, rabbet shapes, roller blind housings, lintel and header elements, and so on. These openings can be saved and retrieved when needed.



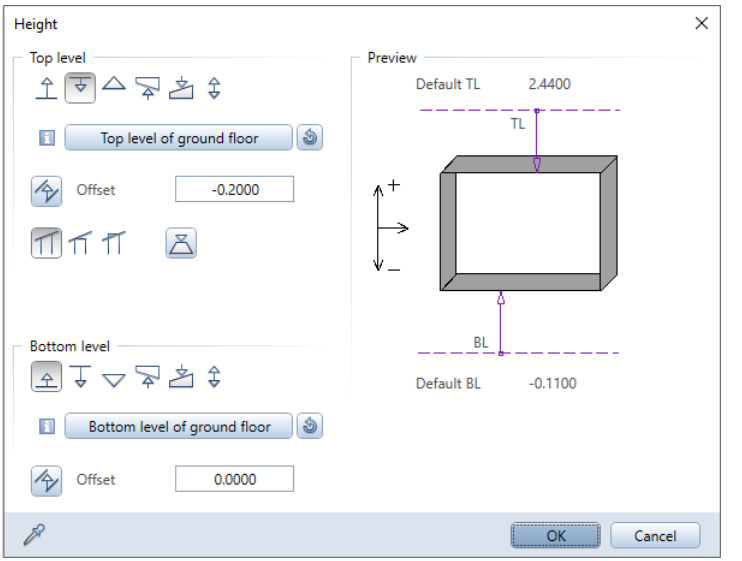
For example: a multilayer wall; each layer of a different height

Settings for the wall parameters:



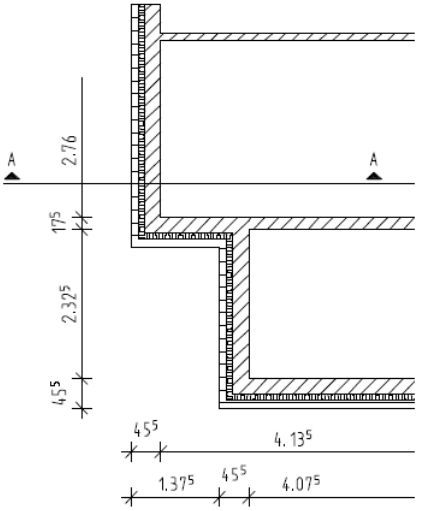
Height definition for layer 1:

- Top level: Relative to upper plane, offset: –0.2
- Bottom level: Relative to lower plane; offset: 0

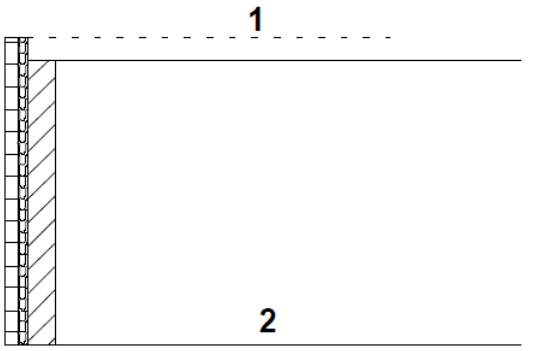


Height definition for layers 2 and 3:

- Top level: Relative to upper plane, offset: 0
- Bottom level: Relative to lower plane; offset: 0



Plan



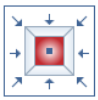
Section: 1 = upper default plane; 2 = lower default plane

Undo the changes for the exercises that follow.

A note on views and viewports

Note: The following sections cover the essentials for working with views and viewports.
If you want to skip these sections and continue drawing, proceed as described in "Axis grid (on page 72)".

When working with walls and other components, you can get an impression of how the building looks in 3D space at the click of a mouse button. Each viewport has its own set of viewing tools in its viewport toolbar.



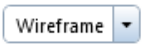
Tools for displaying the model

By using the tools on the viewport toolbar, you can not only move freely on the screen but also display any view. You can zoom in on any section or detail of your drawing as closely as you want. You can even use different view types to display the entire model or selected components.

Most of these tools are 'transparent' tools; in other words, you can use them while another tool (for example, **Line**) is active.

You cannot see the viewport toolbar until you point to the lower border of the viewport, guaranteeing as large a workspace as possible. When you use multiple viewports, each viewport has its own viewport toolbar.

Tool		Use
		Left area:
	View flyout menu	You can use this tool to choose between plan view and any of the predefined standard views.
	Zoom All	You can use this tool to select the display scale so that you can see all the elements in the visible files. **Note**: If you have loaded a view by using **Save, Load View**, you can see this view only.
	Zoom Section	You can use this tool to zoom in on a section. To do this, enclose the elements you want to zoom in a selection rectangle.
	Navigation Mode	You can use this tool to turn navigation mode on or off in the active viewport. In this mode, you can use the mouse to view a 3D model. **Note**: You can move in sphere mode or in camera mode (while selecting and holding CTRL KEY).
	Previous View	You can use this tool to restore the previous view or display scale (if you had selected a different view or scale before you selected the current setting).
	Next View	You can use this tool to restore the next view or display scale (if you have already selected a subsequent view or scale).
	Save, Load View	You can use this tool to save the current view under a name of your choice or retrieve a view you saved beforehand.
	3D View	You can use this tool to display 3D models in three-dimensional space in a perspective view by entering an eye point (observer) and a target point. You can choose between parallel projection and central projection for the perspective view. You can also use this tool to create a view based on the building structure.
	Element Selection	You can use this tool to select the design entities you want to display in the active viewport. The program temporarily hides all the other design entities.
	Drawing File Selection	You can use this tool to temporarily hide drawing files that are currently visible in the active viewport.

Tool	Use
Always on Top	You can use this tool to place the viewport so that it is always on top (that is, in front of) the other ones.
or	You can only use this tool if you have *not selected* the **Connected** option and the viewport is *not maximized*.
	Right area:
Exposure (only for the **Animation** and **RTRender** view types)	You can use this box to control the brightness in viewports of the **Animation** or **RTRender** view type. You can enter a value between -25 and 25. **Important!** This setting *only* changes the way elements look in the active viewport. It has *no* effect on rendering.
Section Display	You can use this tool to display your design in an architectural section for which you have already defined the **Clipping Path**.
Display Scale	You can use this tool to select the scale for displaying the model on the screen. The display scale governs the ratio between the model on the screen and its real-life dimensions. The scale therefore changes automatically if you change the size of sections on the screen. You can see the current display scale on the viewport toolbar in the lower border of a viewport.
 View Type	You can use this list box to select one of the predefined view types (**Wireframe**, **Hidden**, **Animation**, **Sketch** or **RTRender**) for the active viewport. Of course, you can also select a view type you defined yourself. Click to modify various settings of the view types. The settings apply to all the viewports that use this view type. Click **New view type** to define and save your own view types. When **Layout Editor** is open, you can switch between **Design view** and **Print view** (= preview of resulting printout).
	Note: You can find more tools for controlling what's on your screen in the **View** and **Window** drop-down lists on the **Quick Access Toolbar** and on the shortcut menu (in navigation mode only).

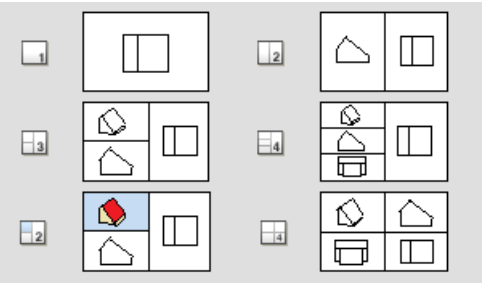
Note: This tutorial uses the **Connected** option, which is selected by default (**Window** drop-down list on the Quick Access Toolbar). When you change the size of a viewport, all the other viewports adapt automatically. New viewports will be fitted into the arrangement.
If the **Connected** option is *not selected*, you can place and resize the viewports independently of each other within the Allplan window.

You edit your model in viewports. Here, you create or modify the required design entities. While doing so, you identify distinctive points and select the view type and view appropriate to the current status of your work.

To maximize the workspace, you can float all viewports freely. If you have a second monitor, you can leave the Allplan window on one monitor, using it as a "toolbox", while editing your model in the independent viewports you place on the second monitor. You can find more information on floating toolbars in the Allplan Help – "Viewports".

By opening several viewports in parallel and arranging them as you need, you can display your model by using different views, scales and view types. You can display a different view in each viewport. For example, you can display a section, the entire design or an isometric view.

You can find the tools for using and arranging viewports in the **Window** drop-down list on the Quick Access Toolbar. You can also select one of the standard viewport arrangements and then modify this arrangement to suit your needs.



How to use viewports: detailed view and full view

The following exercise will help you understand how the viewports work.

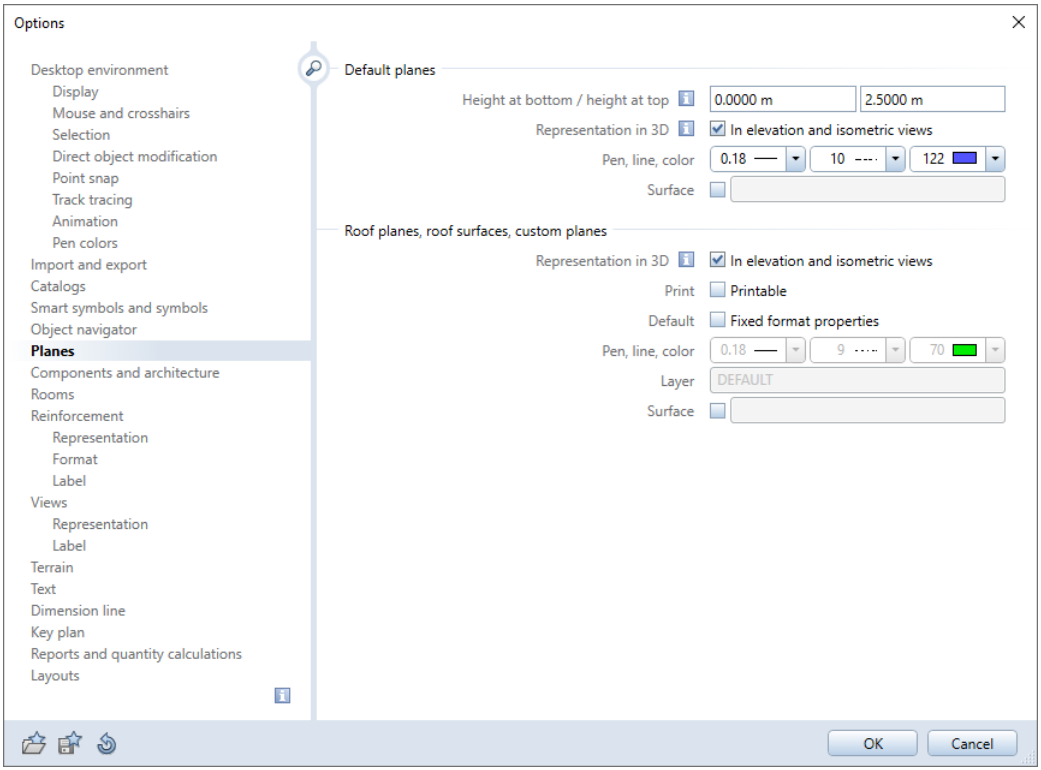
How to use viewports: detailed view and full view

1 Open the **Window** drop-down list on the Quick Access Toolbar and click **3 Viewports**.

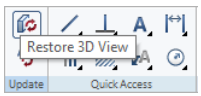
2 Click **Plan** in the upper-left viewport.

3 Click **Front Left, Southwest Isometric View** in the lower-left viewport.

4 Here you can display the default planes of the ground floor. To do this, go to the Quick Access Toolbar, click **Default Settings** and select **Options**. Open the **Planes** page - **Default planes** area.
Select the **3D representation in elevation and isometric views** option and close the dialog box.

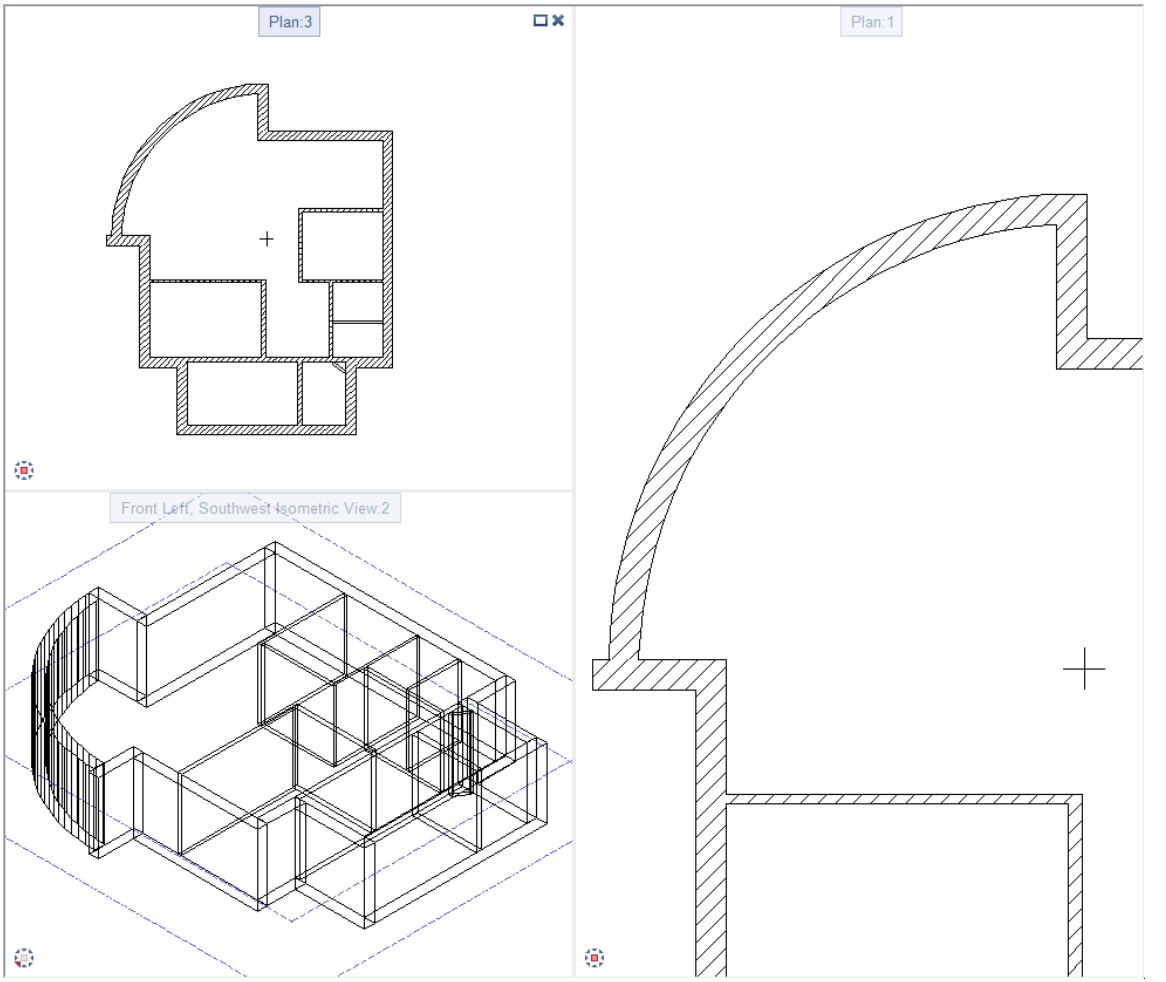


5 When this option is selected, default planes are represented by a square of 2 x 2 meters, which you can see at the origin of all views on the screen.
To adapt the size of the default planes to your design, click **Restore 3D View** (**Update** task area).



6 In the **Input Options**, click **Def Pl** (default planes).

The default planes adapt to the size of your design. The default planes extend one meter beyond the external boundaries of the design so that you can see better.



7 Click **Zoom Section** in the upper-right viewport and define a section by clicking two diagonally opposite points.

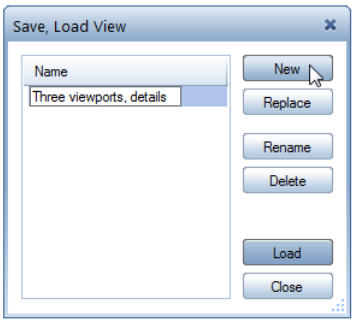
By using three viewports, you can work on details while still displaying the entire drawing in another viewport.

If you want, you can also save this viewport arrangement and retrieve it later without having to make additional settings.

To save a viewport arrangement

1 Open the **Window** drop-down list on the Quick Access Toolbar, point to **Save, Load Arrangement** and click **Save, Load...**.

2 Click **New** and enter a name for the arrangement.



This saves the arrangement of viewports. You can use **Load** to retrieve it when needed.

Axis grid

You will now create an axis grid. This will help you position the columns in the exercise that follows.

To create an axis grid

➲ Make drawing file **1 Grid** current and open **100 Ground floor model** in reference mode.

Note: Only drawing files of active structural levels can be selected together. Make sure that the **Detached house** and **Ground floor** structural levels are selected.

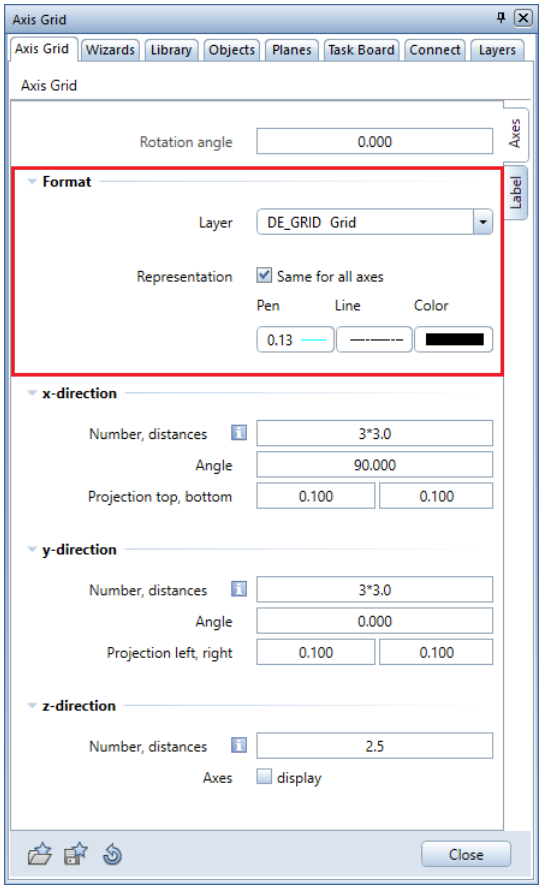
1 Select the **Design** task on the **Actionbar**.

2 Click **Axis Grid** (**Axis Grid** task area).

3 The **Axis Grid** palette opens. Define the following parameters on the **Axes** tab in the **Format** area

- **Layer: DE_GRID Grid**
- Select the **Display – same for all axes** option. As a result, all regions in the grid use the same pen, line and color.
- **Pen**: 0.13 7
- **Line**: 11
- **Color**: 1 black

Tip: You can configure the program to display all elements in reference drawing files in a single color, which you can select in the **Options** on the **Desktop environment – Display** page in the **Drawing file and NDW window** area.



4 The x-direction gets six axes with different values for the spacing between the axes.

Region	1	2	3	4	5
Spacing	1.25	1.375	6.615	1.375	1.25

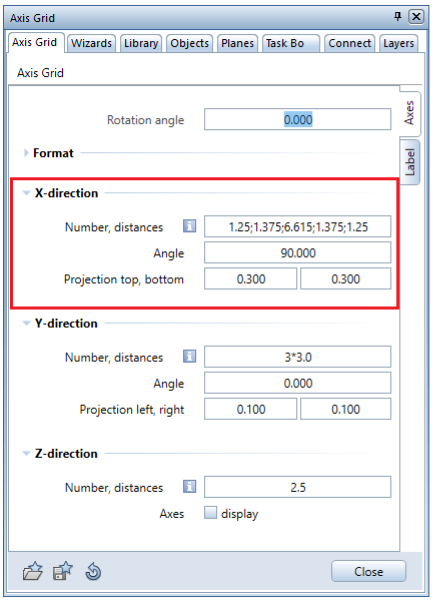
To define the regions in the **x-direction**, enter the following values for **Number, distances**:

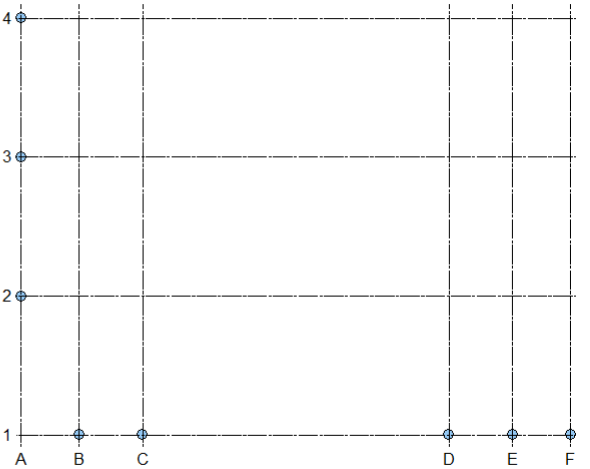
1.25; 1.375; 6.615; 1.375; 1.25

Separate the distances by semicolons. Use commas or dots to separate the leading digits from the decimal places.

5 Enter 0.3 for **Projection top, bottom**. As a result, each axis projects by 0.3 m beyond the grid (see illustration at the end of this task).

You can see the five regions in the x-direction in the preview in the workspace.





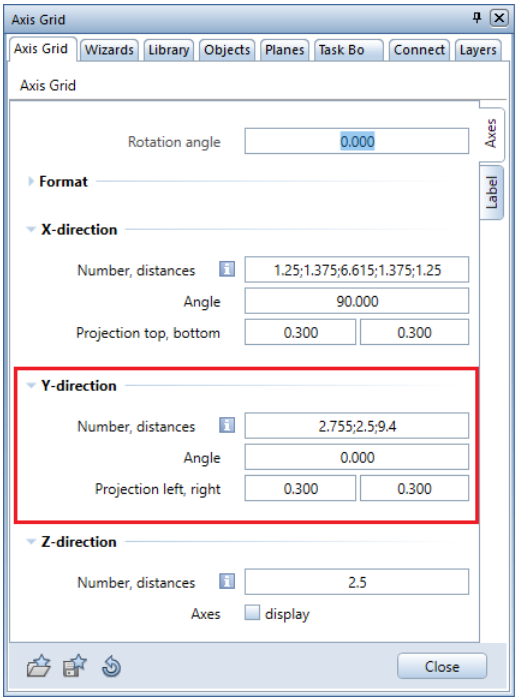
6 The y-direction gets three regions.

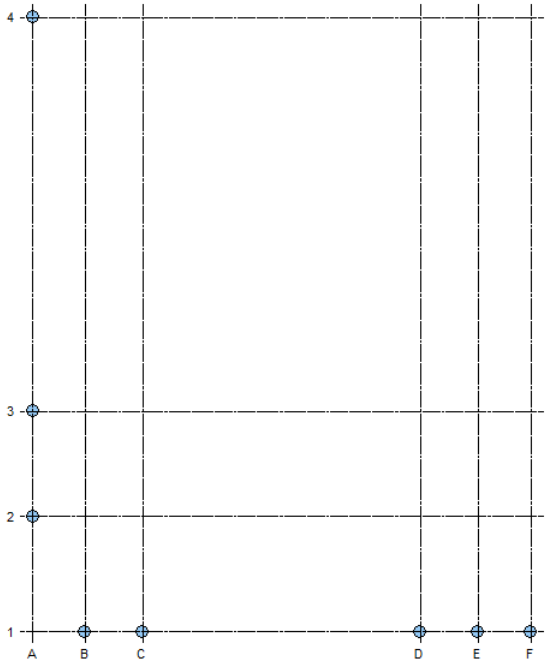
Region	1	2	3
Spacing	2.755	2.5	9.4

To define the regions in the **y-direction**, enter the following values for **Number, distances**:

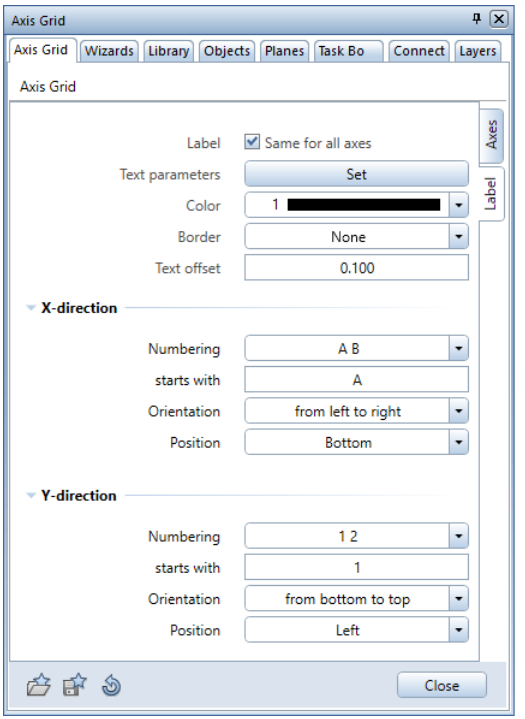
2.755; 2.5; 9.4

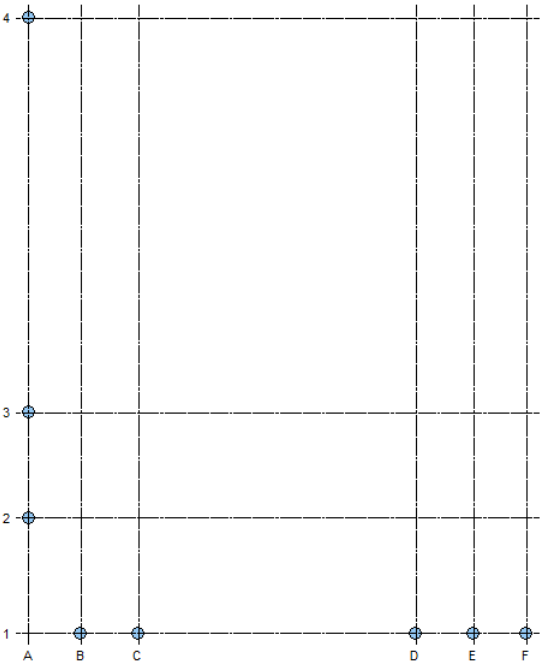
7 Enter 0.3 for **Projection left, right**.





8 Open the **Label** tab in the **Axis Grid** palette and check the settings (see illustration):





9 *Drop-in point*
Position the grid somewhere on the left side, near the bottom of the floor plan.

10 *Close* the **Axis Grid** palette.

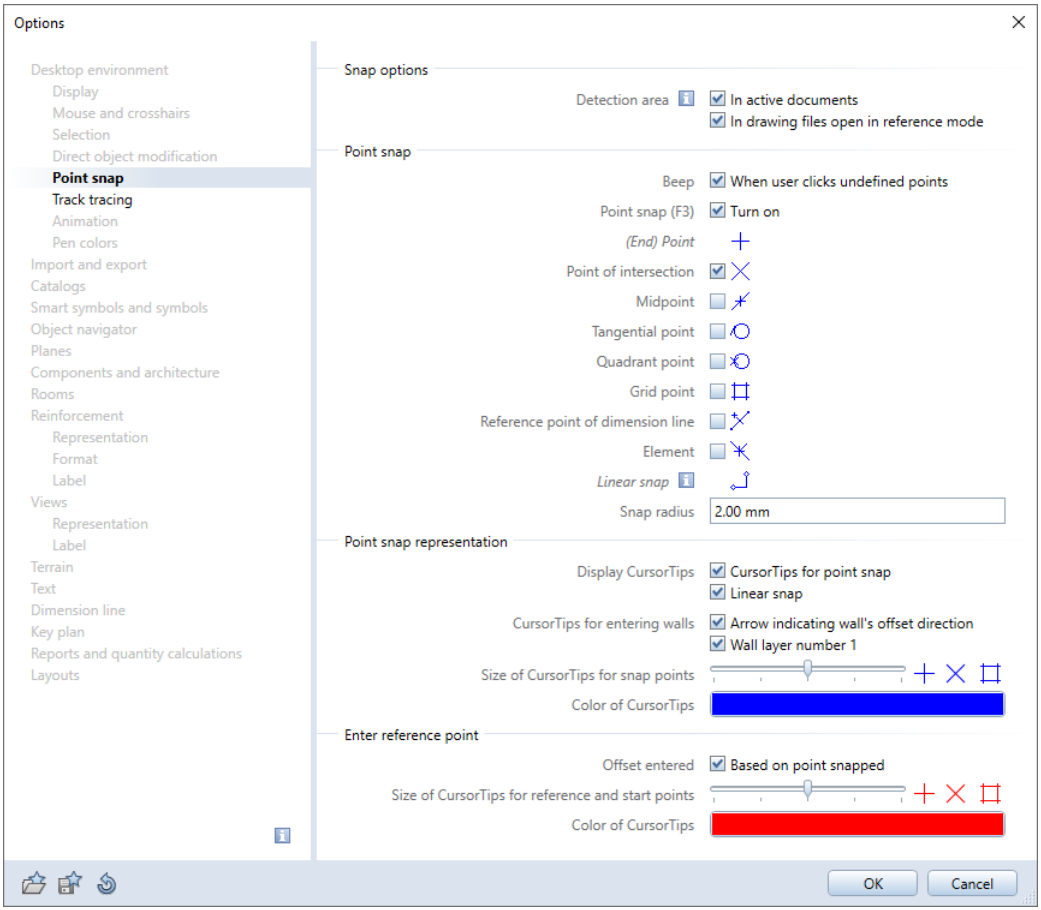
11 Right-click one of axis lines and select **Move** on the shortcut menu.

To place the grid directly over the floor plan, you can use the following point snap mode settings:

12 Right-click in the workspace and select **Point snap options** on the shortcut menu.

- In the **Point snap** area, select the **Point of intersection** check box and clear all the other check boxes.

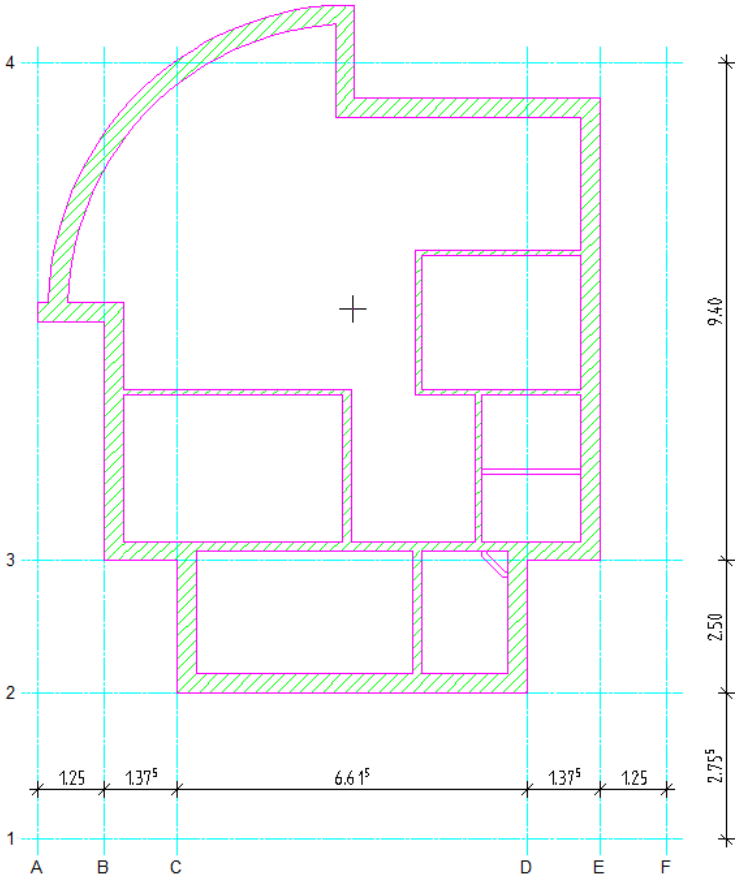
- In the **Point snap representation** area, select the **Display point snap symbols** option and make sure that **In active documents** and **In drawing files open in reference mode** are selected in the **Snap options** area.



Tip: Zoom in on a corner of the building by using **Zoom Section**.

Tip: You can also create the grid by using just lines and parallel lines.

13 *From point, dx - To point*
Click a suitable point of intersection on the grid and position the grid on an appropriate corner of the building.



14 Dimension the grid as shown.
Make sure that you use the **DL_100** layer.

15 The dimension lines are not required for the next steps. Hide them:
Go to the **Layers** palette, right-click the **DL_100 Dimension line 1:100** layer and select **Hidden, frozen**.

Note: If the grid doesn't turn out as shown here, you can always alter it. All you need to do is double-click the grid and change the settings in the **Axis Grid** palette. The procedure is the same as for entering the grid. The only difference is that you do not have to place it.

Now only the gridlines for the round column inside are missing. You can define these gridlines graphically.

To draw additional gridlines

1 Turn on **Construction line** mode (**Properties** palette).

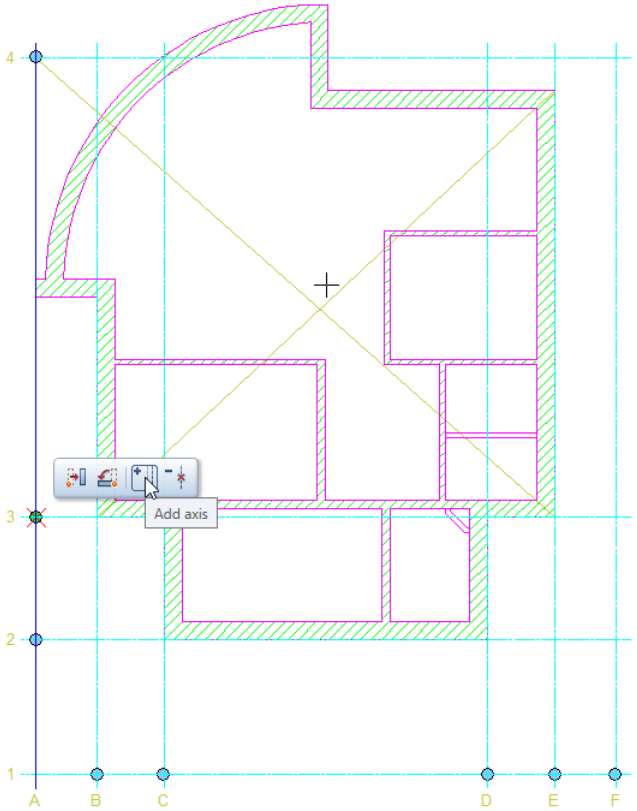
2 Select the **DE_GRID** layer.

3 Click **Line** (**2D Objects** task area) and draw two diagonal lines.

4 Turn off **Construction line** mode again.
To do this, clear the **Construction line** check box (**Properties** palette).

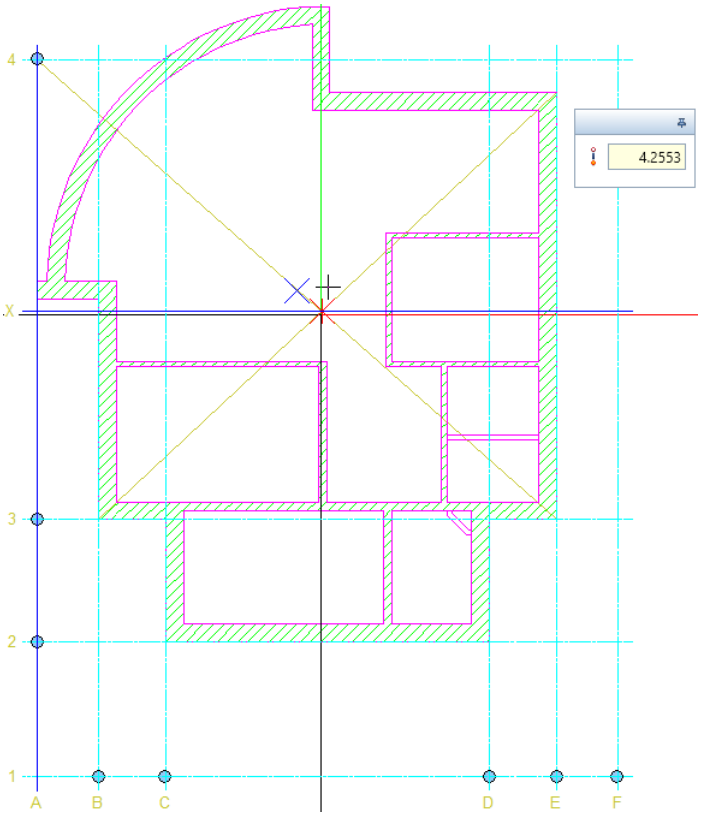
5 Select the grid by double-clicking it.

6 Point to one of the **Point handles** in the y-direction of the grid and select **Add axis** on the shortcut menu.



A horizontal gridline is attached to the crosshairs.

7 Place this gridline on the point where the two diagonal lines intersect.



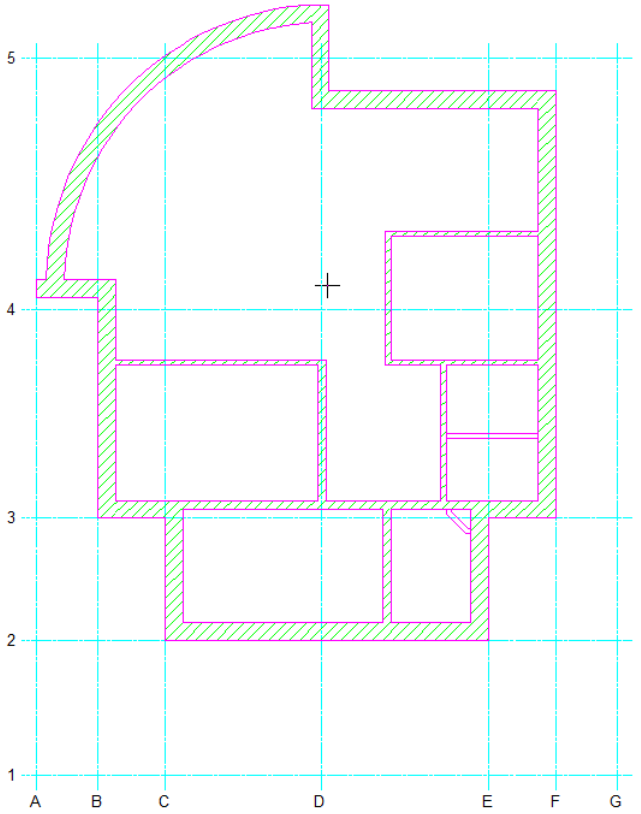
8 To create a vertical gridline through the point where the construction lines intersect, point to one of the **Point handles** in the x-direction of the grid and select **Add axis** on the shortcut menu.

A vertical gridline is attached to the crosshairs.

9 Place this gridline on the point where the two diagonal lines intersect.

As a result, the grid has two more gridlines. The labels of the axes have adapted accordingly.

10 Select ESC to finish.
You can delete the diagonal construction lines.



11 Switch back to the **Elements** task on the **Actionbar**.

Columns

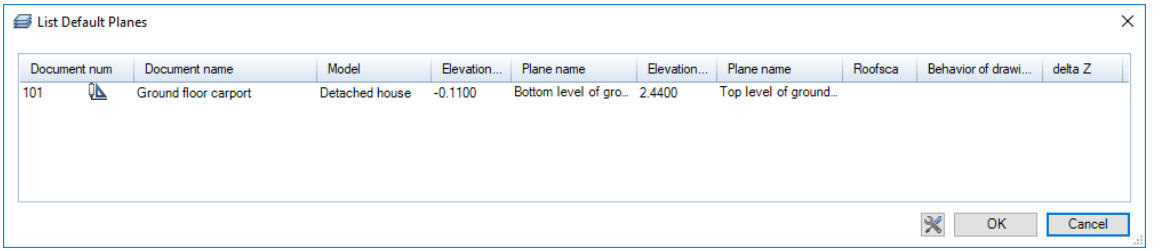
You can now draw the columns: the rectangular columns and the interior column in drawing file **100** and the carport columns in drawing file **101**. The approach is the same as for entering walls: Start by defining the component parameters, then place the element in the drawing file.

Tip: You can also use the **Column** tool to make any other column-shaped element such as table legs, lamp posts, railing posts.

To place columns

➲ Open drawing files **1 Grid** and **100 Ground floor model** in reference mode and make drawing file **101 Ground floor carport** current.

➲ Open **List Default Planes** (**Annotations** task area) and check the height and plane settings of drawing file **101 Ground floor carport**:
Elevation at bottom: **-0.11**; elevation at top: **2.44** (like drawing file **100 Ground floor model**).



1 Click **Match** in the **Change** task area. The **Match selection** dialog box opens. Turn off layer and click **OK** to confirm the dialog box.
Then click a wall line. Allplan copies the line's settings (pen **(2) 0.35** and line type **1**).

2 Click **Column** (**Components** task area).
Check that the layer **AR_COL** is selected. If it isn't, select it in the **Layers** palette or in the **Properties** palette – **Format** area.

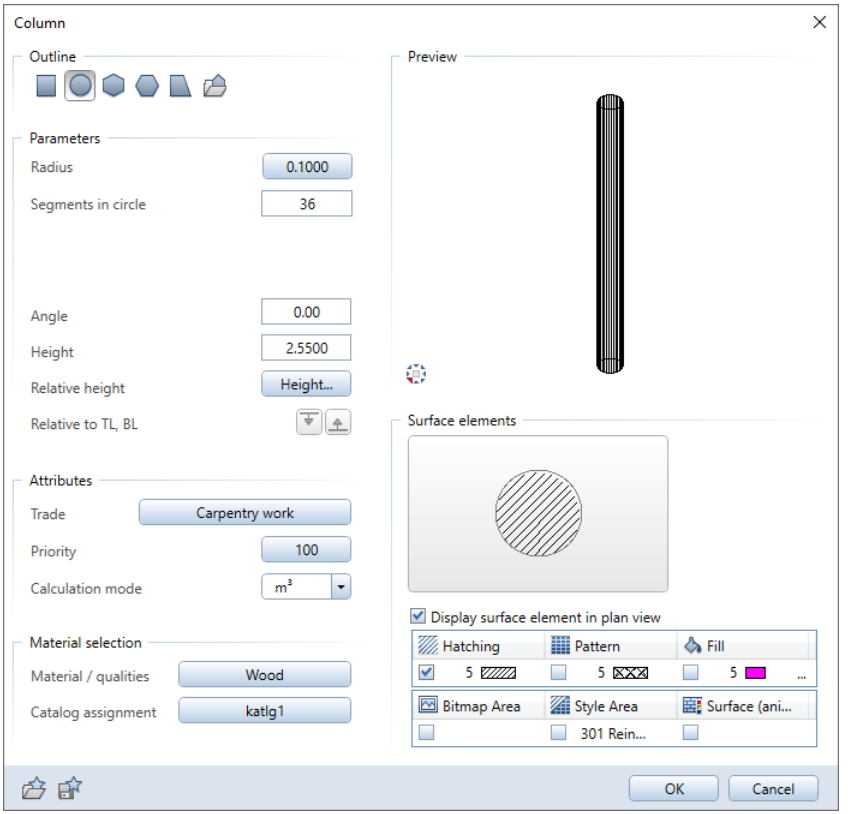
3 Click **Properties** and define the following parameters:

- **Outline** area: round
- **Parameters** area: Radius = 0.100
- **Attributes** area:
  Trade: Carpentry work
  Priority: 100
  Calculation mode: m^3
- **Material selection** area:
  Material, qualities: Wood

4 Check the **Height** of the column (it must be the same as for the walls):

- **Top level:** **Relative to upper plane** at an offset of **0**
- **Bottom level:** **Relative to lower plane** at an offset of **0**

and click **OK** to confirm the dialog boxes.



5 Go to the **Column** Context toolbar and change the column's anchor point to **Centered**. The point snap options you defined for previous exercises are still valid.

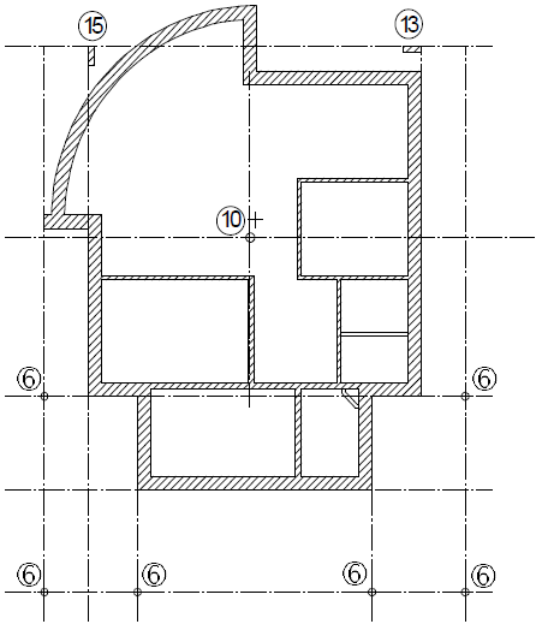
6 Place six columns for the carports on the points where the gridlines intersect. Then select ESC to close the tool.

7 Click **Open on a Project-Specific Basis**, make drawing file **100 Ground floor model** current and open drawing files **1 Grid** and **101 Ground floor carport** in reference mode.

8 Click **Column** (**Components** task area).

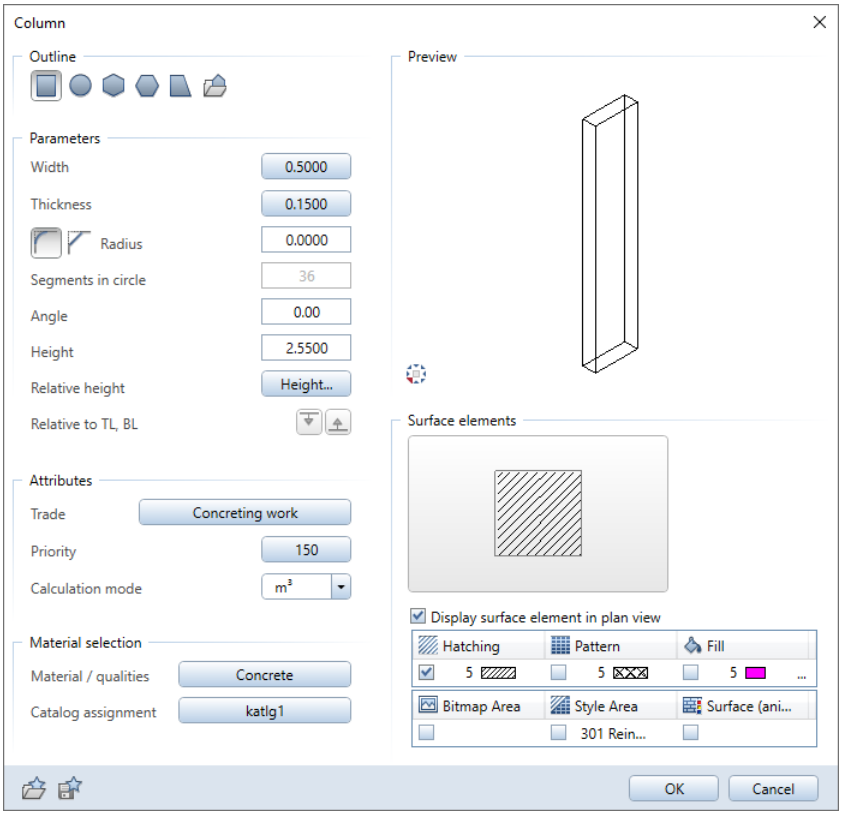
9 Click **Properties** and change the radius to **0.125**.

10 Place another column on the point of intersection near the middle of the building.



11 Click **Properties** and define the height:

- **Outline** area: rectangular
- **Parameters** area:
  Width = 0.500
  Thickness = 0.150
- **Attributes** area:
  Trade: Concreting work
  Priority: 150
- **Material selection** area:
  Material, qualities: Concrete



12 Switch the column's anchor point to **upper right**.

13 Place the column on the upper-right point where the gridlines intersect (see illustration for step 10).

You can also rotate the column profile.

14 Open the **Properties** and change the angle to **90**.

15 Place the column on the upper-left point of intersection.

16 Change the point snap options for the steps that follow: Right-click in the workspace and select **Point snap options** on the shortcut menu.

- In addition to the **Point of intersection** option, select the **Element** and **Midpoint** check boxes in the **Point snap** area.
- Leave the other settings as they are.

17 Select ESC to close the **Column** tool.

18 Click **Open on a Project-Specific Basis** and close drawing files **1 Grid** and **101 Ground floor carport** again.

Only drawing file **100 Ground floor model** is open.

The round, exterior carport columns are now no longer visible, as the relevant drawing file is now closed.

Openings

The procedure for creating **openings** – be it a door, window, niche or recess – is always the same. The differences lie in the property settings you can make.
Like in the real world, walls and openings are linked. For example, when you move only a wall, its openings will move too.

Openings also provide the space for **SmartParts** or **smart symbols**. A SmartPart is a parametric Allplan CAD object that acts according to its own logic, which is independent of the CAD system. Parametric information is controlled by a script, which is attached directly to the object. SmartParts can be inserted in openings for windows and doors in linear walls. SmartParts adapt to any outline.
As the name implies, a smart symbol is an intelligent symbol that automatically adapts to its opening.

In addition, you can use Allplan to create window reveals and door reveals and include them in quantity takeoff.

Doors

In this project, all the doors on the ground floor are single doors. The entrance door is **2.135 m** high; the interior doors are **2.01 m** high.
You will begin by drawing the door swing. The procedure for creating door openings also applies to all other kinds of openings.

Entering openings

- Click the first point of the opening.
- Enter properties and the height.
- Enter the width of the opening.

You must define the settings for the opening only once if you want to create a series of identical openings. The properties and the height information are stored by the system until you redefine them.

To draw doors

1 Click **Door** (**Components** task area).

2 Open the **Layers** palette and select the **AR_WALL** layer.

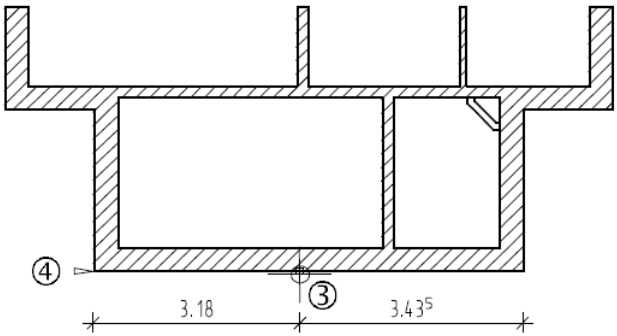
3 Click a point of the exterior wall at the bottom to place the first side of the door.

Note: Make sure that you enter **0.000** for **Offset to reference point** in the dialog line; otherwise, you cannot use this entry option. Alternatively, you can also enter the required offset and click the corner of the wall.

Tip: To enter the offset of openings based on the reference point, turn off the **Enter offset directly** option by clicking the icon.

The reference point is represented by an arrow; you can see the distance in the dialog line.

4 If the reference point is not on the corner as shown, click the corner to move the reference point there.

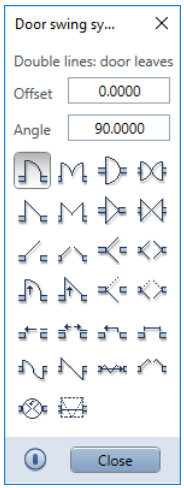


5 Enter the offset: **3.18** (left reference point) or **3.435** (right reference point).

6 Click **Properties**.

7 Select the rectangular shape for the door type.

8 Click the **Door swing** icon and select the symbol representing the single-leaf door swing.



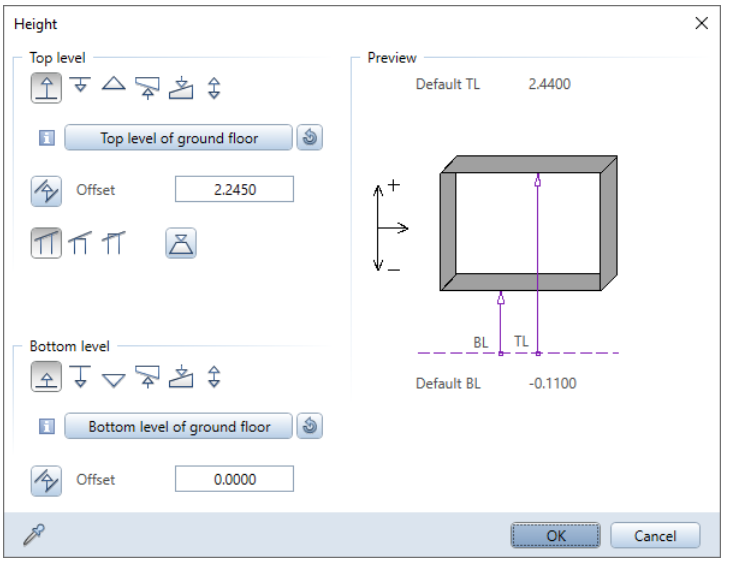
Tip: Modifying door swings is that easy: Select the **Door** tool and click inside the door opening. Select a different **Door swing** in the dialog box. Allplan deletes the old door swing automatically.

Make sure you have selected the correct layer.

9 Click **Height...**.

This is where you define the height of the top and bottom levels of the door opening.

Note: Attach the top level of the door opening to the lower default reference plane too. This ensures that the height of the door will not change, even if the height of the story is modified.

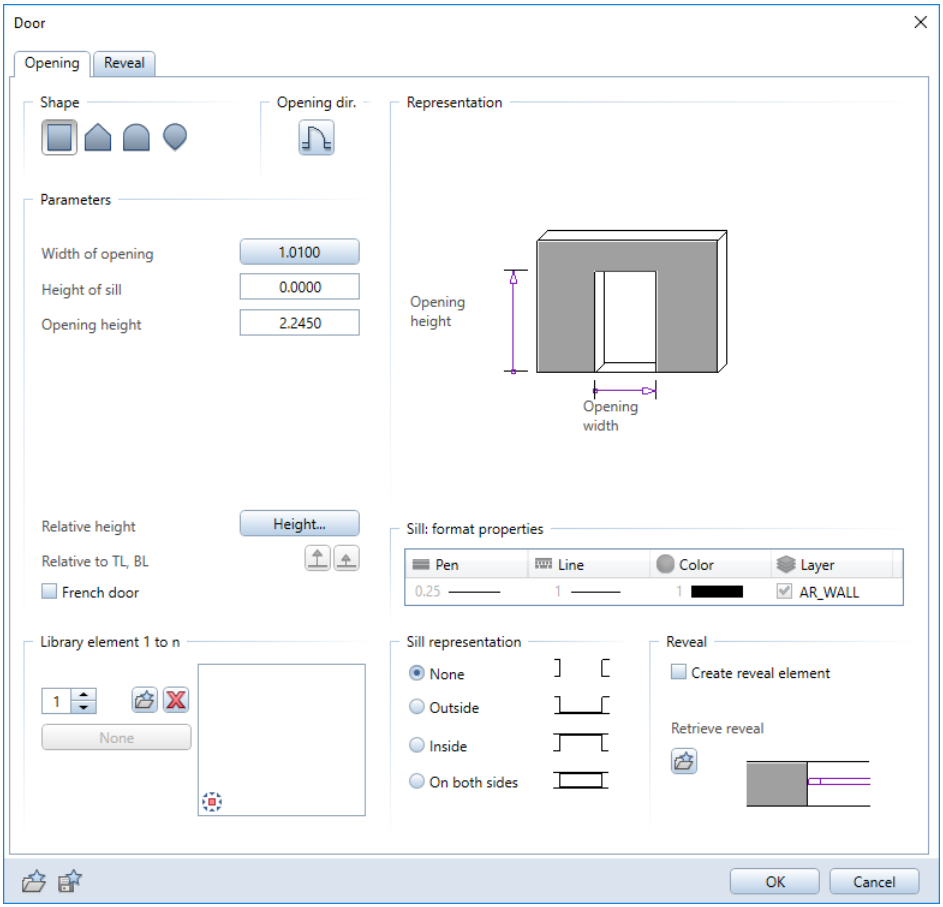


10 In the **Top level** area, click **Relative to lower plane** and enter the following unfinished dimension:
Door height + floor structure: 2.135 m + 0.11 m = **2.245** m.

11 In the **Bottom level** area, click **Relative to lower plane** (offset: 0.00) and click **OK** to confirm.

12 Clear the **Create reveal element** check box and click in the **Library element 1 to n** area. In the **Sill representation** area, select the **None** option.

The **Door** dialog box should now look like this:

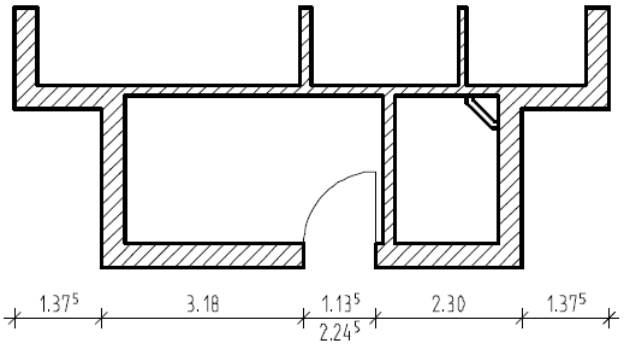


Tip: You can change the width of the opening in the dialog box. You can quickly create several doors of the same type and height but of varying width.

Tip: To create several doors of the same width, turn off the 'Prompt for opening width'.

13 Click **OK** to confirm the settings.

14 Enter the *offset to end point* (the width of the opening) in the dialog line: **1.135**.



15 Specify the direction of the door swing.
The preview is attached to the crosshairs.

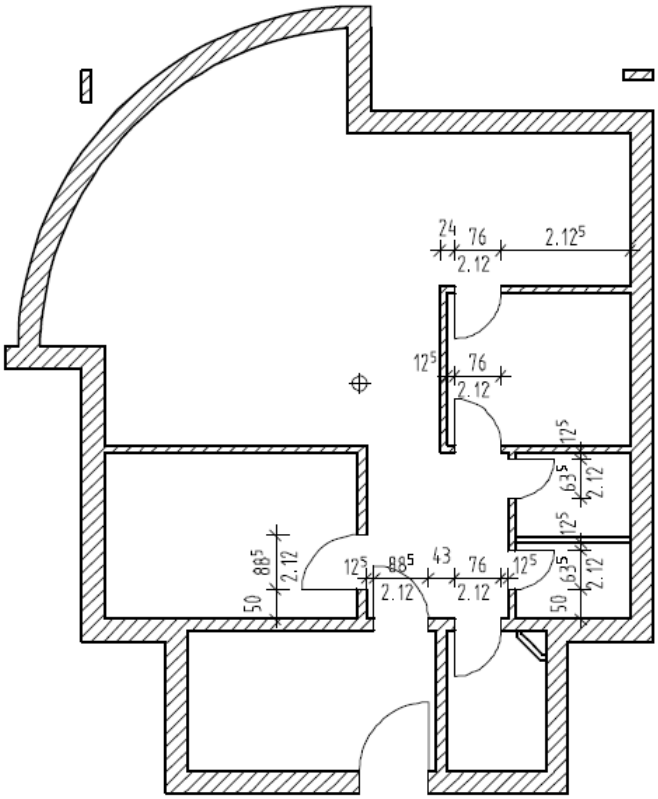
Next, place the interior doors. These are to get different height settings!

Tip: To check how your design looks in 3D, switch to a standard isometric view and create a hidden-line image by using the **Hidden** view type.

16 If the **Door** tool is no longer open, click it again, place the door opening in an interior wall, open the **Properties** and click **Height**.

17 Click **Relative to lower plane** for the **Top level**, enter **2.12** and click **OK** to confirm the two dialog boxes.

18 Insert all interior doors.
Make sure that the offsets and opening widths are correct.



19 Select ESC to close the tool.

Windows

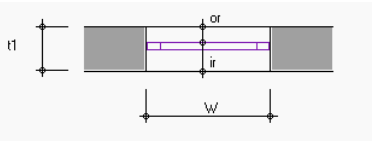
The next step is to insert openings for windows. Some of the openings will be wider and higher than the others and the height of the sill in each opening is also different.

After having created the window openings, you will assign SmartParts to these openings. The position of a window SmartPart within the window opening is based on the position of the window reveal.

The use of precise measurements is not only important for ensuring that the elements appear correctly on the screen – it is also critical if the reports and analyses you generate later are to be accurate. The system's built-in checker makes sure that the sum of the reveal measurements is equivalent to the total thickness of the wall.

Tip: You can modify the reveal later by using **Define, Modify Reveal** (shortcut menu of the opening).

Reveal



or: Outer reveal:
ir: Inner reveal
B: Opening width (unfinished structure)

SmartParts

SmartParts are parametric Allplan CAD objects that act according to their own inherent logic, which is independent of the CAD system. Parametric information is controlled by a script, which is attached directly to the object.

You can insert SmartParts for windows, window sills, doors, shading elements (roller shutters, sliding shutters, folding shutters) and skylights in window openings and door openings in linear walls or in roof openings. SmartParts adapt to these outlines.

To edit SmartParts, you can use handles (graphical modification) or a dialog box (alphanumeric modification). To modify SmartParts graphically, you can use the **Modify SmartPart using Handles** tool, which you can find on the shortcut menu of the SmartPart. You can also use handles and dialog box in combination. Double-click

the SmartPart to open the properties palette of the SmartPart and to display the handles. The program displays changes you make to the SmartPart in real time. You can save the modified SmartPart as an smv file by using the **Save as a favorite** tool. You can also save the modified SmartPart in a folder of the **Library** palette.

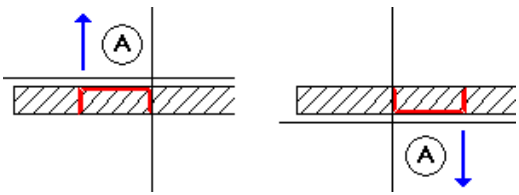
In the following exercise, you will model your own window SmartPart. To make things easier, you can find the required settings in a favorite file in the project folder.

You can use the **Window SmartPart** tool to define and save window SmartParts yourself. For more information see Unit 5: SmartParts (on page 267).

Direction for entering openings (windows and doors)

If you define different values for the inner depth and outer depth of the reveal or if you want to insert window openings or door openings in multilayer walls, it is important that you pay attention to the direction in which you enter the opening:

- The point on the wall you click always defines the exterior side of the opening.
- The preview of the opening, which is attached to the crosshairs, is closed on the outside and open on the inside.
- If you need, you can use **Anchor Point** to change how the opening is attached to the cursor in the preview before you insert the opening in the wall: This makes it easier to use existing corners or wall junctions when you enter openings based on reference points.



A Wall line clicked = exterior side of opening

Creating windows

To create windows

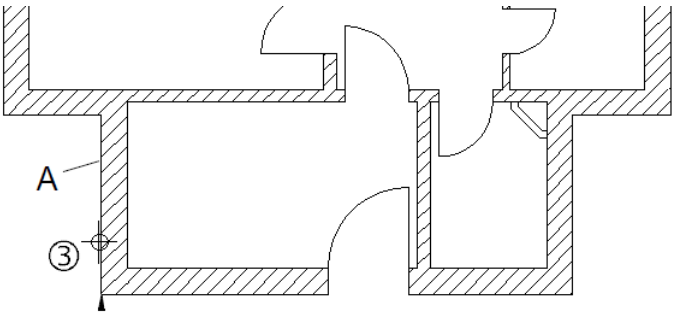
Tip: You can change the anchor point on the context toolbar and the position of the reference point.

1 Click to the right of **Scale** on the **status bar** and change the reference scale to **1:50**.

2 Click **Window** (**Components** task area) and make sure layer **AR_WALL** is current.

3 *Set properties or click a line of an exterior wall*
Place a point for the first side of the opening on the exterior wall and correct the offset to the corner: **0.615**.

It is important that you click the outer line of the exterior wall (A), as the window SmartPart will need it later to find its correct position.



4 Click **Properties**.

5 Choose the rectangular window and select the **Create reveal element** check box.

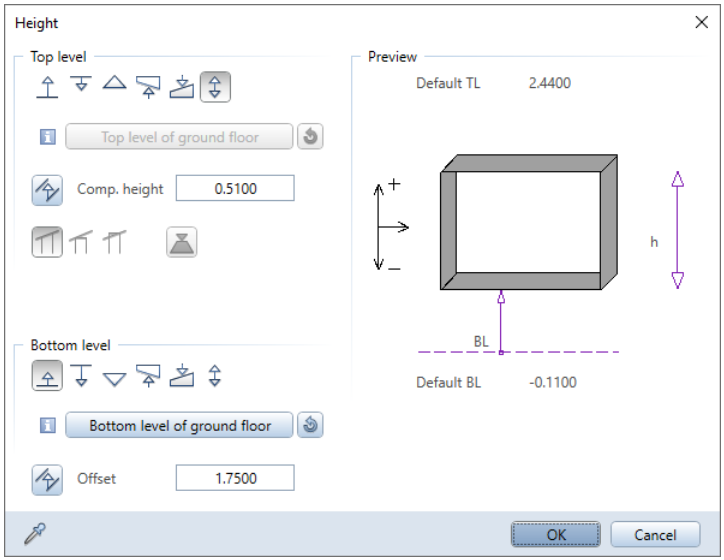
6 In the **Representation of sill** area, select the **On both sides** option; in the **Sill: format properties** area, select pen **2** (0.35) and line **1**.

Define the top and bottom levels of the window opening.

7 Click **Height...**.

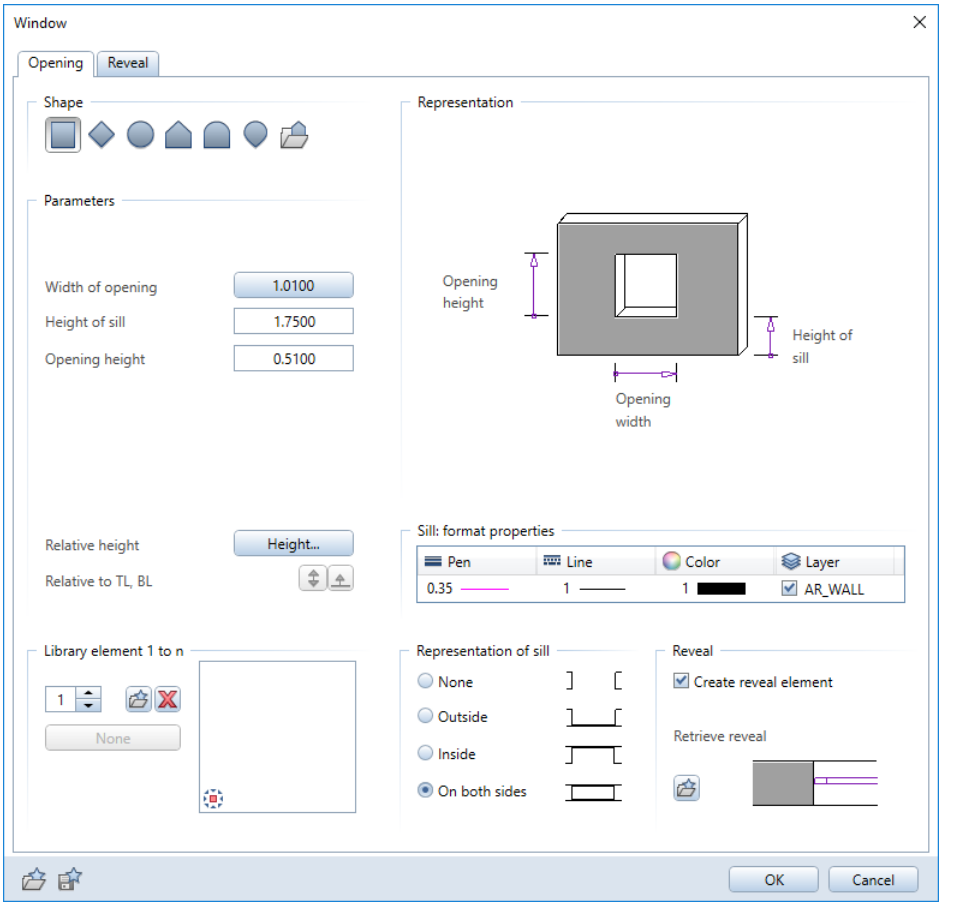
8 Enter the following values:

- In the **Top level** area, click **Fixed component height** and enter **0.51** (same as height of opening).
- In the **Bottom level** area, click **Relative to lower plane** and enter **1.75** for the offset.



9 Click **OK** to confirm.

The **Window** dialog box should now look like this:

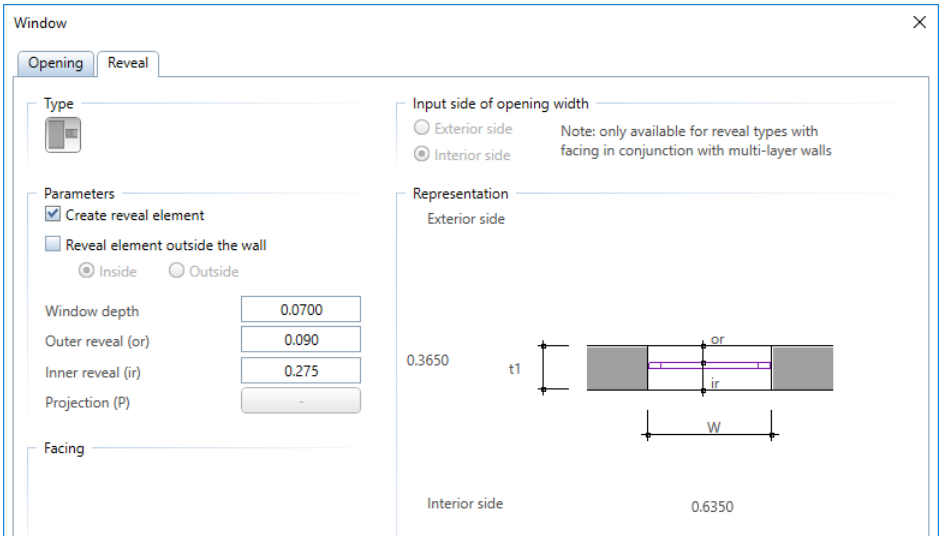


Tip: The **Window** dialog box shows the **height of sill**. This is the relative height of the sill based on the distance between the sill and the reference plane or a reference element.

10 Switch to the **Reveal** tab.

11 Define the reveal as follows:

- Window depth: **0.07**
- Outer reveal: **0.09**

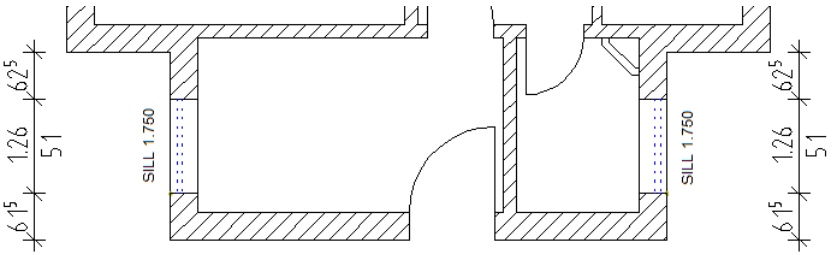


12 Click **OK** to confirm.

13 Enter the width of the opening in the dialog line: **1.26**.

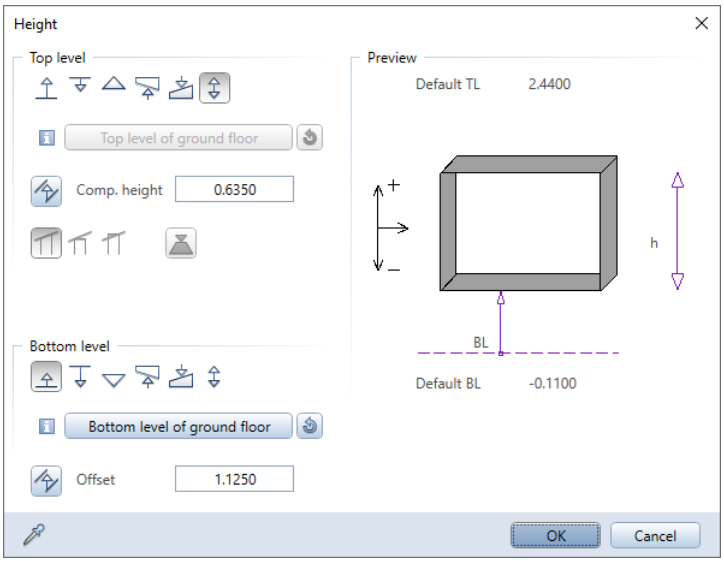
14 Select ENTER to confirm.

15 Use the same settings to draw a window in the opposite wall.



16 Place the next point for a window opening in the **right exterior wall** and, in **Properties**, click **Height** and change the height parameters for the **top level** and **bottom level** (height of sill) as follows:

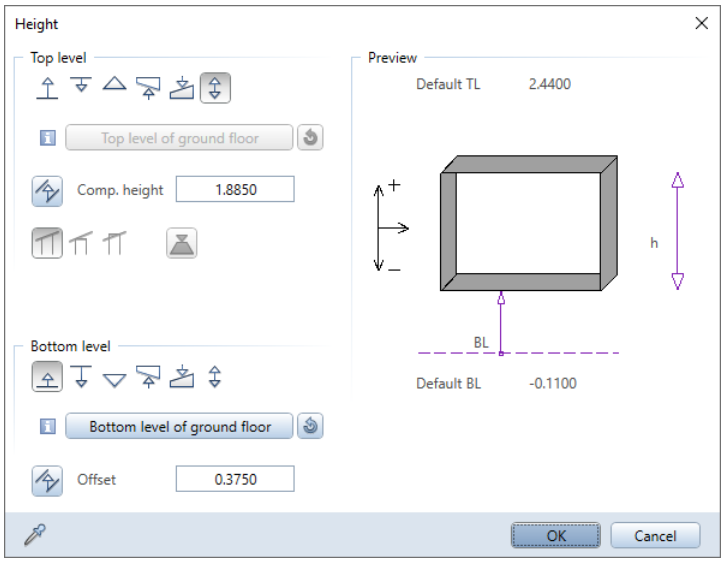
- **Top level** area:
  Fixed component height = 0.6350
- **Bottom level** area:
  Relative to lower plane = 1.1250



Keep the same settings for the other windows in the right exterior wall.

17 Draw more window openings in the **left exterior wall**. Change the height parameters for the **Top level** and the **Bottom level** again:

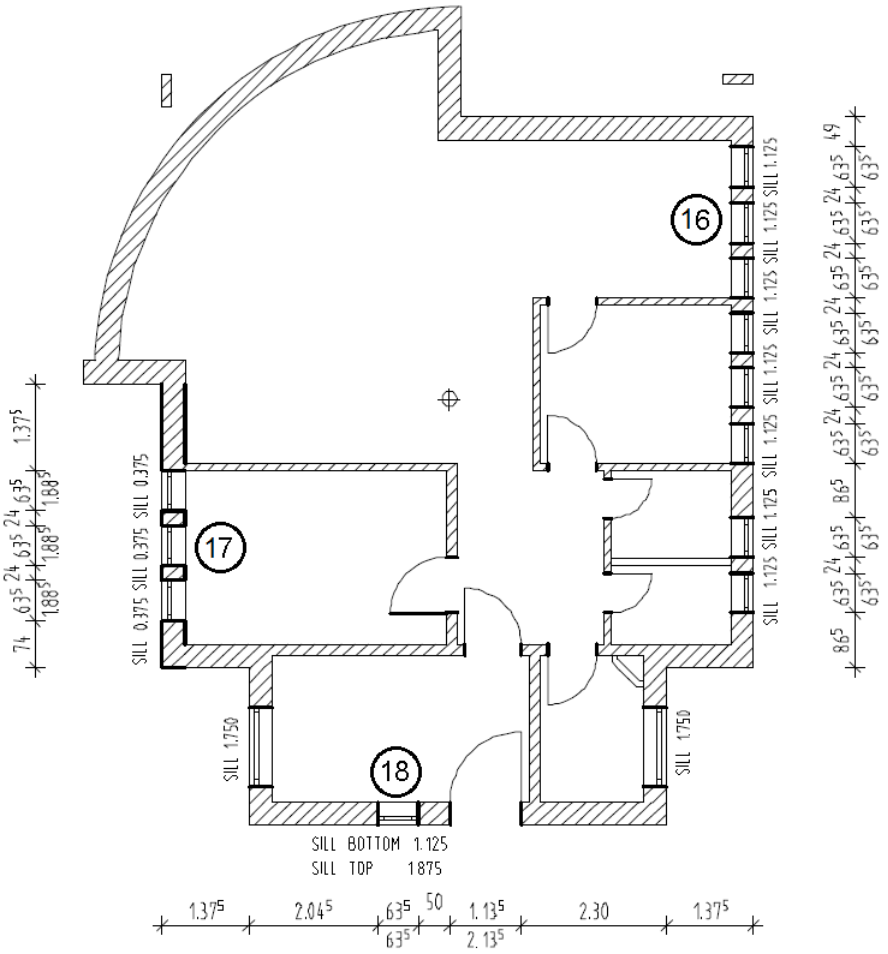
- **Top level** area:
  Fixed component height = 1.8850
- **Bottom level** area:
  Relative to lower plane = 0.3750



18 Draw two window openings above each other in the front entrance.

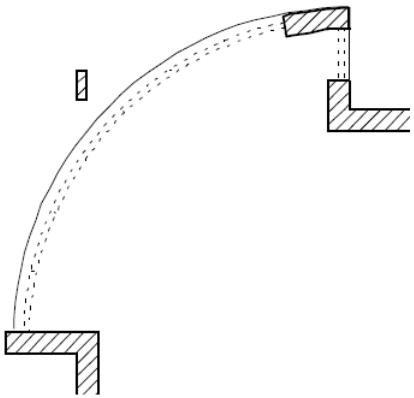
To do this, create two openings in the same place but with different settings for BL relative to lower plane:
First opening: **1.125**; second opening: **1.875**.
The component height in each case is **0.635**.

(See illustration)



Inserting window openings in the curved wall

Now insert windows in the curved wall and in the adjacent straight wall.



Due to the curve, you can define only the **depth of window** and the **outer reveal**; the **inner reveal** is calculated by the program.

Openings in curved walls can have reveal edges that are radial or parallel (**Options** – **Components and architecture** page – **Openings** area). For this building, you will use the **Radial** setting, which is the default.

Tip: If the arrow indicating the nearest reference point does not appear, you have most likely snapped the starting point of one of the segments in the curved wall. In this case, select the ESC key, zoom in even closer and try again.

To make things easier, open the **Point snap options** and select the **Display point snap symbols** option in the **Point snap representation** area.
Make sure that the symbol indicating the **Element** appears next to the crosshairs; you must not see the symbol for **(End)Point**!

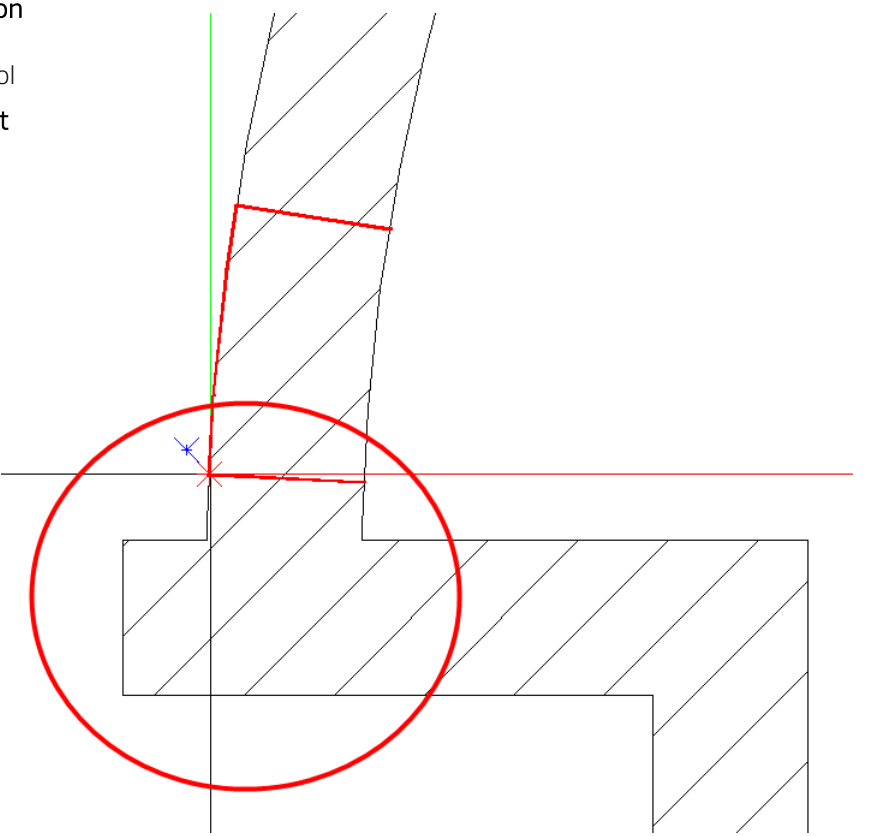
To insert window openings in the curved wall

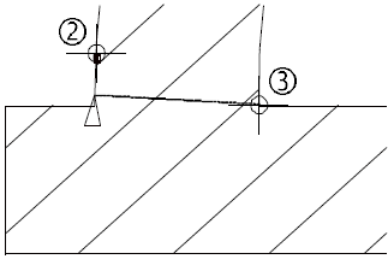
➲ The **Window** tool is still open. If it isn't, activate it now.

1 Use **Zoom Section** to get a close-up view of the lower-left curved wall.

2 Click the line representing the outside of the curved wall.

- Make sure that you do not snap a point (see Tip)!
- Pay attention to the direction in which you enter the opening: The closed side of the preview must point toward the outside. If required, use to select another **anchor point for preview**.



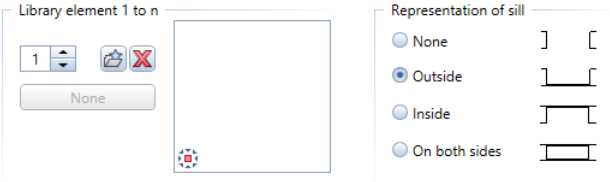


3 Click the inside corner of the curved wall.

You can see that the reference point has moved. A perpendicular has been dropped from the corner to the line representing the outside of the wall.

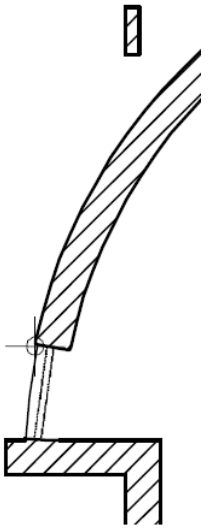
4 Enter the offset: **0**

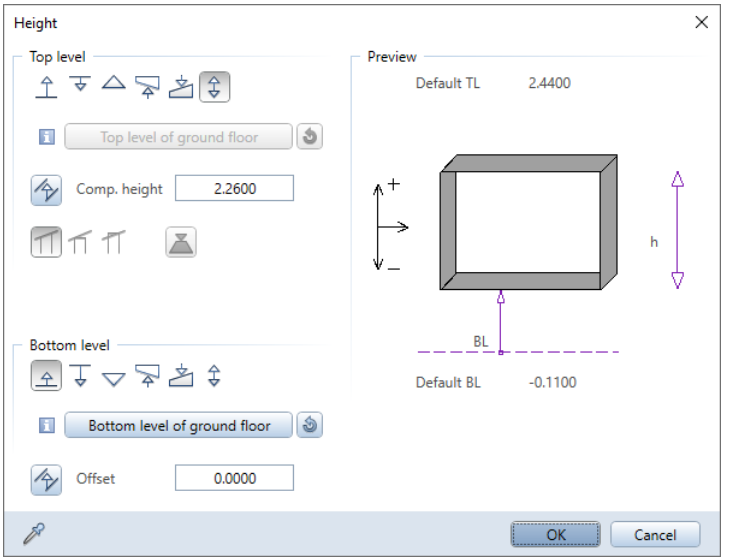
5 Click **Properties**.
Go to the **Library element 1 to n** area and click ; go to the **Representation of sill** area and select **outside**.



6 Click **Height** and enter the following values:

- **Top level:** **Fixed component height**: 2.26
- **Bottom level:** **Relative to lower plane**: 0





7 Click **OK** to confirm the dialog boxes.

8 *Set properties, end point or offset to end of opening*
Enter the opening width: **1.105**

9 *Set properties or click a line of an exterior wall*
Point exactly to the end point of the first opening and confirm **Offset to reference point** = **0.000** in the dialog line by selecting ENTER.

10 *New reference point or offset to reference point*
Open the shortcut menu (right mouse button) and click **Last point**. Then select ENTER to confirm the offset of **0.000** in the dialog line.

11 *Set properties, end point or offset to end of opening*
Confirm the opening width (**1.105**) in the dialog line.

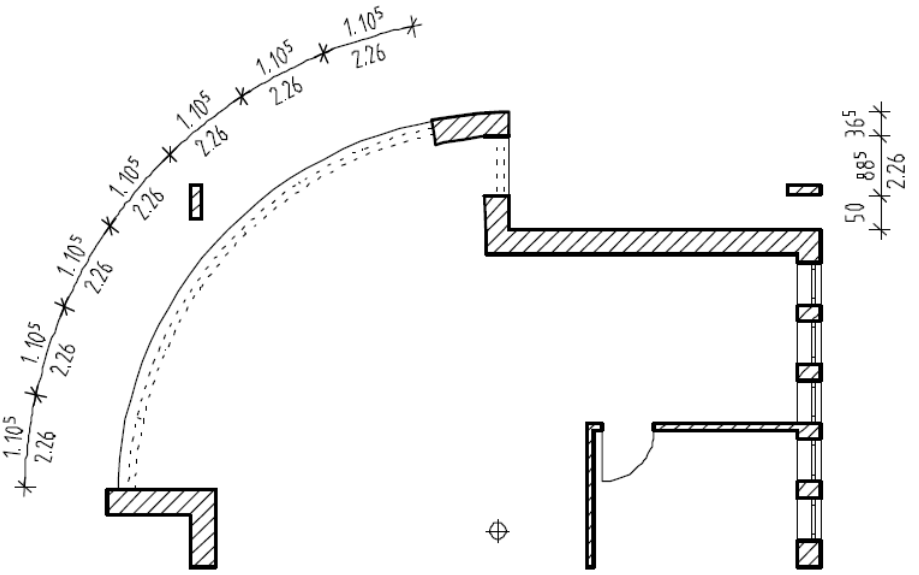
12 Repeat these steps (steps 10 to 12) to create five more openings so that a large opening (made up of 7 openings) is generated.

13 Insert another opening in the short wall that meets the top of the curved wall. The **representation of sill** is still **outside**.

Tip: Make sure that the **Offset to reference point** icon is selected in the dialog line; otherwise, you cannot confirm the value **0.000** by selecting Enter.

Tip: This opening requires a high degree of precision when you click points. Zoom in as close as you can and click the points exactly to avoid the risk of snapping to a point in a segment of the circle.

14 *Set properties, end point or offset to end of opening*
Enter the opening width: **0.885**



15 Select ESC to close the tool.

Defining the reference point

To change the position of the small arrow representing the nearest significant reference point, you can

- set another point on the wall

  or

- click a point beyond the wall. The reference point will move to the point on the wall that is perpendicular to the point you clicked.

The reference point arrow indicates the direction in which the distance between it and the small square is measured. This value is always a positive value, regardless of the axis direction. By entering a negative value, you can mirror the direction of measurement.

Inserting SmartParts

The next step is to insert window SmartParts in all window openings.

You will use single-casement windows for the detached house in this example. You can model your own SmartParts for openings by using the **Window SmartPart**, **Door SmartPart**, **Shading SmartPart**, **Domed Roof-Light SmartPart** and **Skylight SmartPart** tools. You can then save the finished SmartParts to the Library. So that you can start inserting SmartParts at once, the **Project** folder contains a favorite file with the required settings for a window SmartPart.

To insert SmartParts

➲ Drawing file **100 Ground floor model** is open.

➲ The **reference scale** is still 1:50.
Choose a larger scale to display the window SmartParts in greater detail. It is also a good idea to turn on the **Color stands for pen** option.

1 Open the **View** drop-down list on the Quick Access Toolbar and click **Show/Hide**. Select the **Color stands for pen** option.

2 Expand the **Opening Elements** task area and click **Window SmartPart**.

The **Properties** palette opens, displaying an empty window frame. You can now design your own window SmartPart step by step. You can find a favorite file with a complete window SmartPart in the project folder.

3 Click **Load favorite**, open the **Project** folder and select the `Window_single_casement.smv` favorite file.

Allplan reads the saved values and settings into the **Properties** palette.

Tip: You can find detailed information on modeling window SmartParts in the step-by-step guide "Windows, Doors and SmartParts". As a Serviceplus member, you can download this guide in PDF format from Allplan Connect (http://connect.allplan.com). Go to the Training - Documentation area.

4 If you want, you can switch between the tabs and check the settings. So you can see how the SmartPart was modeled.

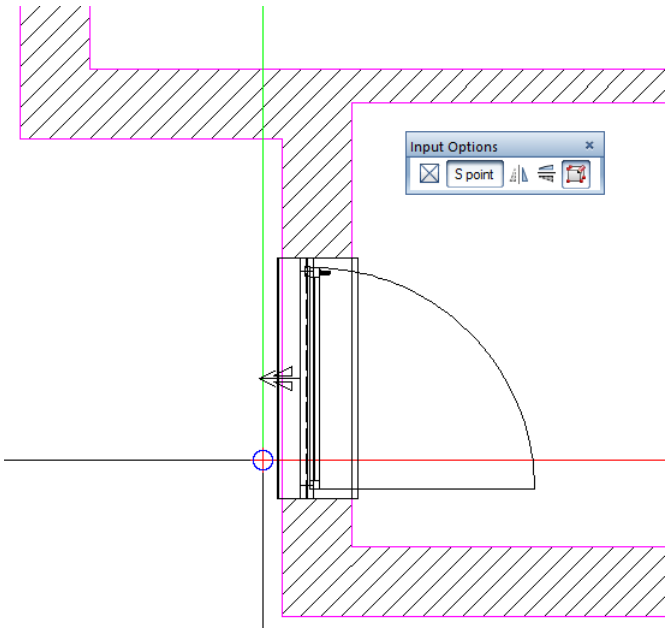
The SmartPart is attached at its drop-in point to the crosshairs. The drop-in point is the lower-left corner of the SmartPart. As soon as you point to a wall opening, the preview adapts to the outline of this opening.

5 Zoom in on the lower-left corner of the building.

6 Move the SmartPart attached to the crosshairs into the lower-left window opening.

The SmartPart automatically adapts to the size of the opening. When you point to the other side of the opening, you can see how the position of the SmartPart changes.

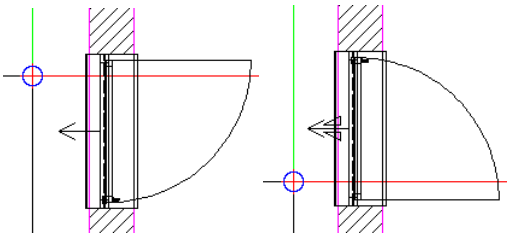
7 As soon as you have found the appropriate position (as shown in the illustration), click in the workspace. You have just placed the first SmartPart.



Notes: If you created the opening with a reveal (as is the case in this example), Allplan always places the SmartPart in the middle of the reveal. It is irrelevant where you click the opening. If there is no reveal, Allplan places the SmartPart in such a way that it is centered in the wall layer clicked.

To place the element, use the tools in the input options.
You can specify an angle of rotation in the dialog line. Allplan then places the SmartPart at this angle.

When you place the SmartPart, an arrow appears in the middle of the SmartPart, indicating the outside of the SmartPart.
Depending on the position of the SmartPart within the opening, you can see another symbol, indicating that the SmartPart will be mirrored.



Note: You can select the size and color of these symbols. To do this, open the **Options** (**Default Settings** drop-down list on the Quick Access Toolbar) on the **Point snap** page and use the **Size of CursorTips for snap points** and **Color of CursorTips** options in the **Point snap representation** area.

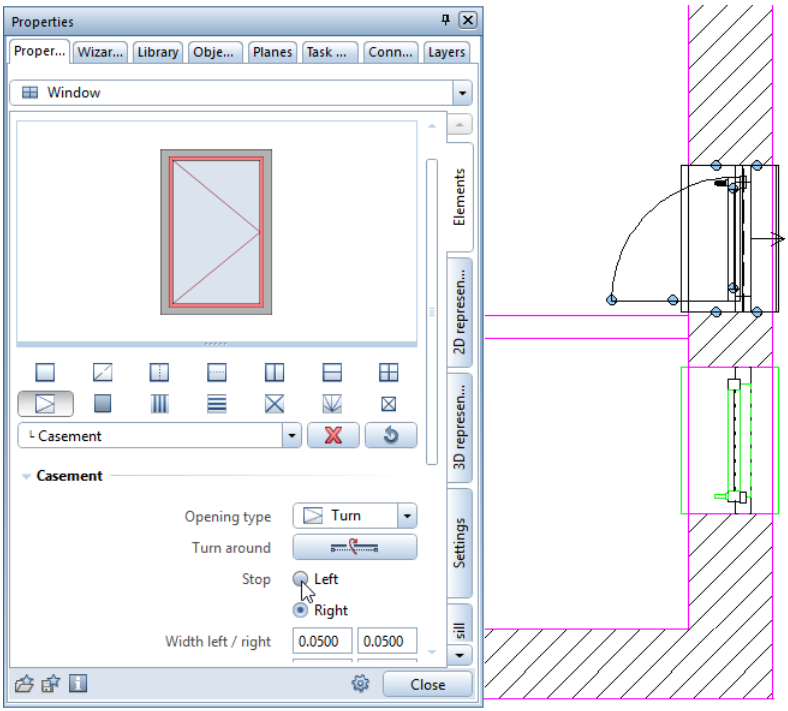
The tabs of the SmartPart provide numerous parameters for modifying the SmartPart itself and the way it looks. By assigning layers, you can control which window elements are visible. You can do this separately for 2D and 3D. Take the **Window, single casement** SmartPart as an example: The window elements are on the **AR_WIND** layer, the window sills are on the **AR_WSILL** layer and the opening symbols are on the **AR_SWING** layer. Do not change this setting.

8 Select ESC to finish.

A copy of the SmartPart you just placed is attached to the crosshairs.

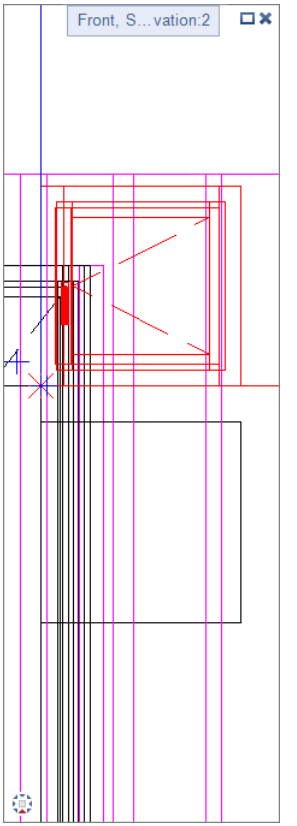
9 Place more SmartParts as shown in the illustration. For the time being, ignore the openings in the curved wall and the floor-to-ceiling opening to the right of the curved wall.

The opening symbols of the windows appear in plan when you place the SmartParts. To change the opening direction, select the corresponding option on the **Elements** tab.

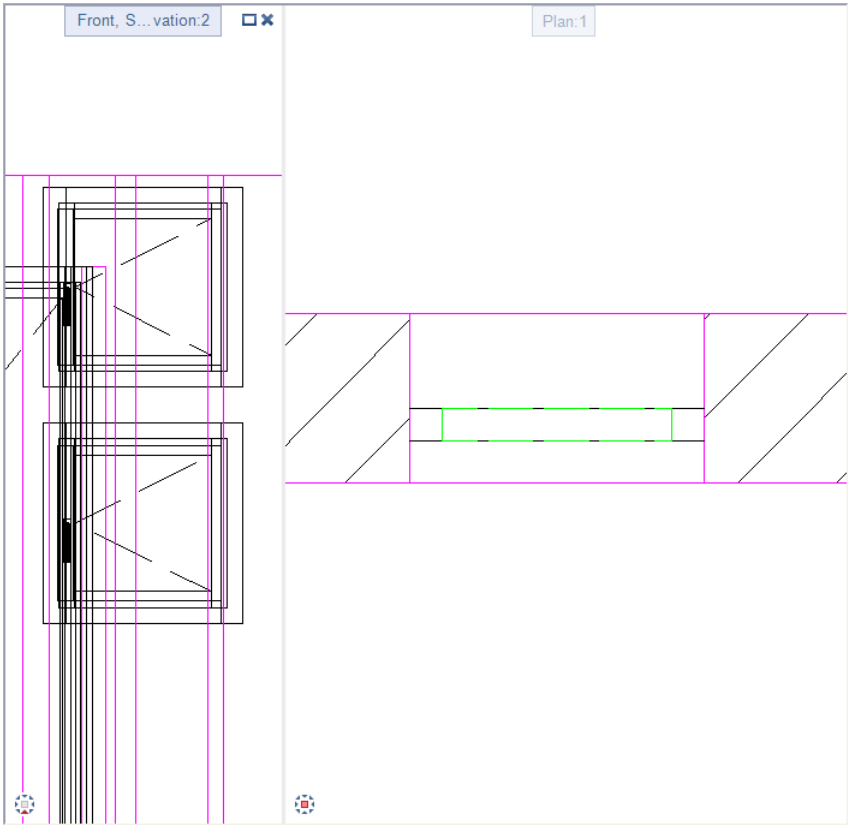


10 When inserting the window SmartParts in the two window openings that are above each other to the left of the entrance door, you need to make sure that the SmartParts really snap into place:

- Insert the first SmartPart in the upper opening. Then close the **Window SmartPart** tool.
- Open the **Window** drop-down list on the Quick Access Toolbar and select **2 Viewports**. Go to the second viewport and select **Front, South Elevation**.
- Use the **Copy** tool (**Edit** task area) to place the same SmartPart in the lower window opening. Select this tool and click the SmartPart you have already placed.
- *From point*
  Click the lower-left corner of the upper window opening in elevation view.

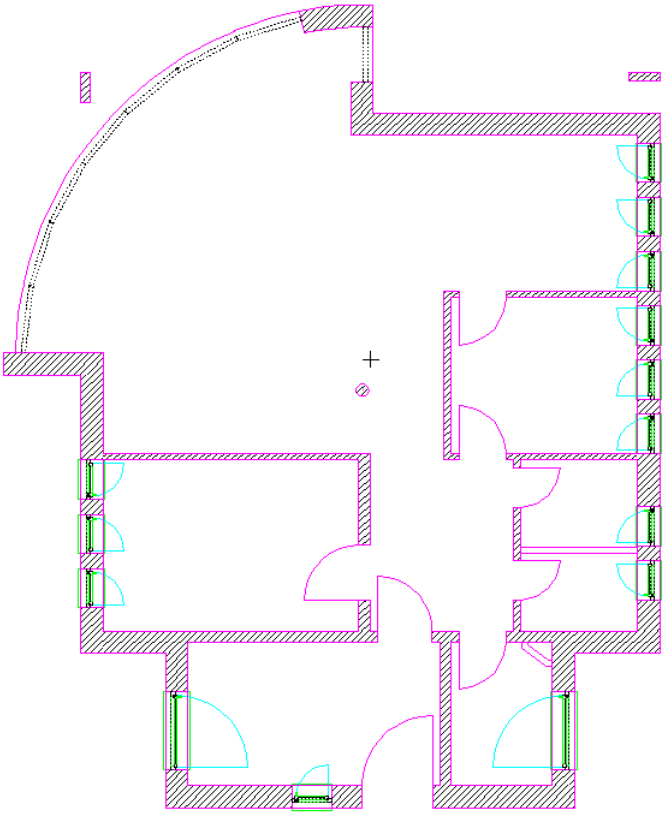


- *To point*
  Enter Δz dz = −0.75 m in the dialog line and select ENTER to confirm.
- Select ESC to close the tool.



11 After you have inserted all SmartParts, select ESC to close the tool.

Open the **Layers** palette and make the **AR_SWING** layer visible.
Your screen should now look like this:



You can save the new SmartPart to the **Project** or **Office** folder in the library.

To save the SmartPart to the library

1 Switch to the **Library** palette.

2 Open the **Project** or **Office** folder.
If you have selected the **Project** folder, open the project where you want to save the SmartPart. For example, choose the **Architecture Tutorial** project.

3 Click **New group** at the bottom of the palette.

4 Enter a name for the group: **Windows**.
Select ENTER to confirm.

Allplan creates the **Windows** folder.

5 Open the **Windows** folder. At the bottom of the palette, click **Insert element** – **Insert SmartPart**.

6 Select SmartPart you want to save
Click one of the SmartParts you have placed.

7 Save as
Enter a name for the SmartPart: **Window, single casement**.
Click **OK** to confirm.

Allplan saves the SmartPart with a preview to the library.

SmartParts in curved wall

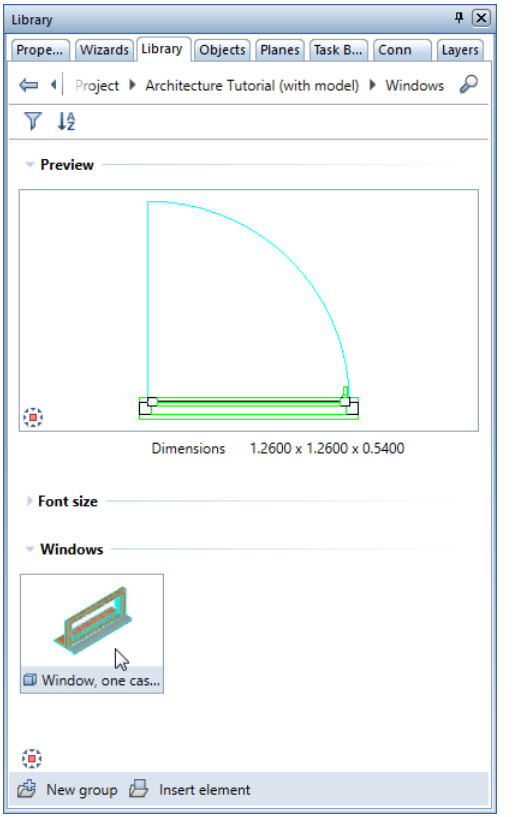
The remaining floor-to-ceiling windows will also be given SmartParts. You will use the SmartPart you just saved to the library. However, you will modify the SmartPart first.

To insert SmartParts

➲ Drawing file **100 Ground floor model** is open.
The reference scale is still 1:50.

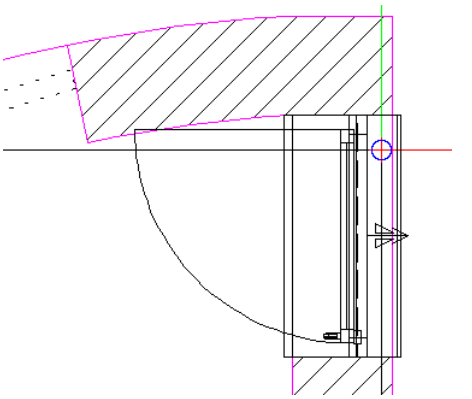
1 The **Library** palette is still open.
If this is not so, switch to the **Library** palette. Then open the **Project** – **Architecture Tutorial** – **Widows** folders one after the other until you see the **Window, single casement** SmartPart you just saved.

2 Select the **Window, single casement** SmartPart by double-clicking it.



Tip: To view the SmartPart from all sides, you can switch between different views in the **Preview** of the palette.

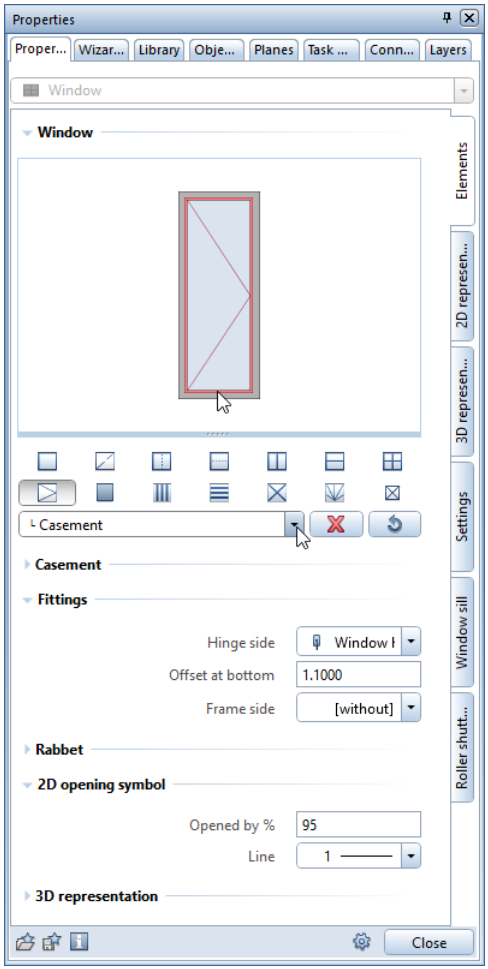
3 First click the opening in the straight wall.



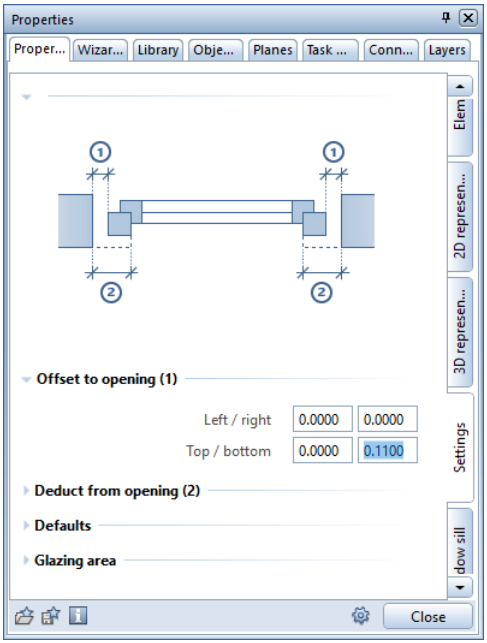
4 The **Properties** palette of the SmartPart opens. To adjust the height of the window handle, open the **Elements** tab and click the casement in the preview or select the casement in the list. The preview shows the casement in the selection color. Below the preview, you can find the parameters of the casement.

5 Open the **Fittings** area and enter **Offset at bottom** = **1.10** m.

6 Open the **2D opening symbol** area and change the value for **Opened by** to **95**.

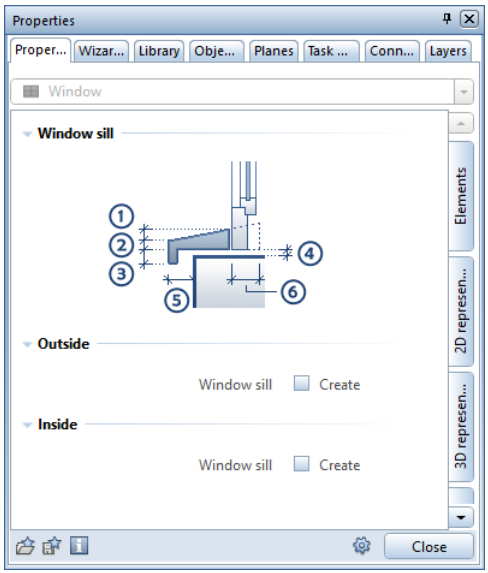


7 Switch to the **Settings** tab in the **Properties** palette of the SmartPart. Go to the **Offset to opening (1)** area and enter **bottom** = **0.1100** m. This is to take the floor structure into account.



8 Switch to the **Window sill** tab in the **Properties** palette and turn off the **Create window sill** options for both the **Inside** and the **Outside**.

9 To confirm your changes, click **Close** at the bottom of the **Properties** palette.



Taking the modified parameters into account, Allplan has inserted the SmartPart in the opening.
A copy of the SmartPart is attached to the crosshairs.

10 Click the first opening in the curved wall and insert the SmartPart.

11 Insert the SmartPart in the other window openings.
You will notice gaps between the SmartParts in the curved wall.
This is caused by the radial edges of the reveal in the curved wall.

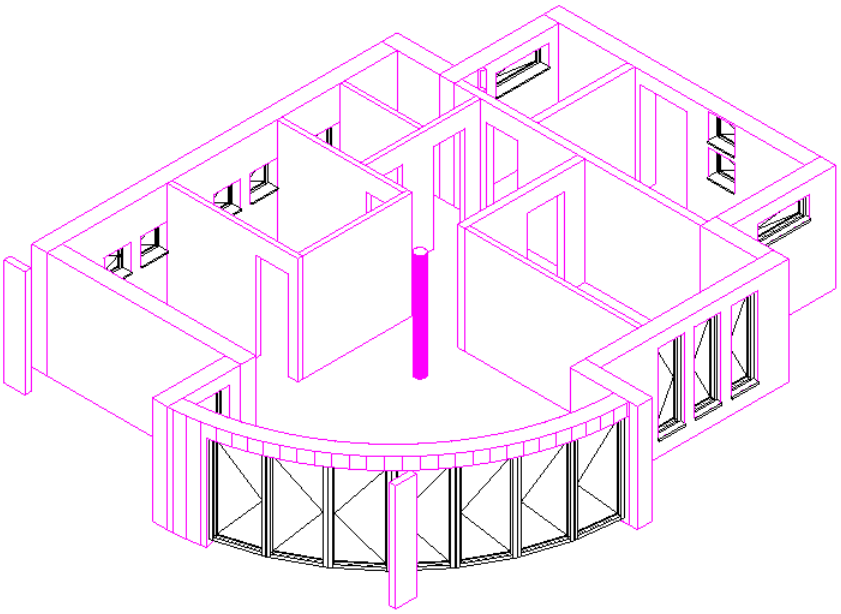
12 Select ESC to close the tool.

13 Next, go to the three windows in the exterior wall on the left side and correct the height of each window handle to **Offset at bottom** = **1.10** m.

14 Change the reference scale back to 1:100.

15 To make sure your drawing does not get too cluttered, open the **Layers** palette and **hide** the **AR_SWING** layer.

Hidden-line image of rear left isometric view:



Chimney

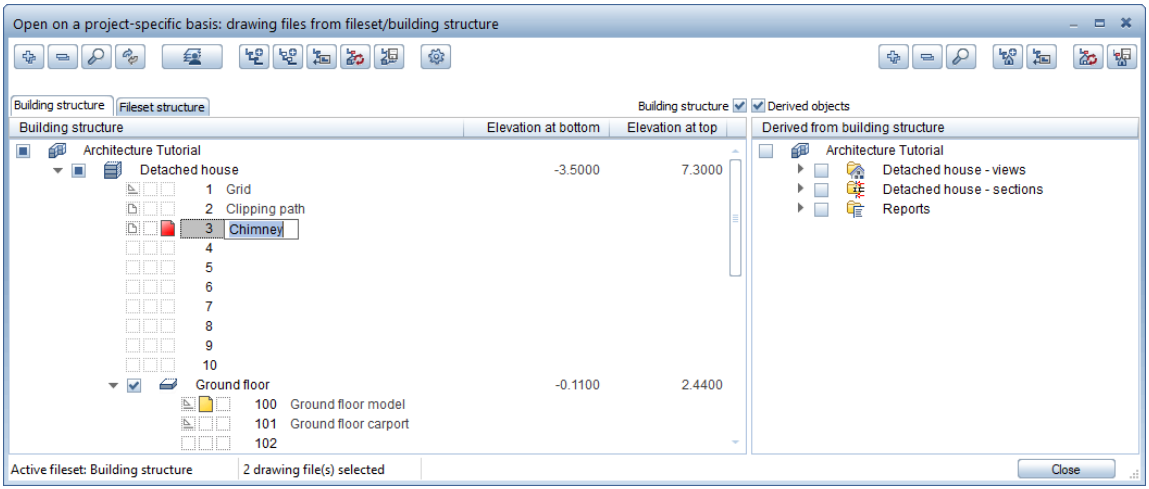
Insert a chimney for the heating system in the basement.

The chimney is a component which, in this example, applies to all four floors. Its bottom level is on the unfinished basement floor; its upper level is above the roof. By means of the building structure, you can design components applying to all floors in a single drawing file. For this purpose, you will use a drawing file under the **Detached house** structural level.

To place a chimney

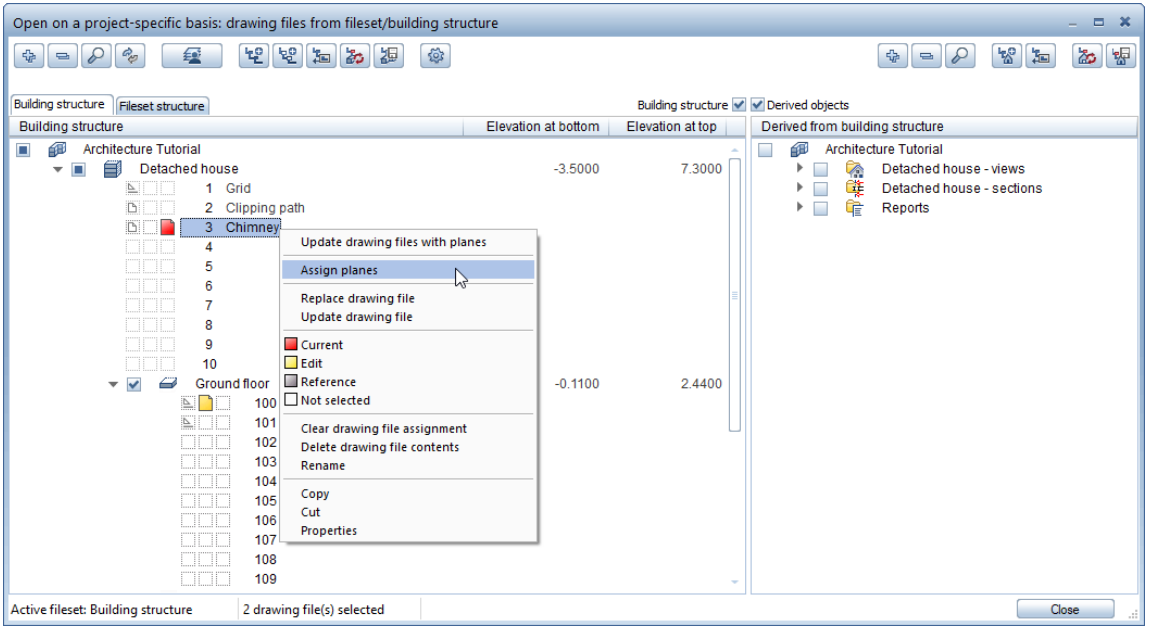
1 Click **Open on a Project-Specific Basis** (Quick Access Toolbar).

2 Open drawing file **3**. Name the file **Chimney**.

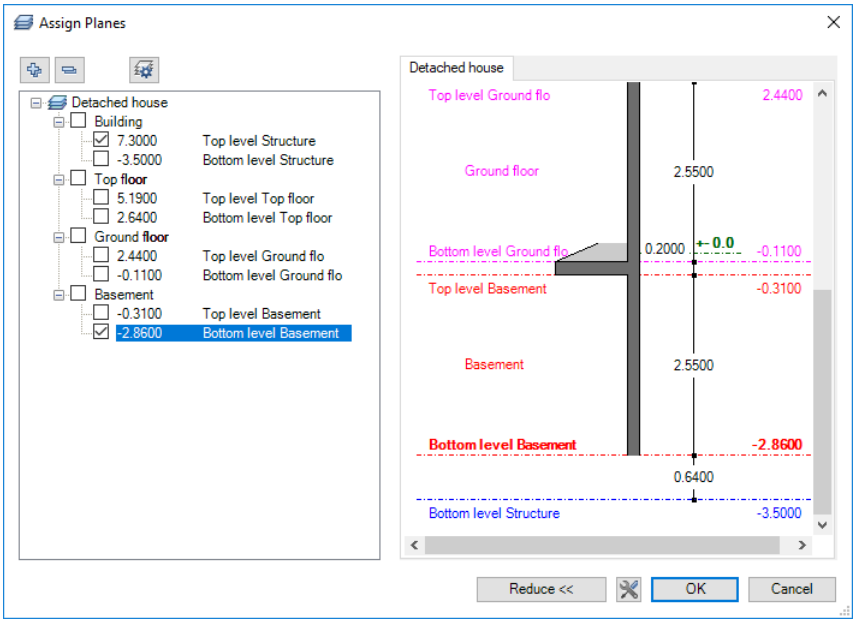


3 Drawing file **3 Chimney** has automatically been given the planes of the **Detached house** structural level (**Default lower plane** = **–3.50** m and **Default upper plane** = **7.30** m). Because the bottom level of the chimney is on the unfinished basement floor, you can now assign this height setting to the drawing file.

To do this, open the shortcut menu of drawing file **3 Chimney** and click **Assign planes**.



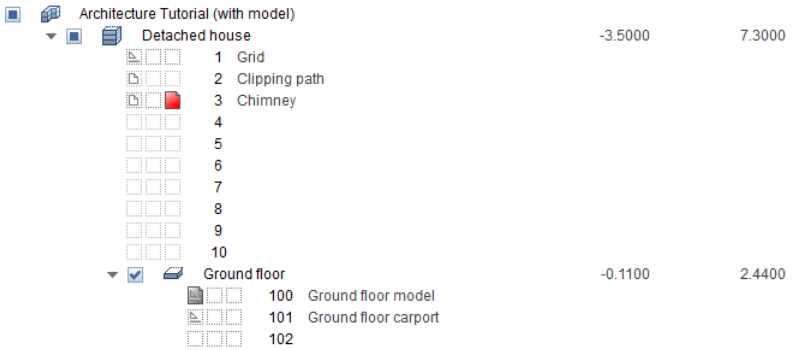
4 The **Assign Planes** dialog box opens. Select **Top level of building** (**7.30** m) for **Default upper plane** and **Bottom level of basement** (**–2.86** m) for **Default lower plane**.



5 Click **OK** to close the **Assign Planes** dialog box.

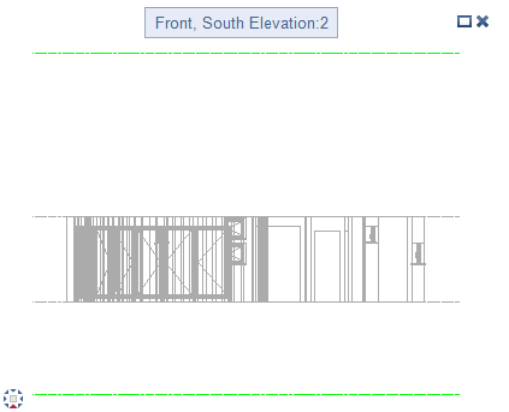
6 Click **OK** to confirm the **Behavior of drawing files** dialog box without selecting an option.

Drawing file **3 Chimney** gets the selected height settings.



7 Make drawing file **3 Chimney** current and open **100 Ground floor model** in reference mode. Close the dialog box.

Have a look at the viewport in **front, south elevation**. You can see the default planes of drawing file **3 Chimney**, which is open in edit mode, and drawing file **100 Ground floor model**:



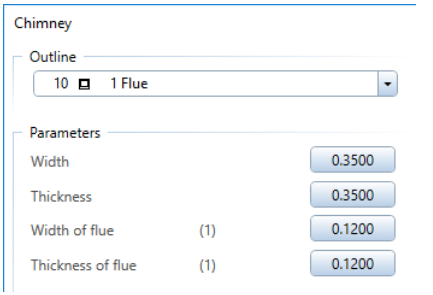
8 Click **Chimney** (**Components** task area).

9 Check the **Properties** palette to see whether the layer **AR_CHIMN** is selected. If it isn't, select it now.

10 Click **Properties** and select chimney type **10**.

11 Enter the following dimensions:

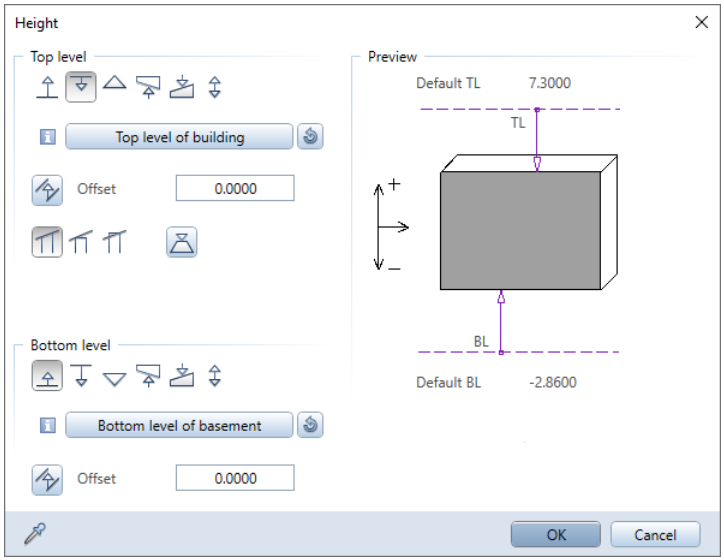
- **Parameters** area:
  Width = 0.3500
  Thickness = 0.3500
  Width of flue = 0.1200
  Thickness of flue = 0.1200



12 Assign any trade, material and calculation mode and turn off the hatching.

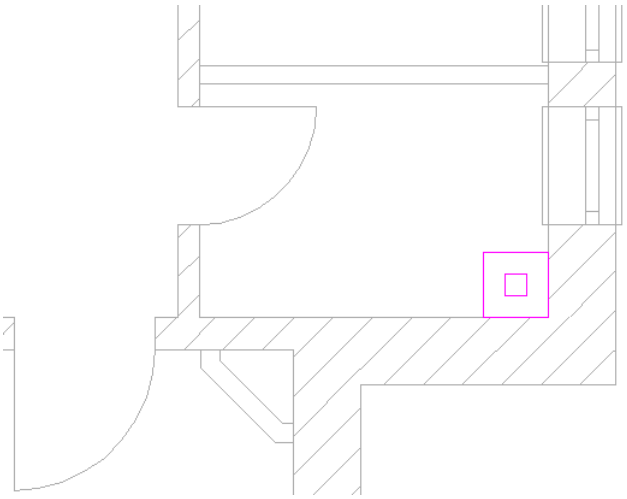
13 Define the height.

At 2.86 m, the top level of the chimney is at the height of the unfinished basement floor. For the time being, its top level is attached to the overall building height of 7.30 m, which is defined in the building structure.



14 Click **OK** to confirm the dialog boxes and change the anchor point to **lower right**.

15 Place the chimney in the lower-right wall corner and select the ESC key to close the tool.



Checking the design

If you want to check the design, switch to the **Animation** view type. You can find this setting on the viewport toolbar of each viewport.

To check the design in animation

➲ Make drawing file **100 Ground floor model** current and open drawing files **3 Chimney** and **101 Ground floor carport** in edit mode.

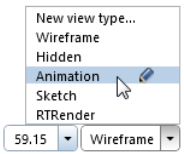
1 Open the **Layers** palette and click **Select Layer Print Set** at the bottom of the palette.

2 Select the **Model** print set in the dialog box and click **OK** to confirm.

3 Open the **Window** drop-down list on the Quick Access Toolbar and click **1 Viewport**.

4 Select **Rear Left, Northwest Isometric View** on the viewport toolbar.

5 Select the **Animation** view type on the viewport toolbar.



6 Turn on **Navigation Mode** on the viewport toolbar.

Tip: When you select the F4 key, the program automatically opens an animation viewport and switches to **Navigation Mode** (viewport toolbar). You can see the building in the middle of the viewport, viewing it from the front and top.

You can now use the mouse to move through the building.

In **sphere mode**, the observer moves around the object on the surface of an imaginary sphere.

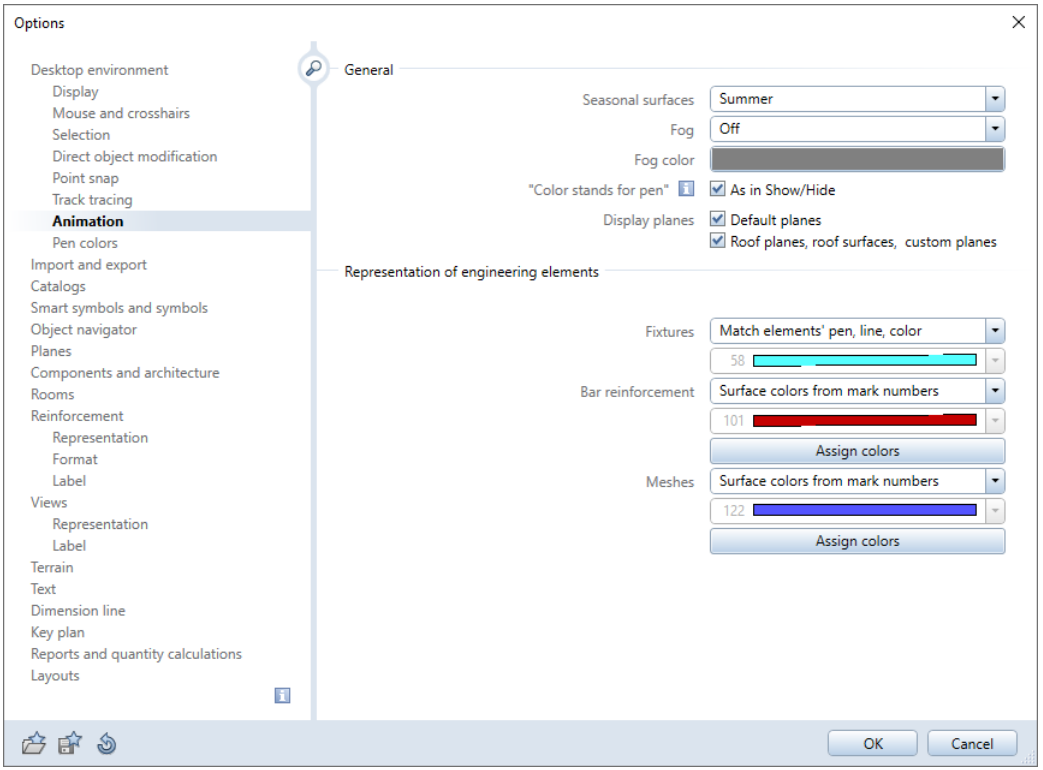
Left mouse button:
Turns the camera about an object on the surface of an imaginary sphere.

Middle mouse button:
Moves the camera to the left or right and up or down on a linear path.

Right mouse button:
Zooms in or out; moves the camera forward or backward.

7 In animation, you can see a virtual ground plane. To define this ground plane more precisely, use **Surroundings** (on the shortcut menu or in the **Architecture** role – **Visualization** task – **Surfaces, Light** task area).
If you want to see the default planes too, open the **Default Settings** drop-down list on the Quick Access Toolbar and click **Options**.

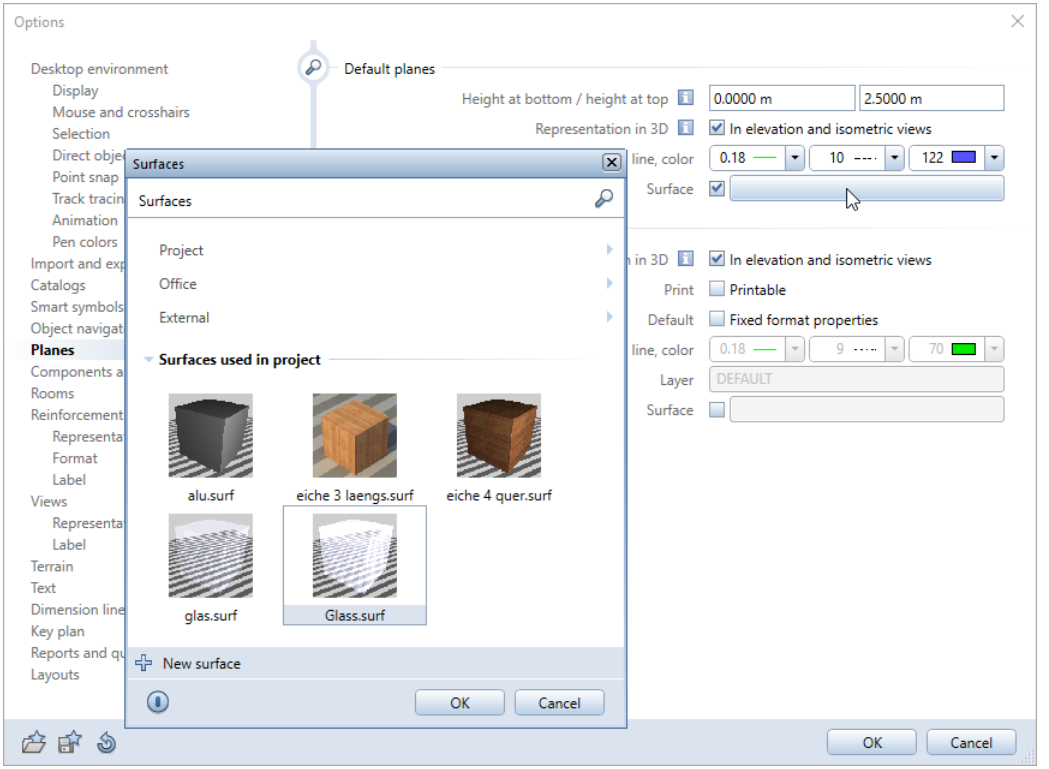
8 Open the **Animation** page, go to the **General** area and select the **Display default planes** and **Display roof planes, roof surfaces and custom planes** options.



9 Click **OK** to close.

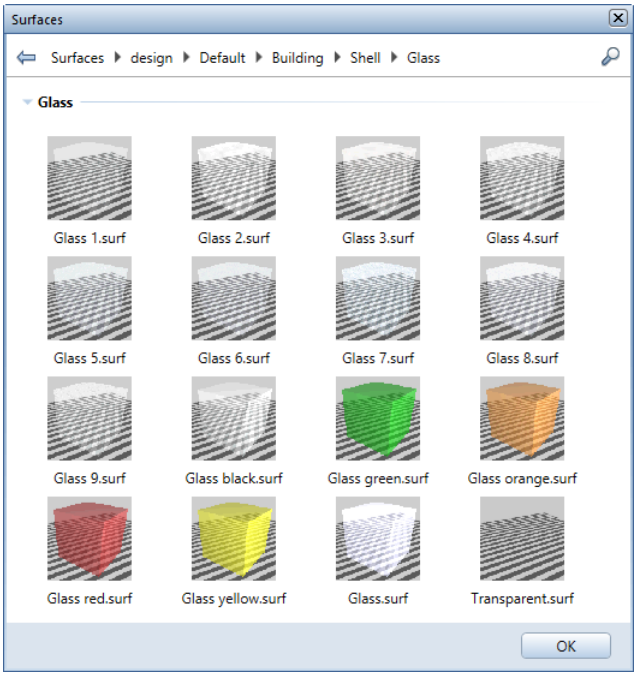
10 To make the planes transparent, select the **Options** again. This time open the **Planes** page.

11 In the **Default planes** area, select the **Surface** check box and click the button.



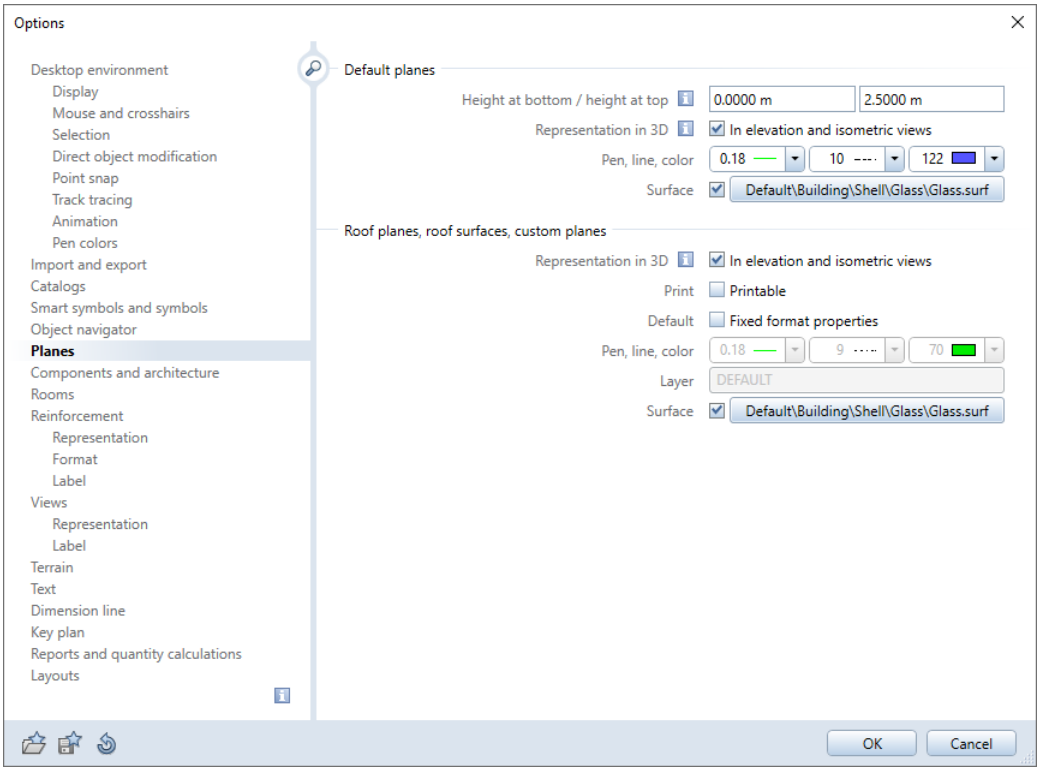
12 Select the **Glass.surf** file.

If you cannot find the **Glass.surf** file in the **Surfaces used in project** area, open the **Office** - **Default** - **Building** - **Shell** - **Glass** folders one after the other. Select the **Glass.surf** file. The program automatically copies this file to the **Design** folder of the project standard. As a result, you can select this file in the **Surfaces used in project** area.



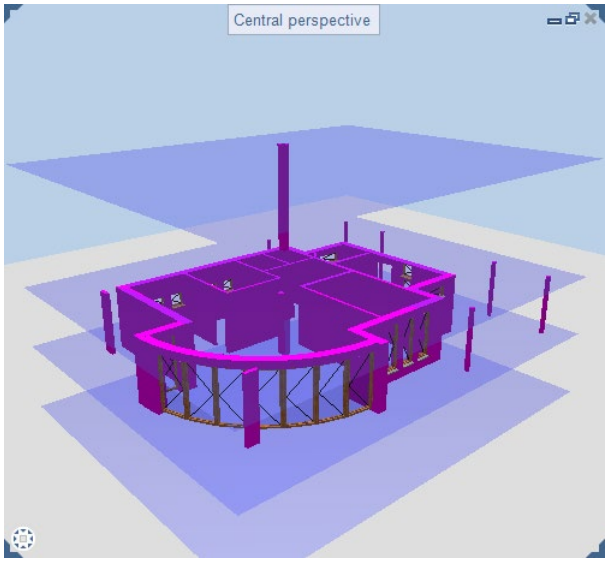
13 Click **OK** to close the **Surfaces** dialog box.

14 Make the same settings in the **Roof planes, roof surfaces, custom planes** area.
Here, you can select the **Glass.surf** file in the **Surfaces used in project** area.

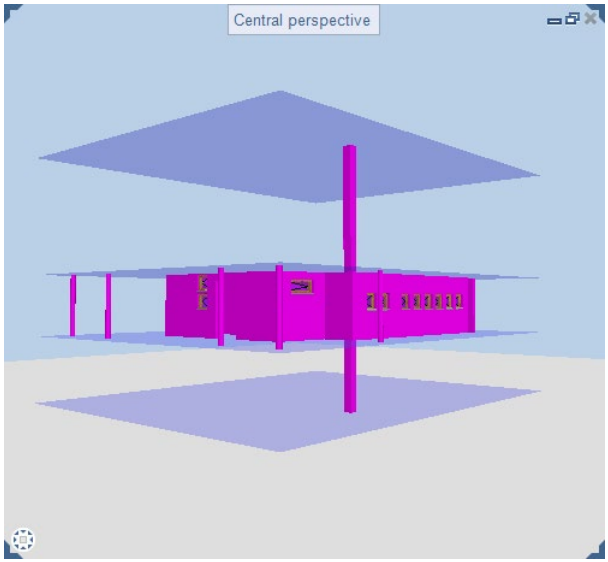


15 Close the **Options**.

16 Click **Restore 3D View** (**Update** task area).



You can see the default planes in animation. It is easy to identify which component is attached to which plane.



17 To close animation, select the **Wireframe** view type on the viewport toolbar.
Switch to plan view.

Note: When checking the design, you can also show or hide elements or element groups, make them transparent or zoom in on a particular element. To do this, use the **Objects** palette, which lists all components of your virtual building model in a compact and clear manner. You can use predefined sorting criteria to show and hide the required objects and elements.
You can find detailed descriptions of the options provided by the **Objects** palette in the Allplan Help.

Completing the design

You will now complete the floor plan with the outline of the slab over the columns, the carports and furniture. To do this, you will use the 2D drafting tools.
It is a good idea to keep 2D information and architectural components in separate places. Consequently, you will use the DE_GEN01 layer for 2D designs.

First, draw the outline of the slab over the columns so that the slab extends beyond the walls. Use a different pen and line type to do this. Place he outline of the slab on the DE_GEN01 layer.

To draw the outline of the slab

➲ Expand the **Quick Access** task area (**Architecture** role – **Elements** task) by double-clicking within the name line of the task area.

1 Open the **Layers** palette and click **Select Layer Print Set** at the bottom of the palette.

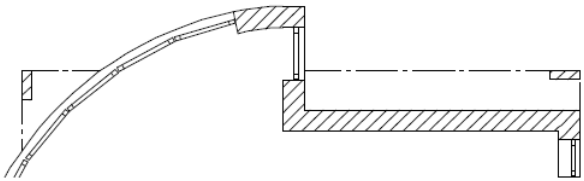
2 Select the **PR Design** print set in the dialog box and click **OK** to confirm.

3 Click **Line** in the **Quick Access** task area.

4 Go to the **Properties** palette and select the layer **DE_GEN01**. Select pen (7) **0.13** and line type **11**.

5 Click **Enter at right angles** (dialog line) and draw the floor slab; use the columns as a guide.

The easiest way to join the lines with the edge of the sill is by means of **Intersect 2 Entities** (shortcut menu).



Tip: You can also use **Ctrl+4** to select layers.

If no tool is active, just double-click the right mouse button in the empty workspace.

Carports

You will draw the outlines of the slabs for the carports as a 2D design in drawing file 101. Here, too, place the outlines on the DE_GEN01 layer.

To draw parallel lines

➲ The **Architecture** role and the **Elements** task are open.
Make drawing file **101 Ground floor carport** current and open **100 Ground floor model** in reference mode.
Close all the other drawing files.

1 Go to the **Quick Access** task area and click **Offset Polyline** (flyout menu of the **Line** tool). Check that the **DE_GEN01** layer is selected.

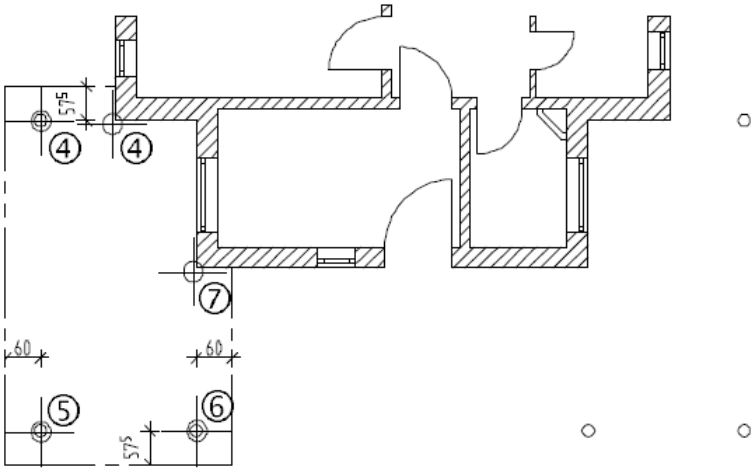
2 *Number of parallel lines*: **1**
Offset: **0.575** (ENTER!)

3 Select pen **0.18** and line type **8** (**Properties** palette) for the outline of the carport.

4 Click the corner of the house and then the center of the column. You can see a preview of the parallel line at the offset you specified.

5 Change the offset to **0.6** and click the lower-left center of the column.

Tip: Offset Polyline:
Use **left** or **right** in the input options to change the side on which Allplan creates the polyline.



6 Change the offset to **0.575** and click the center of the next column.

7 Change the offset to **0.6**, click the corner of the house and select ESC to finish drawing the polyline.

8 Draw a further parallel polyline for the area with the offset **-0.15**. Select pen (2) **0.35** and line type **1** and enter the points in the same sequence.

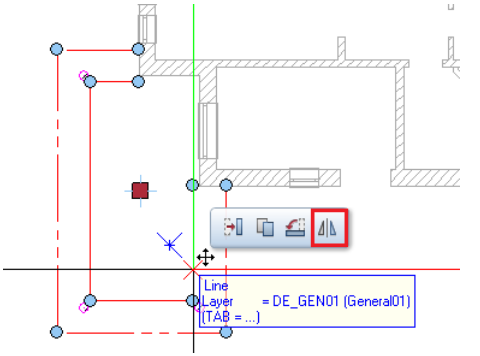
You will create the second carport by mirroring and copying the first one. Now it is a good idea to use track tracing.
In this exercise, you will also learn to use the filter tools. You can use these to select elements in an area.

To mirror and copy the carport

1 Expand the **Filter** task area and click **Filter by Element Type**. Select **Line**. Enclose the carport in a selection rectangle.

The polylines appear in the selection color.

2 Open the shortcut menu of a line and click **Copy and Mirror**.



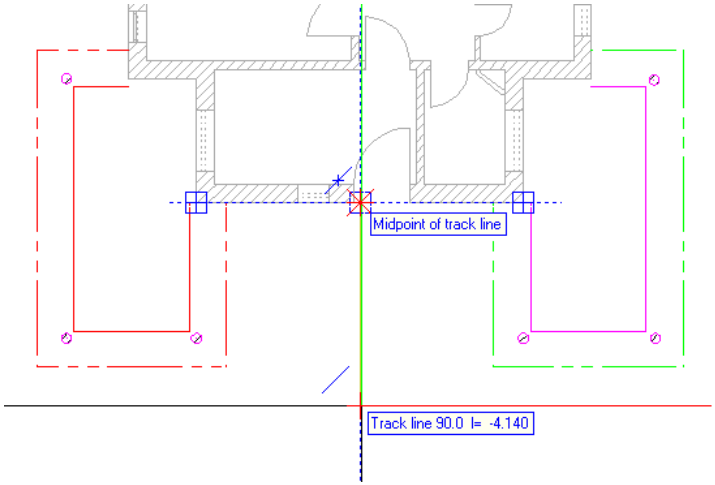
3 *Click point 1 of mirror axis:*
Turn on track tracing by selecting the F11 key or click **Track line** in the dialog line.

The center of the facade at the front of the building will serve as the first point for the mirror axis.

Point to the left corner of the house. You can see the first track point.
Point to the right corner of the house. You can see the second track point.

Position the crosshairs roughly midway between the two track points so that you can see the **midpoint of the track line**. Click this point.

Tip: Here is an alternative to define the midpoint: Right-click in the workspace to open the shortcut menu. Choose **Midpoint** and left-click the left and right corners of the house.



The mirror axis needs to be parallel to the y-axis.

4 *2nd point of mirror axis:*
By means of track tracing, you can display the track line that is perpendicular to the first point of the mirror axis (= midpoint of the facade at the front of the building). Move the crosshairs roughly at a 90-degree angle above or below the first point of the mirror axis. The 90.0-degree track line appears. Click this line wherever you want.
Allplan creates a vertical mirror axis, mirroring and copying the selected elements.
As you can see, the lines of the second carport are placed correctly.

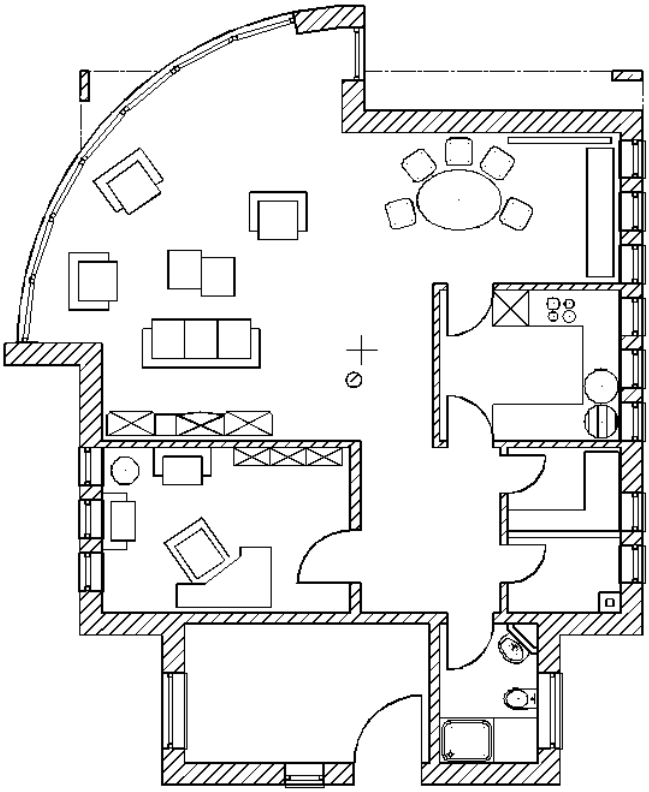
5 Select F11 to turn track tracing off again and select ESC to finish.

Furniture

You can draw the furniture for the ground floor yourself.

Use the tools in the **Quick Access** task area to design the furniture. Place the furniture on the **DE_FURN** layer Sanitary objects get the **DE_SANY** layer. By doing so, you can conveniently transfer single layers to specialist planners.
You can find furniture in the **Library** palette. Open the **Default – 2D objects – Interior** folders.

When furnished, the ground floor might look like this:



Symbols and layers

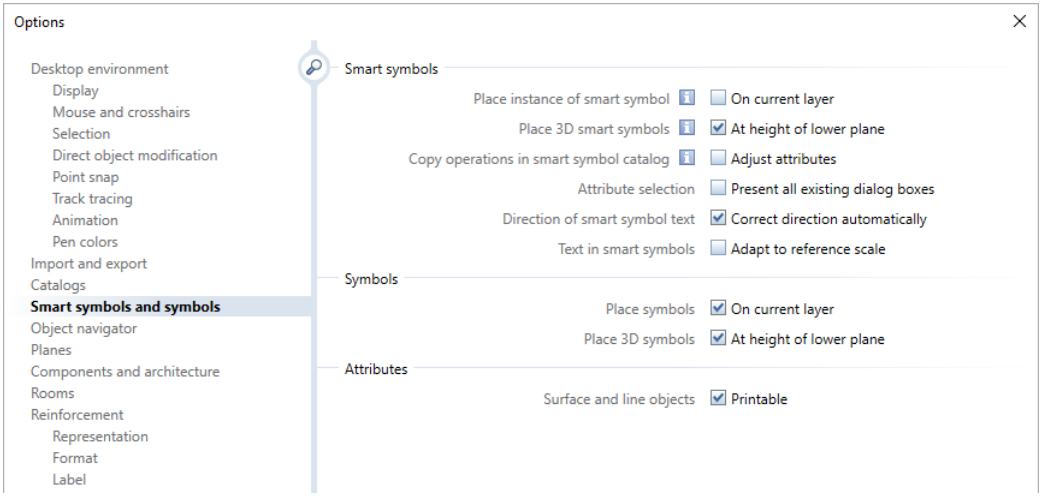
When you place symbols, they usually get the layer on which they were drawn. The elements in a symbol can also reside on different layers. When you use symbols provided by partner offices, the layers of the symbols are usually unknown.

To avoid changing layers frequently, you will now select the **Place symbols on current layer** option in the **Options**. When selected, all symbols get the layer that is currently active, regardless of the layers on which they were drawn.

To define the layer for symbols

1 Open the **Default Settings** drop-down list on the Quick Access Toolbar and click **Options**. Select the **Smart symbols and symbols** page.

2 In the **Symbols** area, select the **Place symbols on current layer** option.



3 Click **OK** to confirm.

Modifying layers

If you find that elements are on the wrong layer, you can move them to a different layer at any time. The following section shows how to assign a different layer to these elements.

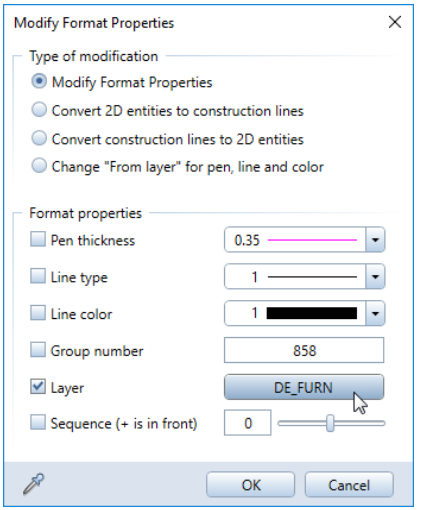
Note: Symbols are saved as entity groups in Allplan. An entity group is a group of elements which can be addressed and modified as a whole. To address a symbol or group in a single step, click the symbol with the middle mouse button and then left mouse button. This mouse button combination selects entity groups.
You can also select entity groups by clicking while selecting and holding the SHIFT key.

Tip: You can also modify the layer of an element by selecting **Format Properties** on the shortcut menu.
However, this approach does not modify linked elements (for example, window openings in walls).

To modify layers

1 Click **Modify Format Properties** (**Change** task area).

2 Click the **Layer** button, double-click the **DE_FURN** layer to select it and click **OK** to confirm the **Modify Format Properties** dialog box.



3 Select the symbols you want to place on the **DE_FURN** layer.

To do this, open the **Brackets** (**Work Environment** task area) and click each symbol with the *middle* and *left* mouse buttons. Close the **Brackets** afterward.

Dimensions and labels

To dimension architectural elements, you can use a tool that creates associative dimension line blocks:
the **Dimension Walls** tool (**Architecture** role – **Elements** task – **Components** task area). "Associative" means that the program updates all dimensions automatically when walls and openings change.

Dimension lines and sill heights get separate layers. Having all elements in the same drawing file ensures that associativity is not lost.
The dimension lines for the building are in drawing file 100; the carport dimensions are in drawing file 101.

You can find an illustration of the dimensioned floor plan at the end of this chapter.

Dimensioning walls

In the following exercise, you will create associative dimension line blocks for the walls.

Tip: To avoid confusion, hide the furniture layer and sanitary layer. There are various ways to do this:
– Use the **Layers** palette.
– Use the **Select, Set Layers** dialog box.
– Use the **Objects** palette and the **Sort by layer** criterion.

To dimension walls

➲ Make drawing file **101 Ground floor model** current and open **100 Ground floor carport** in edit mode.

1 Click **Dimension Walls** (**Architecture** role – **Elements** task – **Components** task area).

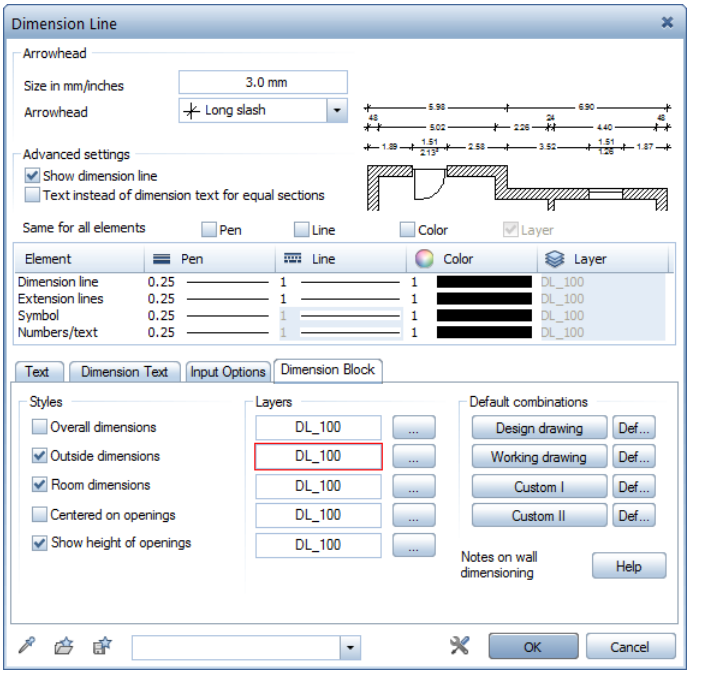
2 Click **Properties**.

3 Do not change the settings for **Arrowhead**, the **Format properties** and the **Text**, **Dimension Text** and **Input Options** tabs.

4 Open the **Dimension Block** tab and select the following check boxes for the vertical dimensions:

- Outside dimensions
- Room dimensions
- Show height of openings

5 Each dimension string type can be assigned its own layer. Assign the layer **DL_100** to all dimension strings.



6 Click **OK** to confirm.

7 Click the vertical exterior walls on the right side, which you want to dimension.
The walls will appear in the selection color as you select them. Make sure you select them all.

8 Right-click in the workspace to confirm. (Adjacent interior walls will also be dimensioned automatically.)

Tip: You can save four dimension string combinations as default combinations.

9 *Active wall line as direction element*
Click a vertical line on the edge of one of the walls selected to define the direction of dimensioning.

10 Place the dimension block in the workspace.

11 You can change the settings for the dimension strings in **Properties** and dimension the other walls.

12 Make drawing file **101** current, open drawing file **100** in edit mode and dimension the carports.

Note: Before placing the dimension line block, you can use **Flip dimensions** in the input options to reverse the arrangement of the dimension lines. When **Offset to drop-in point** is on, the offset at which the dimension line block is attached to the crosshairs corresponds to the spacing between the dimension lines in the block. You can thus append the next dimension line block "seamlessly".

You can customize the dimension blocks to your needs. To do this, open the shortcut menu of a dimension line you want to modify and select

- **Add Dimension Line Point**
- **Del Dimension Line Point**

Modify Component Height, Additional Text (**Label** task – **Dimension** task area or shortcut menu of a dimension line) to alter height specifications. You will use this tool to change the height specifications for the window openings in the entrance.

Curve Dimensioning (**Elements** task – **Quick Access** task area or **Label** task – **Dimension** task area) to dimension the openings in the curved wall. When you do this, you must work carefully, as the points to be dimensioned – the end point of an opening, which also serve as the starting point of the next opening – are not visible on the outside edge of the sill.
However, the points do exist and can be dimensioned.

Sill height

You can use the **Sill Height** and **Elevation Point** tools to label your design or just as a means of checking that the elements you entered were created correctly.
These tools create "intelligent" labels. In other words, the program updates the labels automatically when you change the components. You must click the openings in plan view.

Note: The exponent format is based on the setting in **Dimension Line Parameters** (**Dimension Text** tab).

To calculate the sill height automatically

➲ Open drawing file **100 Ground floor model** again.

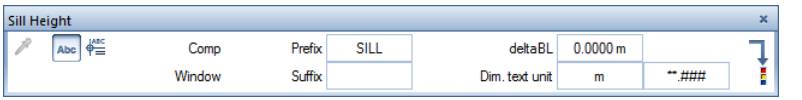
1 Right-click a corner of the window opening. The shortcut menu appears; select
Sill Height.

2 Select the layer **AR_SILLE**.

3 Select **Vertic**(al Text) in the input options. This defines the text orientation.

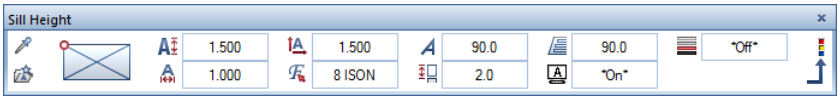
4 Click **Prefix** on the context toolbar and enter **SILL**. (This will appear **in front of** the value).

Tip: If you want to use the finished floor as the basis for the sill height, enter the height of the floor in the **Delta BL** box.

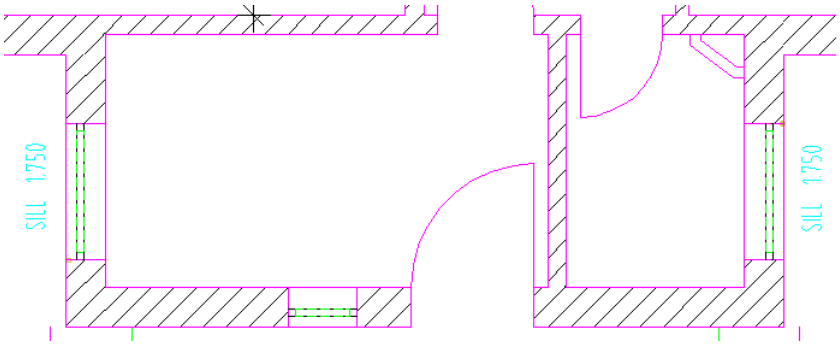


5 Switch to the text parameters and enter the following values:

- **Text's anchor point**: upper left
  Text height = 1.500
  Text width = 1.000
  Aspect = 1.500
  Font: 8 ISONORM DIN 6776
- Leave the other settings as they are.

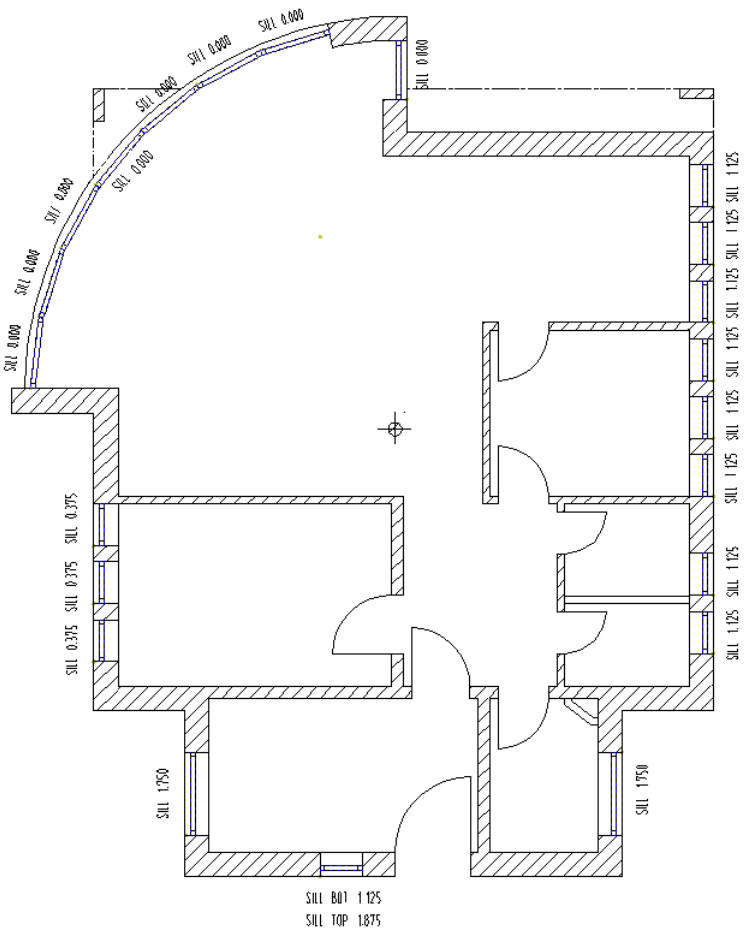


6 Place the label beside the window.
Allplan measures the height from the lower default plane to the sill.



7 Create labels for the other window sills. Check the text orientation each time.
For the curved wall, change the text direction to **Angle** and click a line of a SmartPart to match its angle.

Tip: When you click **congruent openings** in plan view, Allplan identifies one opening only (usually the lower one).
There are two ways to enter the other sill height: Click the opening in isometric view or switch to the tools in the **Quick Access** task area and enter the sill height manually. Use to match the text parameters.



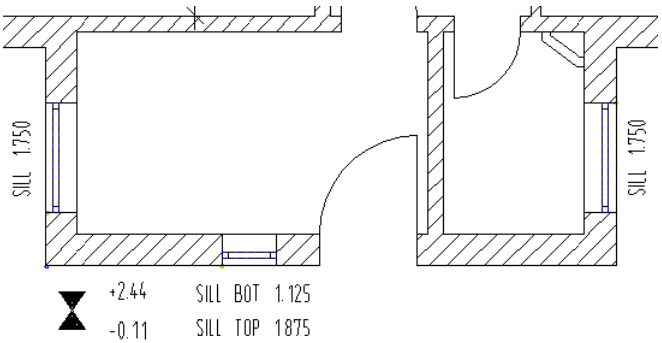
8 Select the Esc key to close the tool.

You can use **Align Text** (**Architecture** role – **Label** task – **Text** task area or shortcut menu of a text) to align vertical sill labels. Select F1 for detailed information on this tool.

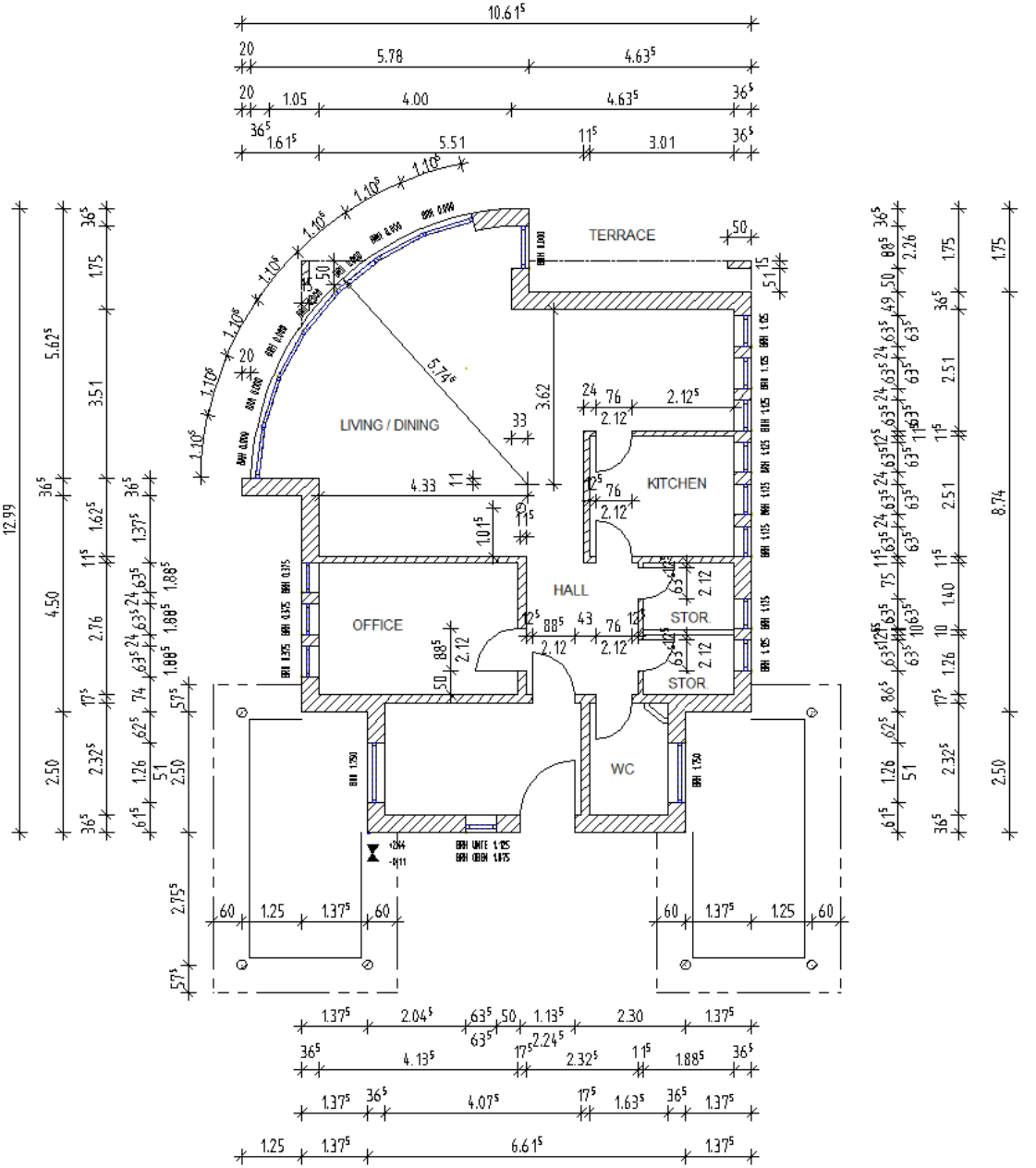
You can use **Elevation Point** (shortcut menu) to place elevation specifications in the same way. With this tool, you can also define the symbols used for the upper and lower elevation marks.

Tip: Check that the correct layers are visible.

The following illustration shows the elevation specifications for a wall.



The floor plan of the ground floor might look like this. The room identifiers are on layer **TX_100**.


TERRACE
LIVING / DINING
KITCHEN
HALL
OFFICE
STOR.
STOR.
WC

Stair outline

To draw the stair outline

➲ Drawing file **100 Ground floor model** is open.

1 Select the **DE_GEN02** layer and use **Line**, **Rectangle** and **Parallel to Element** (**Quick Access** task area) to draw the stringers and the steps.

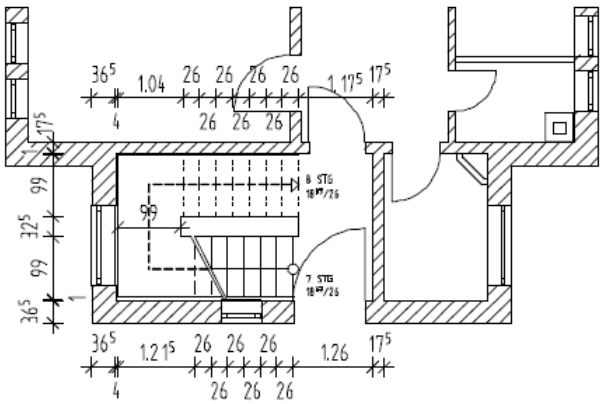
2 Use **Perpendic. Bisector** (**Quick Access** task area) and **Line** to draw the line of travel.

3 Use **Line**, **Circle** (**Quick Access** task area) and **Auto-Delete Segment** (shortcut menu) to draw the symbols representing the top and bottom of the stair.

4 Use **Line** to draw two lines representing the clipping path and delete redundant line segments with **Delete Segment of Line**.

5 Change the line type by using **Modify Format Properties** (**Change** task area) and the **Brackets** (**Work Environment** task area).

Check the offset to the walls. Use the options for **snapping to points** and **entering offset values**.



Slab

The ground floor is still missing the slab.
You will draw this slab in a separate drawing file.
As with walls, start by entering the properties and then draw the outline of the slab.

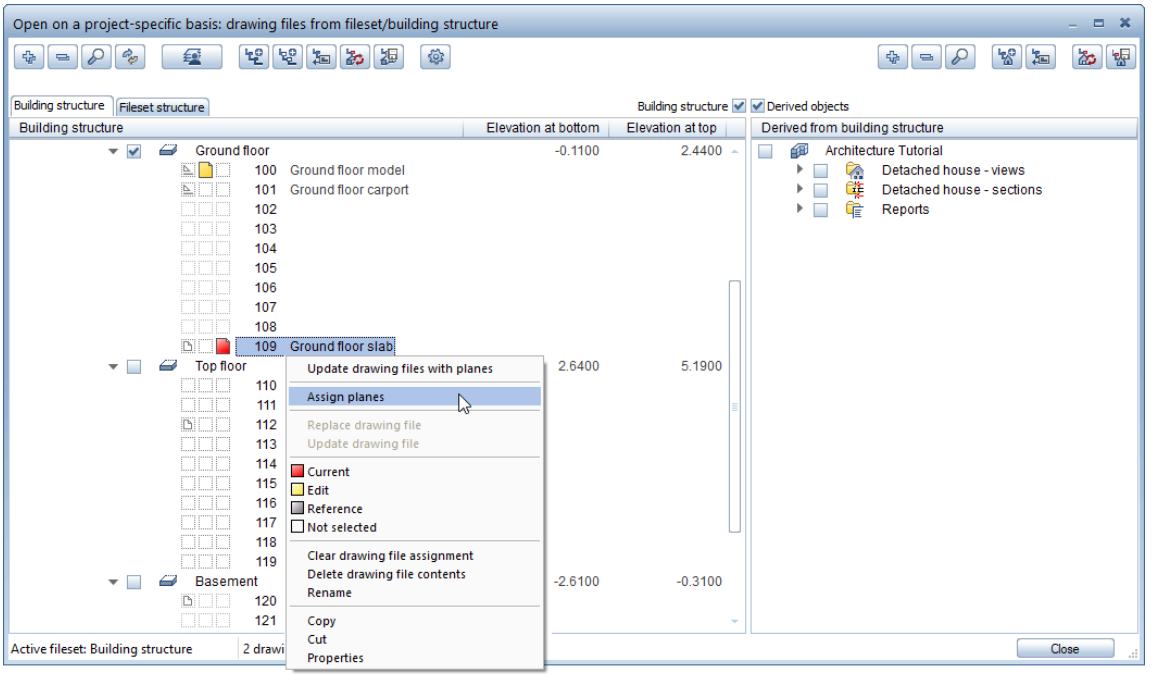
Tip: You can also use the **Slab** tool to create floor slabs.
You can use separate tools to design foundations.

To define the slab's properties

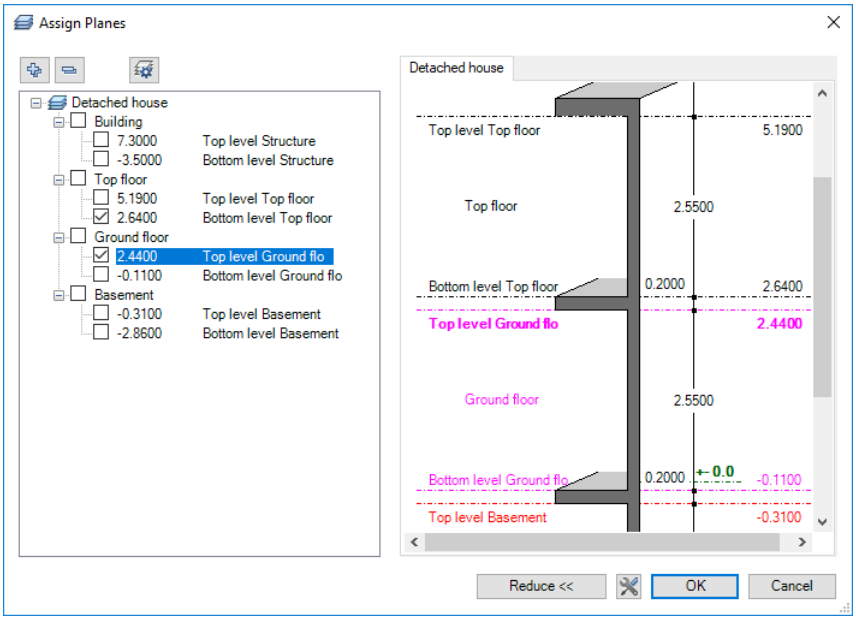
1 Click **Open on a Project-Specific Basis**.

2 Open drawing file **109**. Name the file **Ground floor slab**.

3 Open the shortcut menu of drawing file **109** Ground **floor slab** and click **Assign planes**.

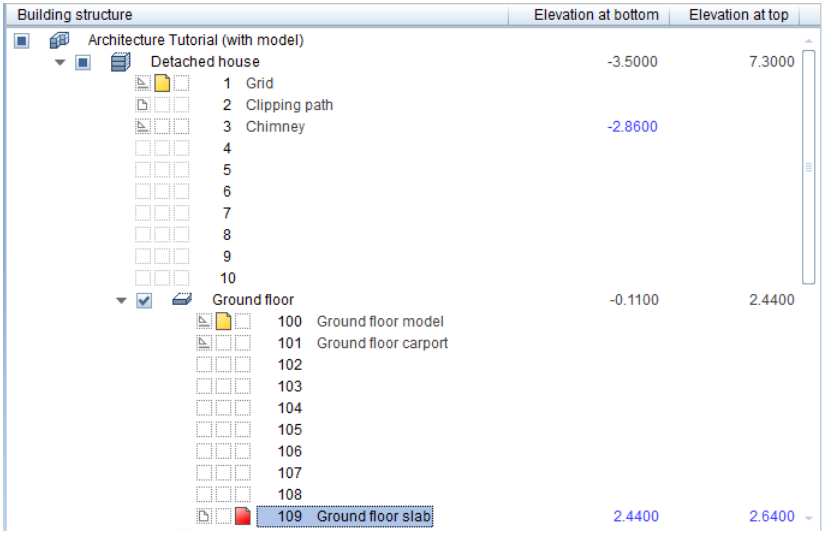


4 The ground floor slab is between the **Top level of ground floor** and **Bottom level of top floor**. Select these two planes in the **Assign Planes** dialog box and click **OK** to close.



5 Click **OK** to confirm the **Behavior of drawing files** dialog box without selecting an option.

6 Make drawing file **109 Ground floor slab** current and open **1 Grid** and **100 Ground floor model** in edit mode.



7 Open the **Layers** palette and click **Select Layer Print Set** at the bottom of the palette.

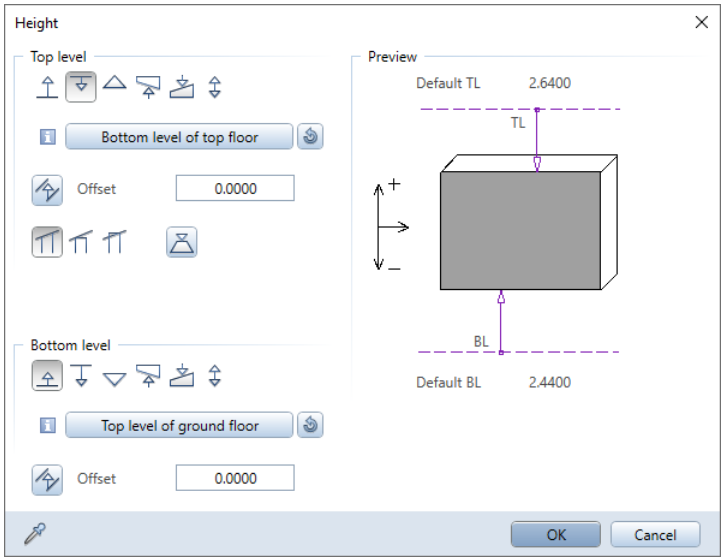
8 Select the **SC Entry** print set in the dialog box and click **OK** to confirm. (Therefore, the grid layer is visible.)

9 Click **Slab** (**Components** task area) and select the **AR_SLAB** layer.

10 Select pen (2) **0.35** and line type **1** (**Properties** palette).

11 Click **Properties**.

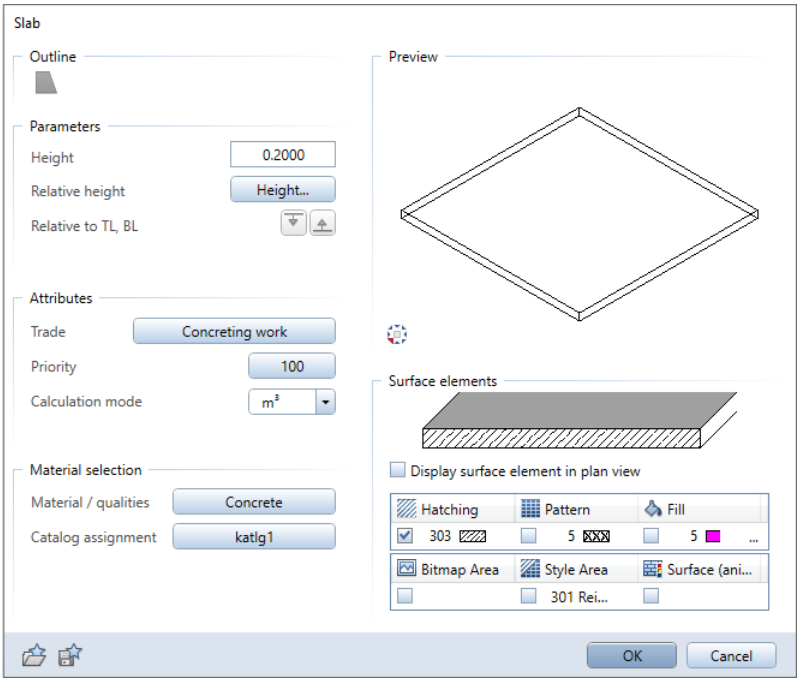
12 Define the height as follows:



The bottom level of the ground floor slab is positioned on the **Top level of ground floor** (2.44 m) and its top level on the **Bottom level of top floor** (2.64 m). The slab is 20 cm thick; thus, the slab is flush with the upper and lower default planes.

13 Click **OK** to confirm and enter the other properties as follows:

- **Attributes** area:
  Trade: Concreting work
  Priority: 100
  Calculation mode: m^3
- **Material selection** area:
  Material, qualities: Concrete



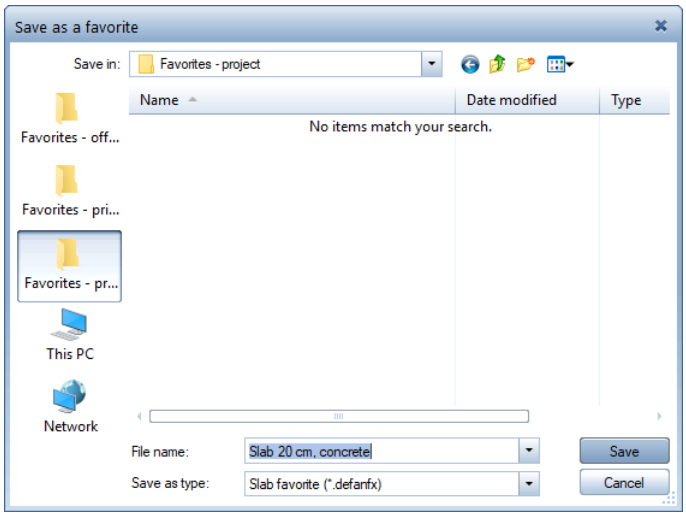
Saving component properties as favorite files

As is the case with all component settings, you do not need to specify the slab properties from scratch each time, but you can save combinations of settings as favorite files.

Saving component properties as favorite files

➲ The **Slab** tool and the dialog box are still open. If it isn't, select this tool and click **Properties**.

1 Click **Save as a favorite** in the lower-left corner of the dialog box.



2 Select the **Favorites – project** folder, enter a name and click **Save** to confirm.

The next time you need a slab with these settings, click **Load favorite** and select the file.
The values in the dialog box will change automatically.

Entering the outline of the slab with the polyline entry tools

You will now define the position of the slab. The layers will be useful to define the corners and delimiting points along the outline of the slab.
To trace the outline of the slab along the shape of the curved wall, you will use the polyline entry tools.

Polyline entry tools

You can use these tools to enter any outline.

Polygonize entire element: This uses the starting point for the direction. You can specify the number of segments for circles and curves.

Define area of element to polygonize: This generates a polyline based on a portion of an element. Define the portion by clicking a 'from' and a 'to' point.

Enter reference point: This identifies a point on the element as the starting point for the new element. To define this point, click a point on the element and enter the offset between this point and the nearest significant point (indicated by an arrow).

Area detection using additional point: This uses a point you click on a polyline to detect the entire boundary.

Area detection: This uses closed areas delimited by design entities of any kind as an outline polygon. All you need to do is click anywhere within the area. Allplan will automatically detect and polygonize the entire outline. The boundary elements can have points in common; they can intersect or touch. You can turn this automation feature on and off at any time.

Island detection, **Inverse island detection**: **Island detection** detects closed outlines within an area and cuts them out automatically.
Inverse island detection does not cut out closed outlines but fills these outlines with the selected surface element. It is the area around the 'island' that remains empty.
You can use these tools only together with **Area detection using additional point** and **Area detection**.

To force the polyline along the outline of the wall, you first need to get a close-up view of that area. Now you will enter the polyline of the slab.

To enter the outline of the slab with the polyline entry tools

➲ The **Slab** tool is still active.
Right-click in an empty area of the workspace and select **Point snap options** on the shortcut menu. In the **Point snap** area, select the **Point of intersection** option.

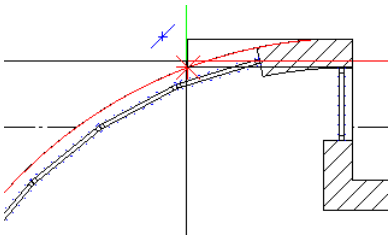
1 Click **Multi** in the input options to enter the polyline defining the outline of the slab in several steps.

2 Check that **Polygonize entire element** is active in the input options.

The settings should look like this:

3 Use **Zoom Section** to get a close-up view of the area with the curved wall and click the first wall corner.

4 Point to the arc.
Make sure that Allplan detects the curved wall as a single element (selection color, CursorTips: or).

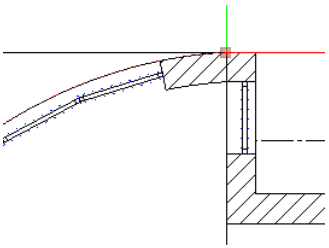


Click the arc.

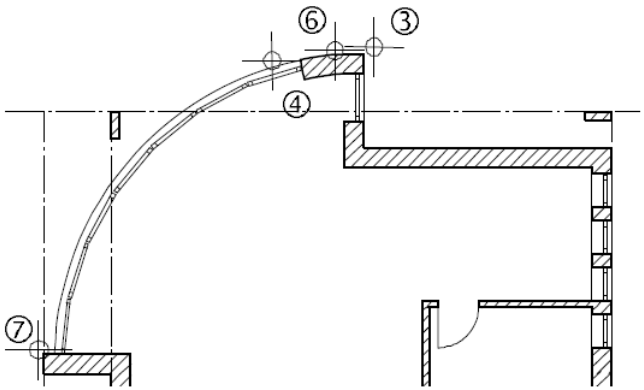
Tip: You can undo incorrect entries. The number of undo steps is unlimited.
Just click **Back** in the input options.

5 **Polygonize entire element** is selected in the input options.
With this option, you can integrate an entire element – in this example it is the arc – into an outline polygon in a single step.

6 *Starting point*
Click the upper end point of the curved wall.
Check that the end point of the curved wall is marked correctly.

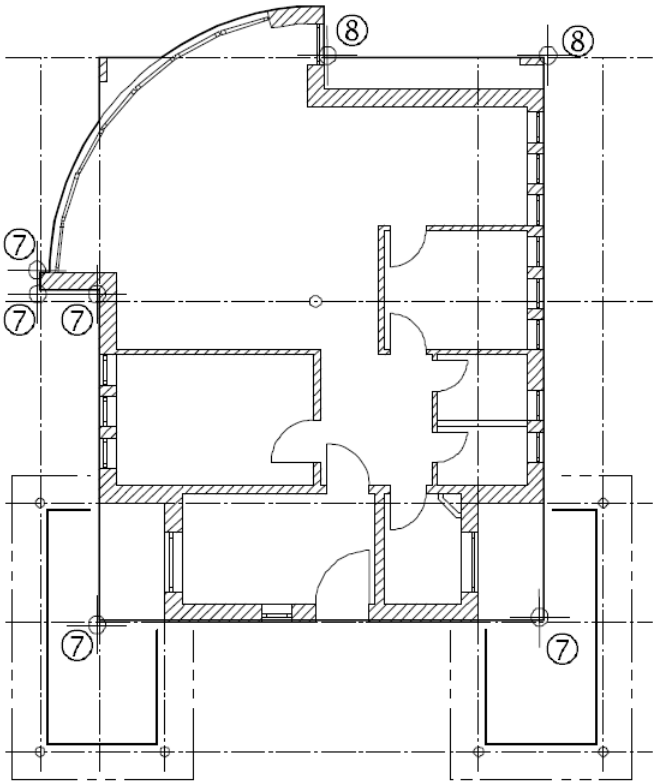


This integrates the entire arc into the polygon in one go.
The next step is to enter the part of the slab that extends toward the column.



7 Change the viewpoint and use the corners and grid points to define the remaining points for the outline of the slab. The slab rests exactly on the walls.

8 Click the corner of the column and the point of intersection between gridline and wall. Select ESC to finish entering the first polyline.

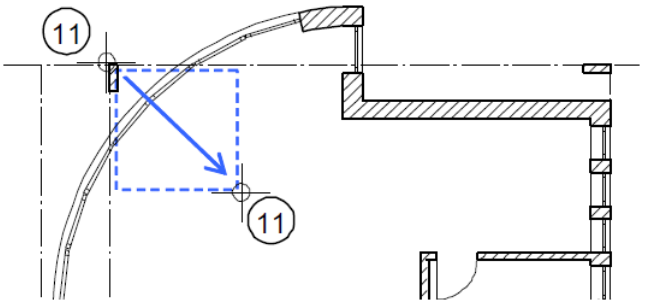


9 The slab is still missing the part that extends toward the column in front of the curved wall.
Click **Plus** in the input options to integrate this section into the polyline.

10 Use **Zoom Section** to zoom in on the area around the column and the curved wall.

11 Click the upper-left corner of the column, then click a diagonally opposite point within the curved wall and select ESC:

Allplan creates the rectangular section of the slab.



12 Select the ESC key to close both the outline and the tool.

To adapt the size of the planes to your design, click **Restore 3D View** (**Update** task area).
Select F4 to open the animation viewport and check the design.

Carport roofs

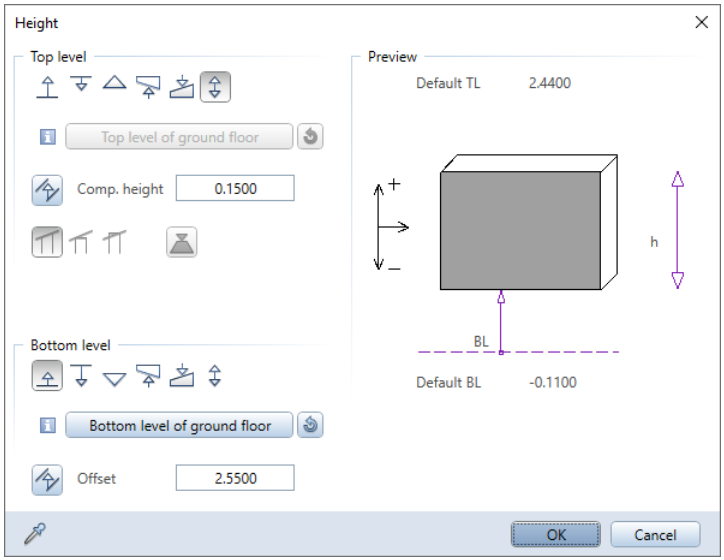
You will draw the carport roofs in drawing file 101.
These slabs are located immediately below the slab between the ground and first upper floor but are thinner and will be assigned a different material.

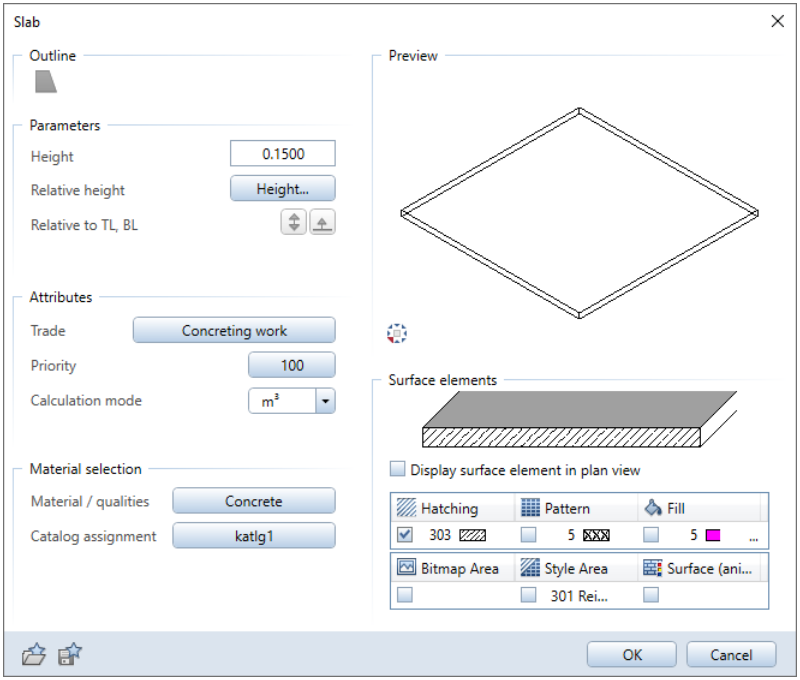
To draw the roofs over the carports

➲ Make drawing file **101 Ground floor carport** current and open **100 Ground floor model** and **109 Ground floor slab** in edit mode.

1 Click **Slab** again (**Components** task area).

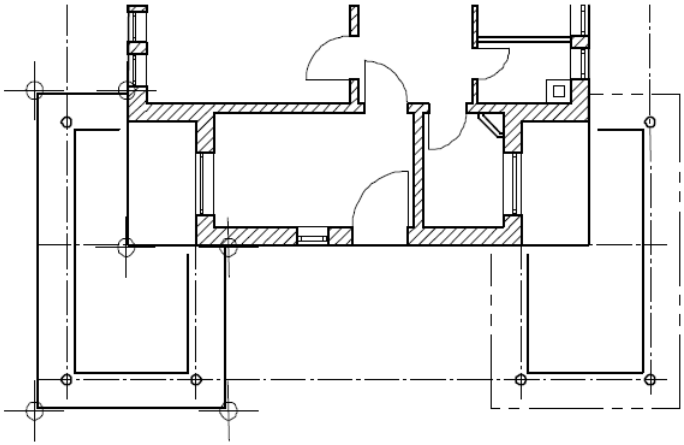
2 Change the **Properties** including the **Height**.
The bottom level of the carport slab is positioned above the upper default level of 2.44 m (2.44 m + 0.11 m = 2.55 m) assigned to this drawing file.
The component thickness of the carport slab is 15 cm.





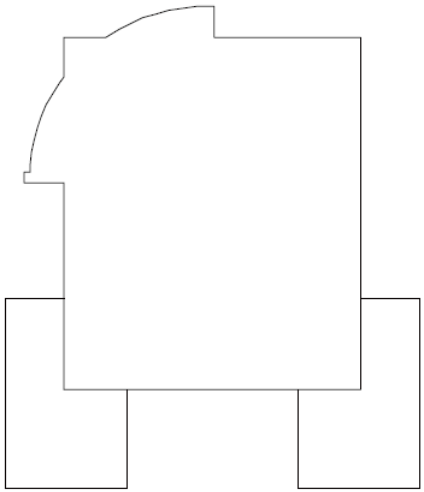
3 Zoom in on this area.

4 Click the corners of the roof outline one after the other and select ESC to close the polyline.



5 Draw the second carport slab in the same way.

6 Select ESC to close the tool. Change the view type to **hidden**; the floor plan should now look like this:



Slab openings

Next, you will insert openings in the slab for the chimney and to provide access to the top floor.
Height settings are not required for openings in slabs as they always pierce the slab in its entirety.

To draw a rectangular slab opening

➲ Make drawing file **101 Ground floor slab** current and open drawing files **3 Chimney**, **100 Ground floor model** and **109 Ground floor carport** in edit mode.

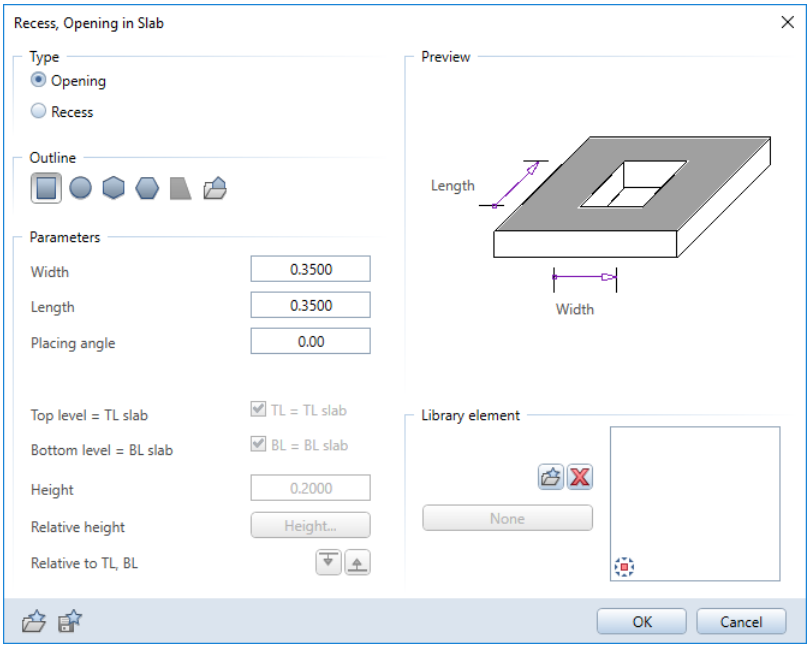
➲ If you cannot see the chimney, make the layer AR_CHIMN visible.

1 Click **Recess, Opening in Slab** (**Components** task area).

2 Click the ground floor slab.

3 Click **Properties**.

4 Select the icon for a **rectangular** opening and enter **0.35** for the length and width of the opening.



5 Switch the anchor point to **lower right** and click the lower-right corner of the chimney.

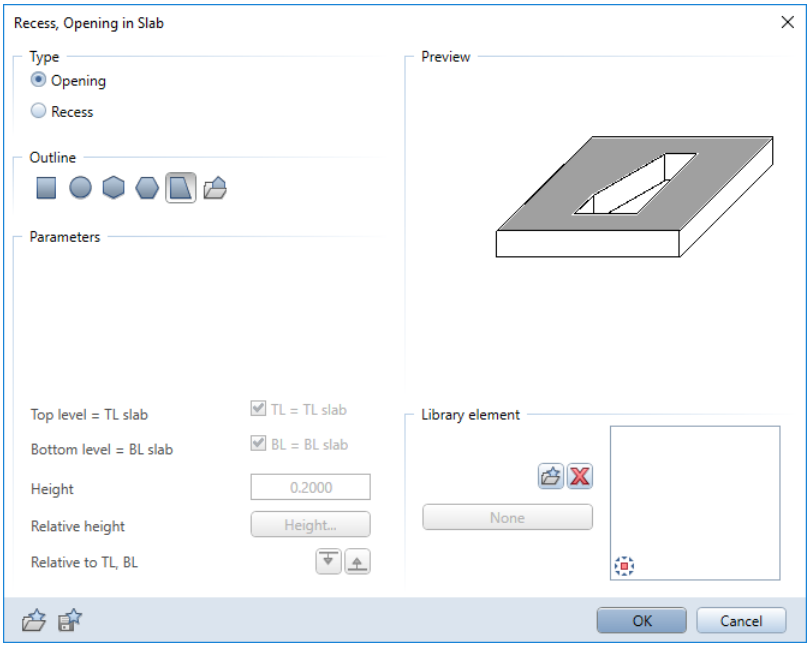
You will use a freeform opening for the stairs. By opening the drawing file with the stair outline in reference mode, you will find it easy to enter the outline of the opening.

To draw a freeform slab opening

➲ The tool is still open. Make the layer **DE_GEN02** with the stair outline visible.

1 Click **Properties**.

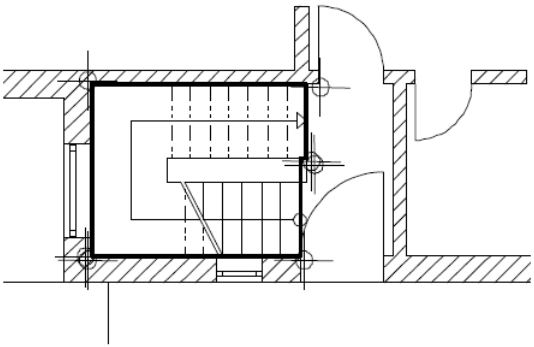
2 Select the icon for a **freeform** opening.



3 Zoom in on the area around the stair.

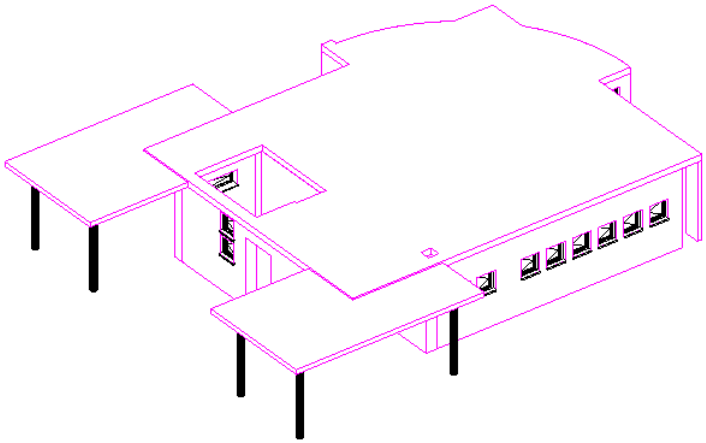
4 Click the points on the boundary of the stair outline one after the other. To do this, click **Enter at right angles** in the dialog line.

To close the polyline, make sure the last point you click coincides with the first one.



5 Select ESC to close the tool.

Close drawing file **3 Chimney**. Now the **Front Right, Southeast Isometric View** looks like when you select the **Hidden** view type:



Tip: Slab openings and **slab recesses** are created in the same way.
The only difference is that **slab recesses** have their own height settings, because they do not pierce the slab completely.

Exercise 3: top floor

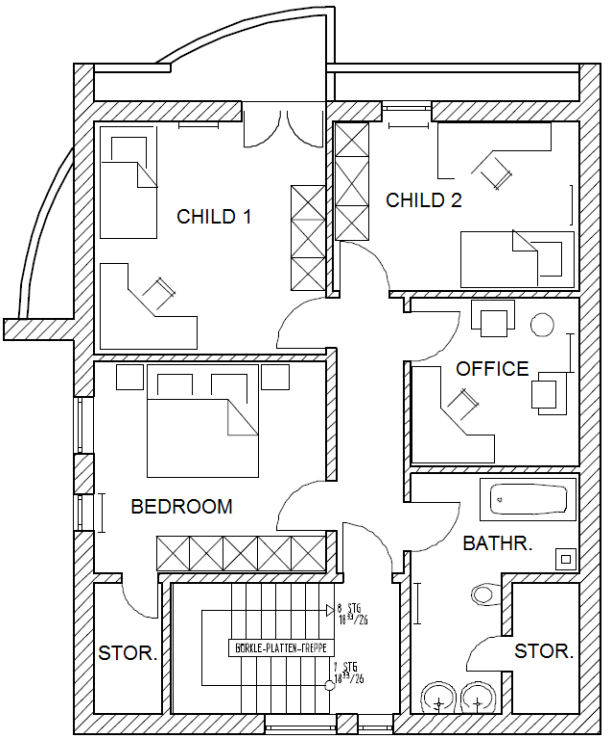
In this exercise, you will make the top floor by copying the ground floor to relevant drawing files for the top floor and then raising these by the height of one story. You will also find out about some of the tools that you can use to make alterations to the floor plan.

Objective

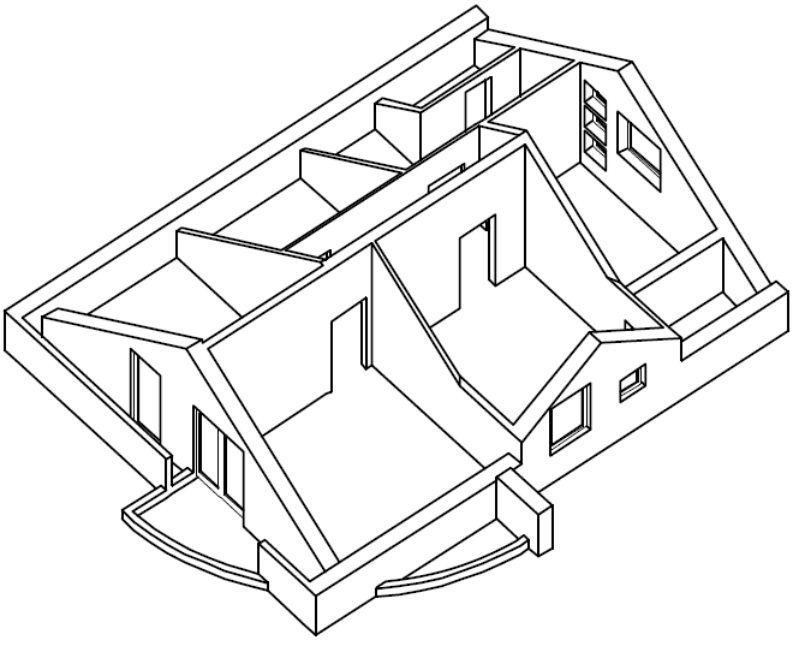
When you design the top floor in a building, you can

- **Draw the elements from scratch** or
- **Copy and modify** the elements. Copy the elements from an existing floor to new drawing files and then make alterations.

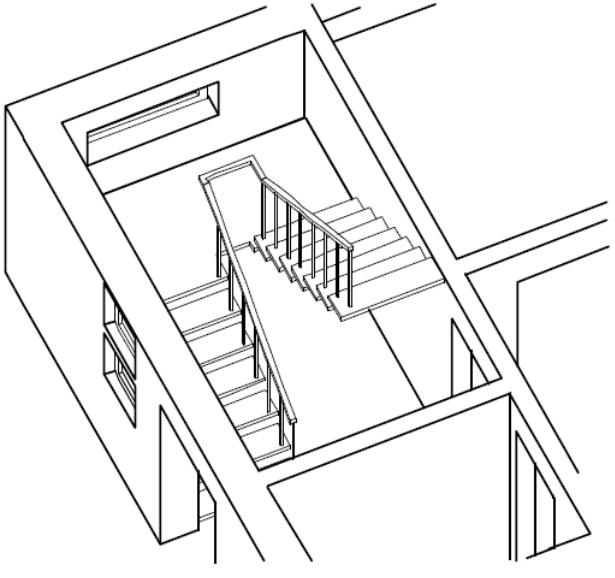
In this tutorial, you will use the second method.



Floor plan of top floor



Isometric view of the top floor (without the roof)



U-type stair from the ground floor to the top floor

Copying components between documents

You will begin by copying drawing file **100 Ground floor model** to drawing file **110 Top floor model**.

Note: You can also copy drawing files in the building structure. The program always copies all elements of the drawing file, including hidden and frozen layers.

To copy components between documents

➲ The **Architecture** role and the **Elements** task are open.

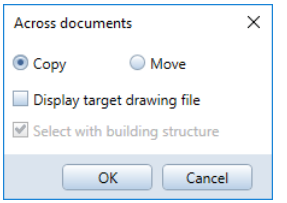
1 Click **Open on a Project-Specific Basis** and select drawing file **100 Ground floor model**. Close all the other drawing files.

2 Open the **Layers** palette and click **List layers used in open documents** on the shortcut menu.

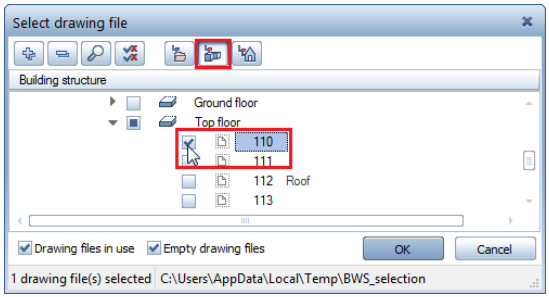
3 Make the following layers modifiable:
DE_GEN02, **AR_WALL** and **AR_COL**.
Hide all other layers.

4 Click **Copy, Move Elements between Documents...** in the drop-down list of the Allplan icon on the title bar.

5 Select **Copy** and click **OK**.



6 In the **Select drawing file** dialog box, click **Building structure** at the top and select drawing file 110.



7 Click **All** in the input options.

8 Click **Open on a Project-Specific Basis** and select drawing file **110**. Close all the other drawing files.

9 Rename drawing file **110 Top floor model**. To do this, click **Rename** on the shortcut menu.

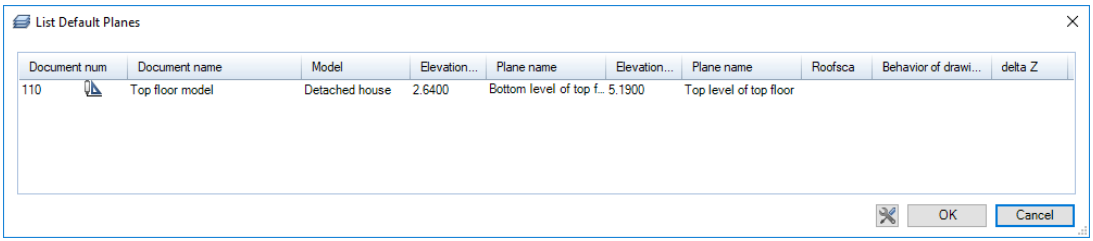
10 Close the **Open on a project-specific basis: drawing files from fileset/building structure** dialog box.

Note: Drawing file **110 Top floor model** belongs to the building structure you defined at the beginning of this tutorial. Therefore, this drawing file takes its height settings from the top floor in the plane model.

As you copied the drawing file by using **Copy, Move Elements between Documents**, the architectural elements coming from drawing file **100 Ground floor model** got the height settings of the top floor.

You can find detailed information on "Behavior of default planes when copying or moving elements between documents" in the Allplan Help.

To check the height settings of drawing file **110 Top floor model**, open the **List Default Planes** tool (**Annotations** task area).



Modifying the top floor

Allplan offers a wide range of tools you can use to modify data at any time.
When modifying, you must differentiate between the following situations:

- Changes you make to element properties and their height settings by using **Apply Archit. Component Properties**. You can apply this tool to components of the same type (for example, walls only).
- Changes you make to components of different types by using **Change Archit. Properties**. You can use this tool to modify element properties and their height settings (for example, height and material of walls and columns) in a single step.
- You can also modify individual elements by selecting **Properties** on the shortcut menu.
- Changes you make to the geometry in the xy plane by using the tools in the **Edit** task area and on the shortcut menu of an element.

To modify components in the z-direction, use the following tools only:
Change Archit. Properties
Apply Archit. Component Properties or **Properties** on the shortcut menu of the component

Deleting design entities

You will start by deleting redundant design entities. You can use the architectural filters.

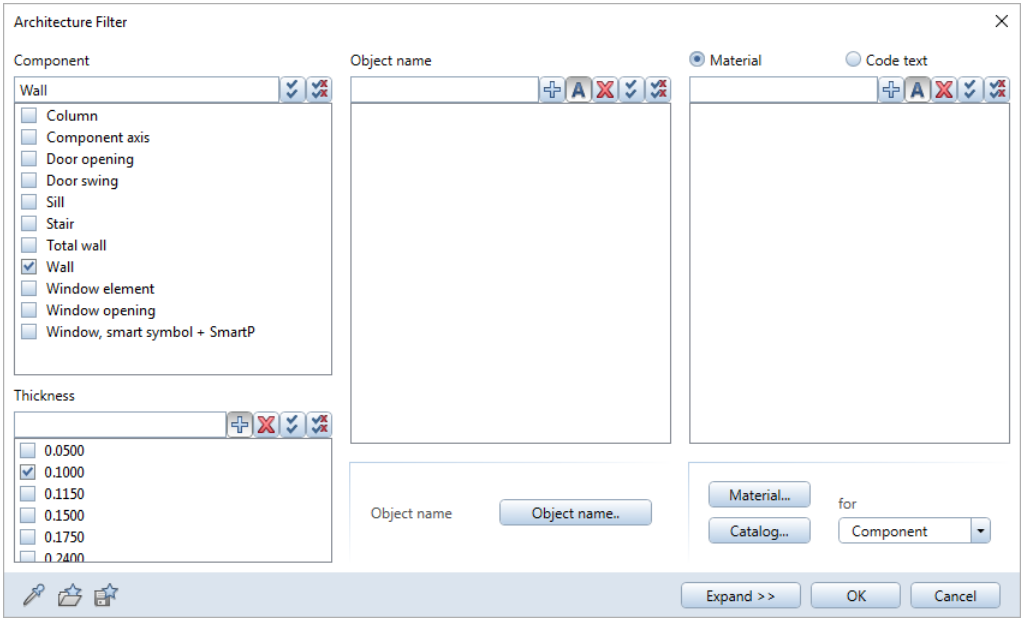
To delete design entities

➲ **Actionbar**: **Architecture** role – **Elements** task.
Use the **Layers** palette to hide layer **DE_GEN02** (stair outline).

1 Click **Delete** (**Edit** task area).

2 Go to the **Filter** task area and click **Filter by Archit. Element Type**.

3 Only elements that are in the drawing file are available in the architecture filter.
Select the component **Wall** and the thickness **0.100**.
If the required thickness is not available in the list, enter the value in the input line.

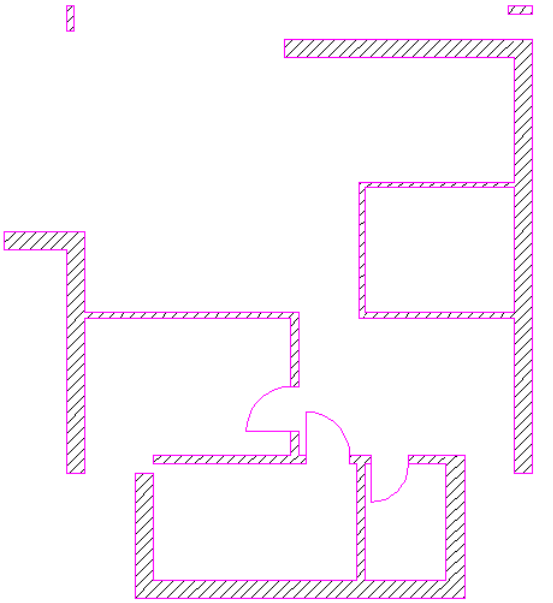


4 Enclose the entire design in a selection rectangle.
The elements selected for filtering are immediately deleted.

5 Use the **Window opening** filter to delete all the windows. This also deletes the window SmartParts.

6 Now delete the round columns, the curved wall, the vertical section of wall at the top, the short vertical wall sections at the bottom and some of the doors.

After this, your screen should look like this:



7 Select ESC to close the **Delete** tool.

Joining walls

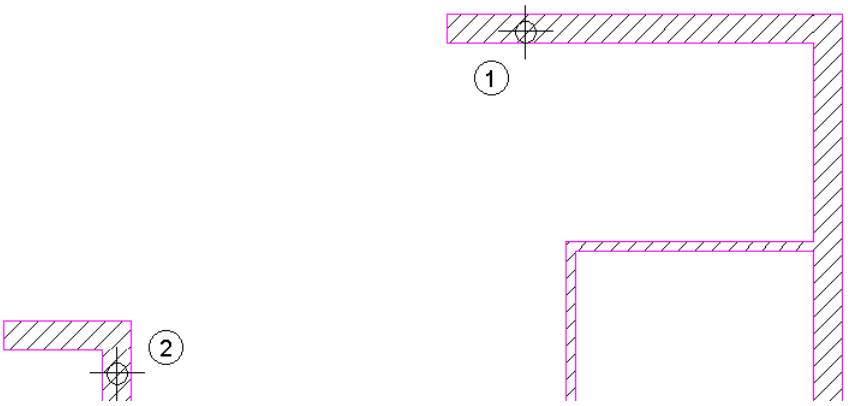
Walls that are not parallel can be joined with the **Join Linear Components** tool. You will use this tool to close the open corners.

Tip: You cannot join curved walls with other walls.

To join walls

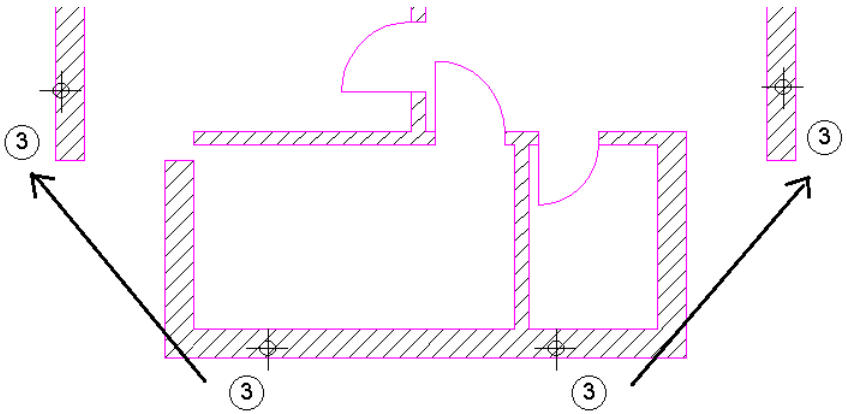
1 Right-click the horizontal wall at the top. On the shortcut menu, select the **Join Linear Components** tool.

2 Click the left exterior wall.



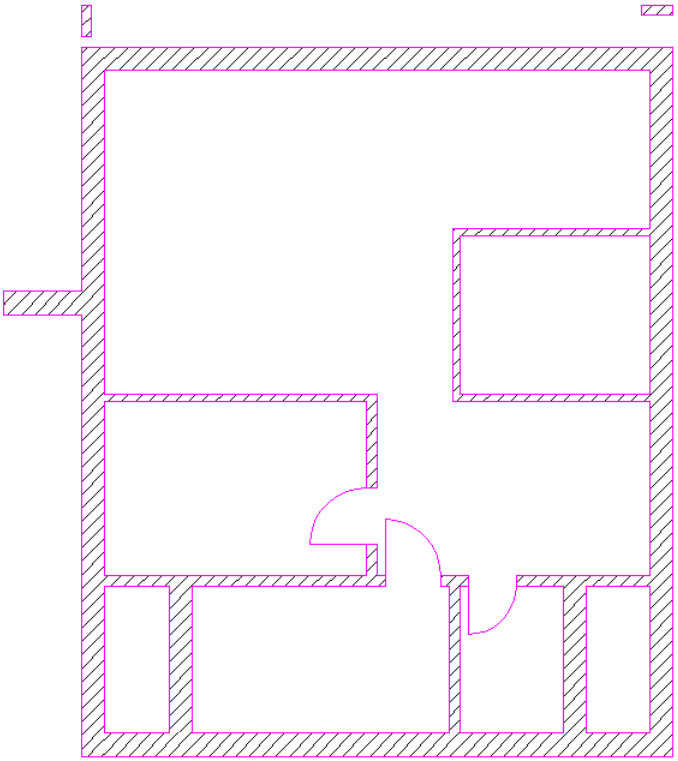
Tip: You can enter any joint width at the keyboard.

3 Click the lower exterior wall and join it with the left exterior wall. Then click it again and join it with the right exterior wall.



4 Now join the interior walls at the bottom with the exterior walls. Do not forget to join the former, lower-left exterior wall with the interior wall you have just lengthened.

Now your floor plan should look like this:



5 Select ESC to close the tool.

- Since you have made major changes to the architectural elements, minor inaccuracies might occur. It is thus a good idea to recalculate the architectural elements:
- Click **Restore 3D View** (**Update** task area).
- Click **All** in the input options.

Allplan recalculates the architectural elements. This can take some time.

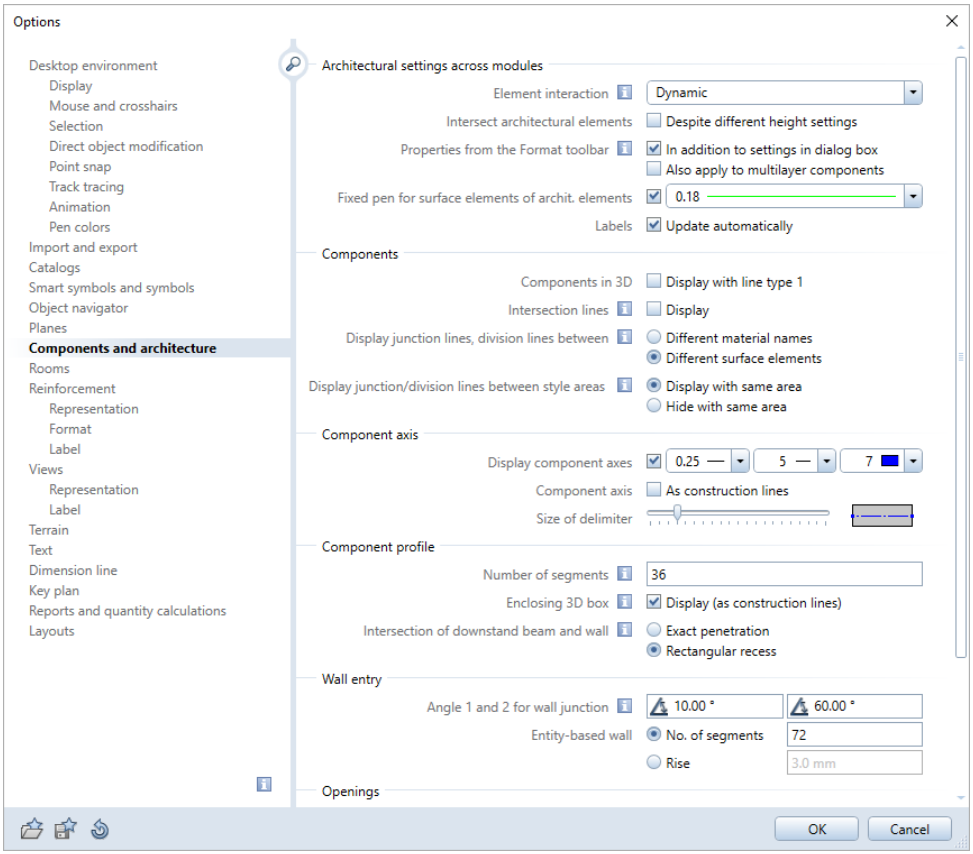
Modifying the thickness of walls

Some of the walls are now no longer exterior walls – they have become interior walls. To change the thickness of these walls, you will use the **Apply Archit. Component Properties** tool.

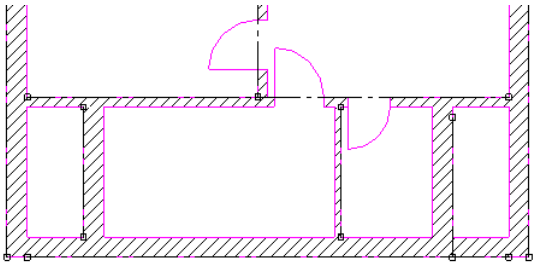
Tip: You can find more information on the component axis in the Allplan Help.

When creating these walls, you defined the offset direction inward: The wall axis is thus on the outside. As the side where the axis is located does not change, the new thickness would also be applied toward the inside. You therefore need to move the axes of these walls to the opposite side (inside).

To see better what you are doing, you can also display the component axes in plan: Open the **Options**, **Components and architecture** page, **Component axis** area and select the **Display component axes** option.



Now the walls look like this:

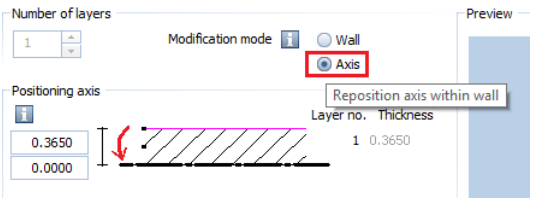


To modify the thickness of walls

1 Right-click the former left exterior wall and select **Properties** on the shortcut menu.

2 Select the **Reposition axis within the wall** option and use the mouse to drag the component axis to the opposite side of the wall in the preview. Click **OK** to confirm.

The result looks like this:



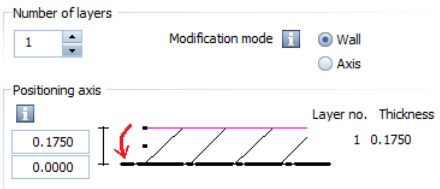
3 Repeat steps 1 and 2 for the former exterior wall on the right.

4 Click **Apply Archit. Component Properties** (**Components** task area).

5 The former exterior walls will become 17.5-cm interior walls.
Click the element whose settings you want to match
Click a suitable interior wall to match its parameters

Tip: You can also use **Modify Offset** to change the thickness of walls.

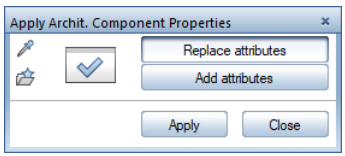
The **Wall** dialog box opens, displaying the parameters of the wall you clicked. Check that the thickness is **0.175** and the priority **175**. Here, too, drag the component axis to the opposite side of the wall.



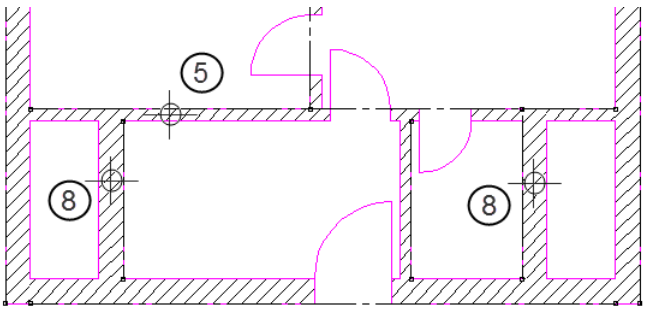
Note: Check the **Modification mode**, making sure **Wall** (recreate wall based on axis) is selected.

6 Click **OK** to confirm the dialog box.

7 Select **Replace attributes** on the context toolbar so that the attributes of the selected interior wall replace those of the exterior wall.

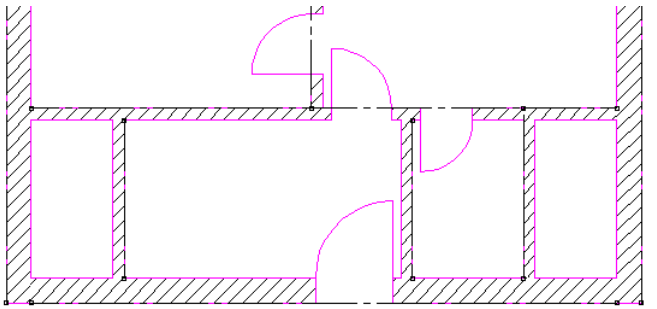


8 Click the two former vertical exterior walls at the bottom and right-click to confirm.



The thickness of the walls changes. If it is necessary, join the walls with the other interior walls again.

The result should look like this:



Moving walls

To move the walls, you can use the **Stretch Entities** tool. This tool moves walls together with their doors and windows without changing the wall junctions.

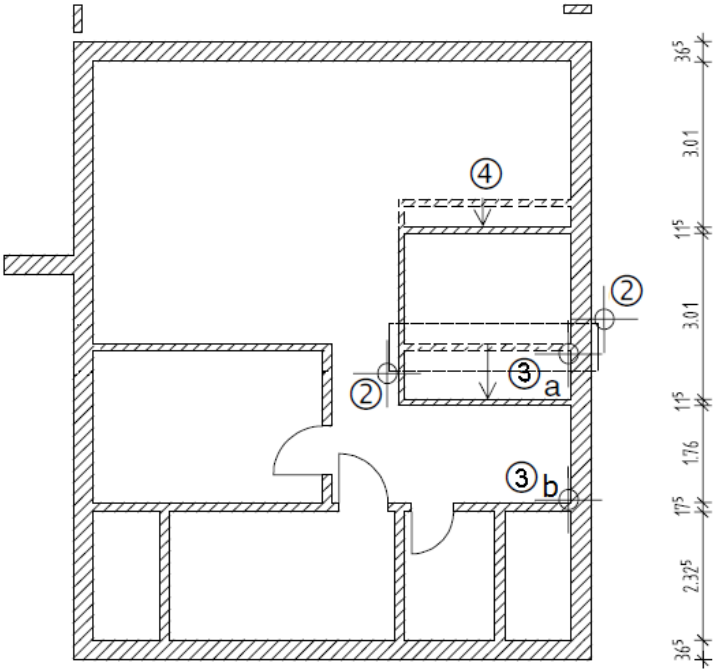
To move walls

Tip: Do not work with the crosshairs to move walls in conjunction with the **Stretch Entities** tool. Always enter precise values in the dialog line.

1 Click **Stretch Entities** (**Change** task area).

2 Select the lower-right interior wall.

3 Define the new position of the wall as follows:
a) *From point*: Click the wall corner.
b) *To point*: Point to the interior wall corner at the bottom.
The boxes are highlighted in yellow.
c) Enter **y-coordinate** = **1.76** in the dialog line.
d) Select ENTER to confirm.



4 Move the upper-right interior wall.

5 Select ESC to finish.

You can also move walls by using direct object modification. However, you must restore the wall junctions afterward.

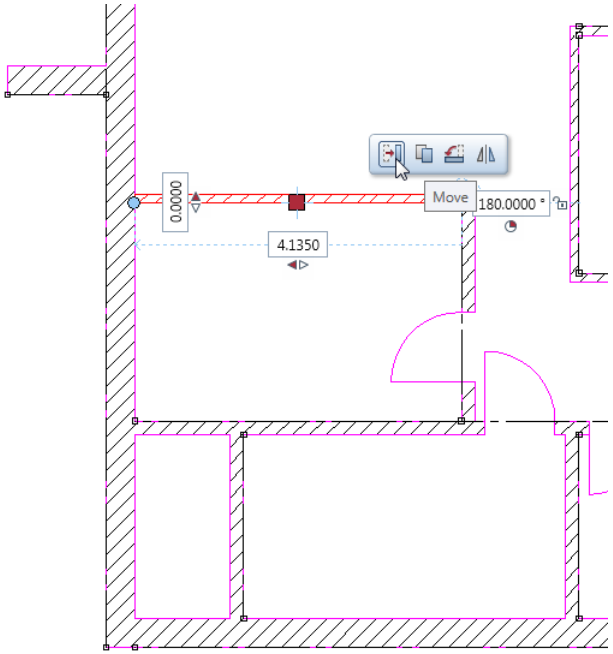
To move walls by means of direct object modification

1 Enclose the upper-left interior wall in a selection rectangle.

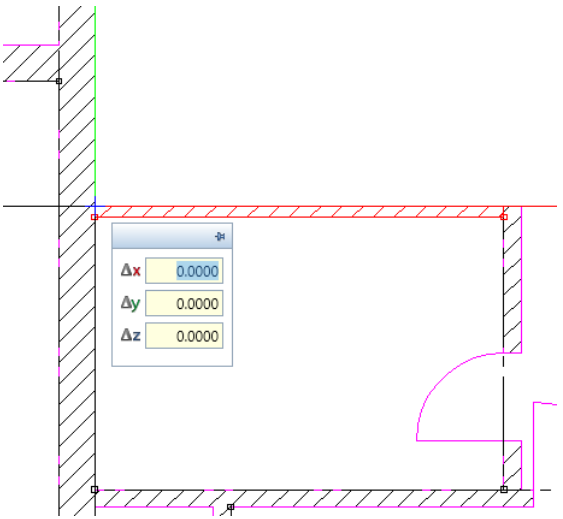
The wall has handles.

2 Point to the wall without snapping a handle.

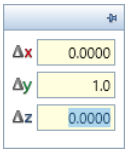
3 On the context toolbar, click **Move**.



4 *‹Move› From point or enter offset:*
Click the point where the upper edge of the wall and the left exterior wall intersect.



5 *<Move> To point or enter offset:*
Enter Δy dy = **1.0** in the coordinate dialog box and select ENTER to confirm.

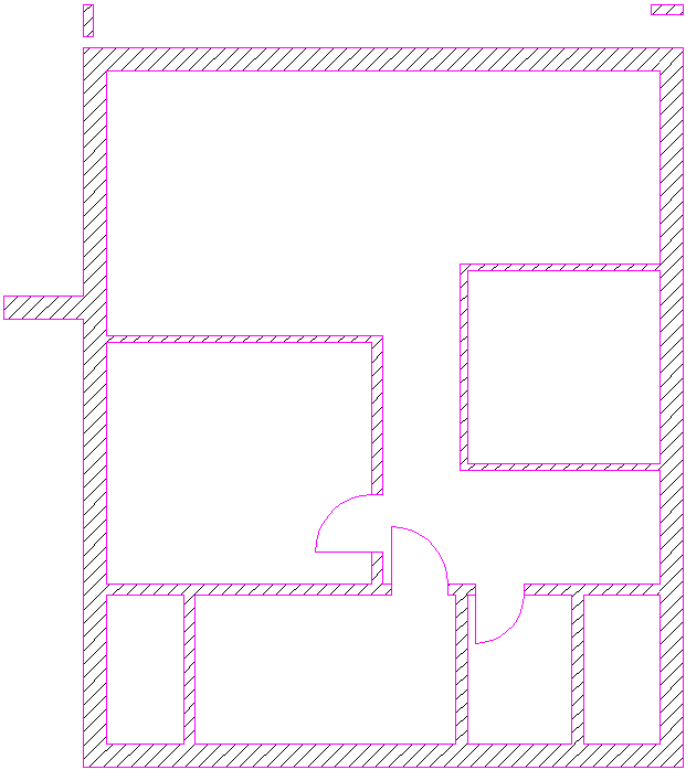


6 Select ESC to close direct object modification.

7 Hide the component axis again. To do this, open the **Options** (**Components and architecture** page – **Component axis** area).

8 Join the two interior walls by using **Join Linear Components**.

The floor plan should now look like this:



Deleting wall sections

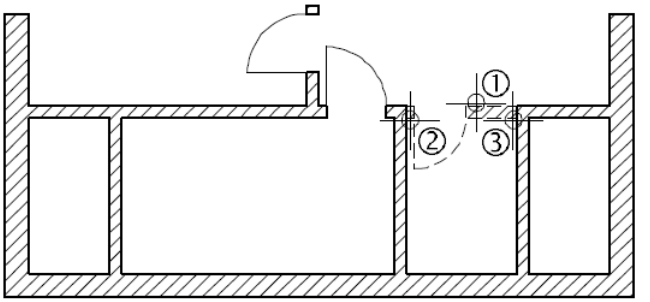
You can use the **Delete Section of Linear Component** tool to delete entire wall sections. Two smaller, discrete walls are created based on the wall.

To delete wall sections

1 Right-click the wall from which you want to delete a section. On the shortcut menu, click **Delete Section of Linear Component**.

2 Click the first point on the component – the corner of the wall.

3 Click the second point on the component (= the other corner).



Tip: If the point you click on the component is not a significant (defined) point, a small square will appear to indicate the nearest significant point together with the distance between the square and the point you clicked (represented by an arrow).

Joining walls with lines

Walls can also be joined with lines in the same manner as the **Join Linear Components** tool. The main difference occurs when joining multilayer walls: If you want to join only one layer in the wall, use **Join Linear Components** to select the layer separately from the others. **Join Linear Component with Line**, however, always lengthens the entire wall.

The exterior walls on the left and right sides need to be modified so that they stretch as far the columns over which the balcony will later be constructed.
You will find it helpful now if you display the grid you drew earlier.

To join walls with lines

1 Open drawing file **1 Grid** in reference mode and make the layer **DE_GRID** visible.

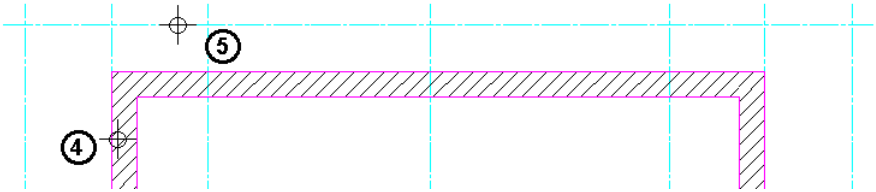
2 **Delete** (**Edit** task area) the rectangular columns.

3 Click **Join Linear Component with Line** (**Components** task area).

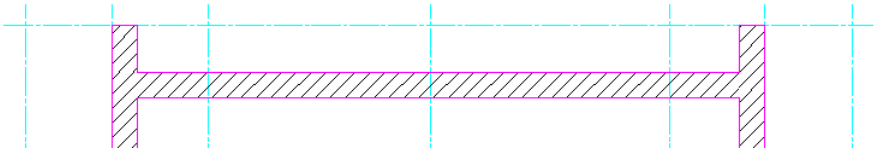
4 Click the left exterior wall.

5 Click the gridline through to which the wall is to extend.

Tip: You can also find the **Join Linear Component with Line** tool on the shortcut menu.



6 Use the same approach to lengthen the exterior wall on the right side.



7 Close drawing file **1 Grid**.

Changing the height settings of a wall

The modifications you have made so far have involved alterations in the xy plane. In the following exercise, you will change the height of part of the left wall, at the end of the balcony. It needs to be 1.27 m high.

To change the height settings of a wall

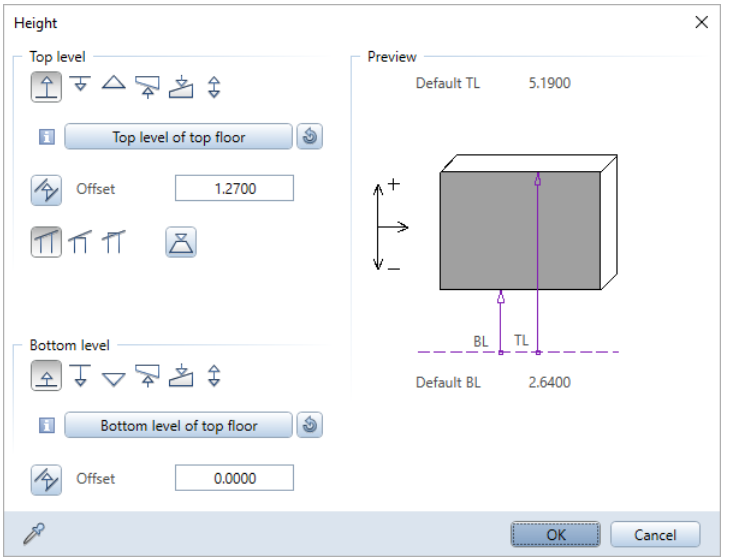
1 Click **3 Viewports** (**Window** drop-down list on the Quick Access Toolbar) so that you can better observe the changes as they happen.

2 Right-click the section of wall on the outer left. On the shortcut menu, click **Properties**.
The **Wall** dialog box opens, displaying the parameters of the wall clicked.

Tip: You can also double-click a component to view its **Properties**.

Click **Height...**. Leave the bottom level as it is. Change the settings for the wall's top level as follows:

- **Top level** area: **Relative to lower plane** = **1.2700**



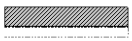
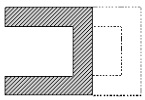
3 Click **OK** to confirm the settings in the dialog boxes.

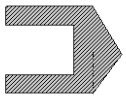
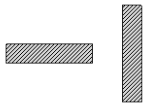
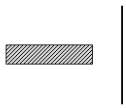
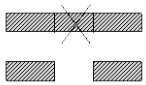
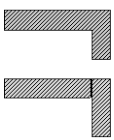
You can see how the height changes in isometric and elevation view.

Modification options

You should now be aware of the main modification tools. It is up to you to decide whether it is quicker to use one of these tools or whether it's more efficient drawing new elements from scratch. Do not forget the other, more general tools which you can use to copy, mirror and so on.

Tip:
Modify Offset, **Stretch Entities**, and **Fold Line** function in 2D in the same way.

Task	Tool	Result
Modifying parameters		
Modifying parameters (such as height, thickness, dimensions) of architectural components of the same type; Repositioning the component axis in the element **Apply Archit. Component Properties**		
Modifying the parameters of a single architectural element (analogous to creation) **Shortcut menu – Properties**		
Modifying architectural elements of different types (including height settings) **Change Archit. Properties**		
Modifying the geometry		
Changing the wall thickness **Modify Offset**		
Lengthening, shortening, moving walls; changing opening sizes **Stretch Entities**		

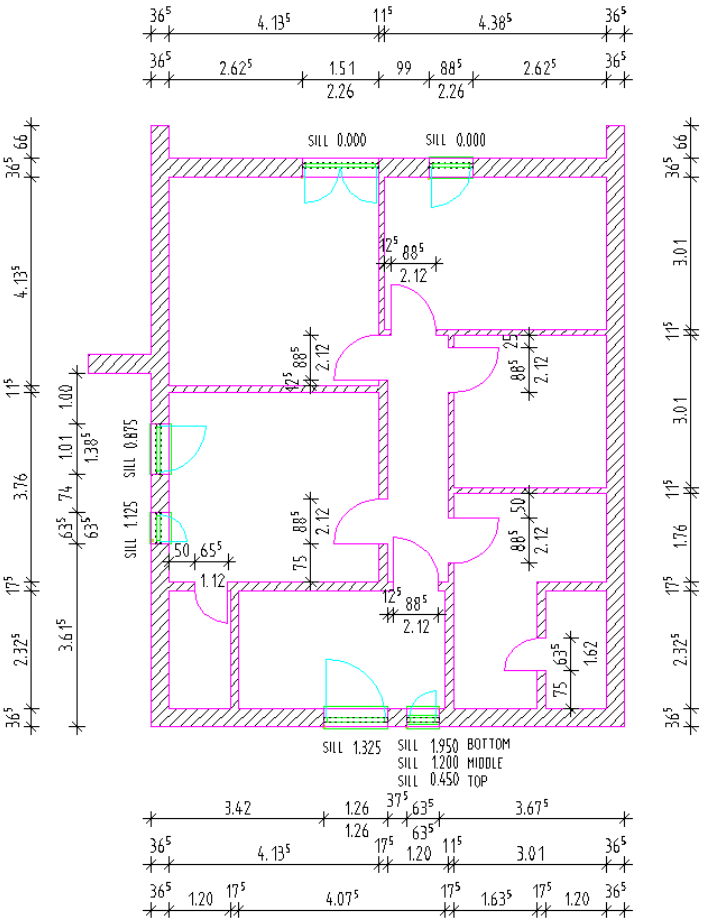
Folding wall lines; fitting in wall ends **Fold Line**		
Joining walls **Join Linear Components**		
Joining walls with lines The difference between this and joining a wall with a wall is evident in the case of multilayer walls. **Join Linear Component with Line**		
Deleting wall sections (the wall is divided into two sections) **Delete Section of Linear Component**		
Showing and hiding wall junctions Each wall is delimited by a boundary line even when it appears to seamlessly 'flow' into the next wall. This tool only affects how a wall looks; it does not affect the component itself. **Show/Hide Junctions**		

If you have chosen to display the component axis,
Modify Offset,
Stretch Entities, and
Fold Line
might produce different results.
You can find more information in the Allplan Help; see the chapter about the component axis.

Modification

Now it's your turn. Finish modifying the top floor and add the missing doors and windows. When you have finished, the top floor should look like this:

Tip: For the balcony door, you can use the **2c wood rabbet** SmartPart you can find in the **2 casements** folder (**Library** palette – **Default** – **Architecture** – **Windows**).



Drawing the balcony parapet

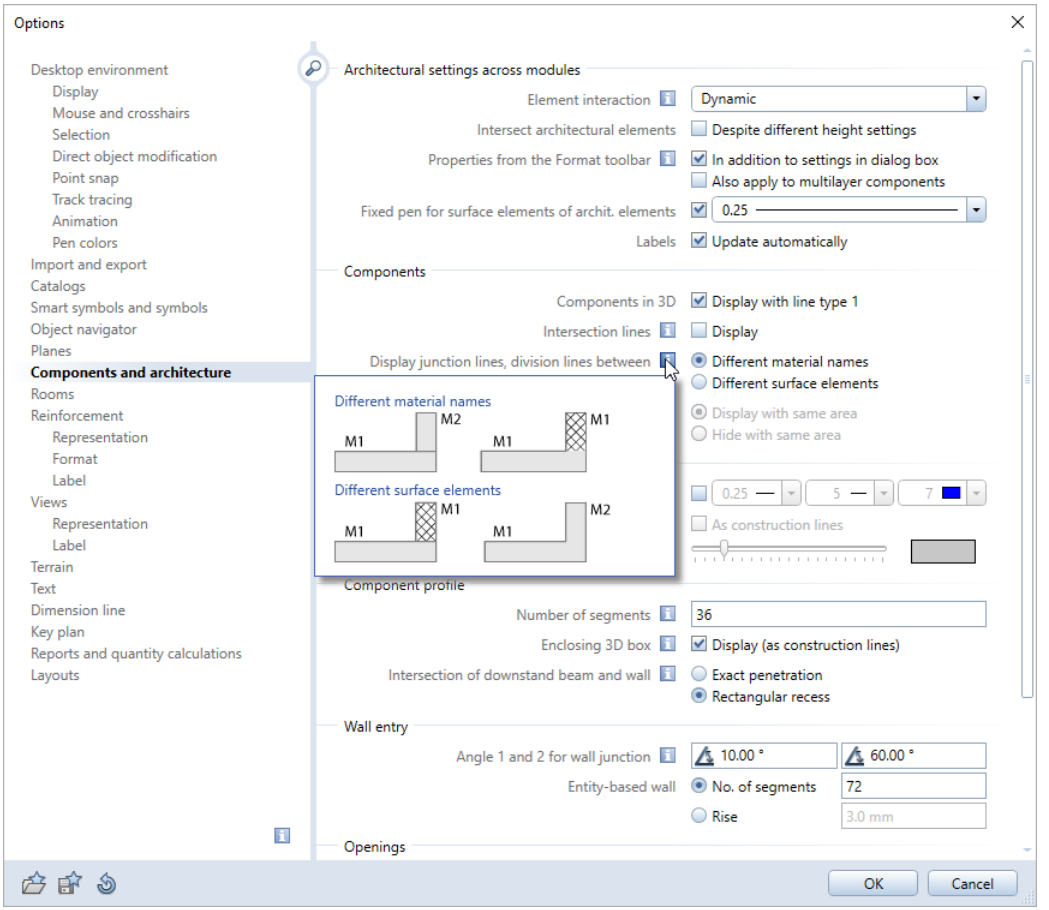
In this exercise, you will be using tools with which you are already familiar – **Wall** (straight and curved) and **Delete Section of Linear Component**. The parapet is 1.17 m high; the upstand is 25 cm high and 8 cm from the edge of the slab.

To draw the balcony parapet

1 Open the **Default Settings** drop-down list on the Quick Access Toolbar and click **Options**. Select the **Components and architecture** page.

2 Go to the **Components** area and select the **Different material names** option for **Display junction lines, division lines between**.

3 Click **OK** to confirm the dialog box.



4 Double-click a wall with the right mouse button.

This selects the **Wall** tool.

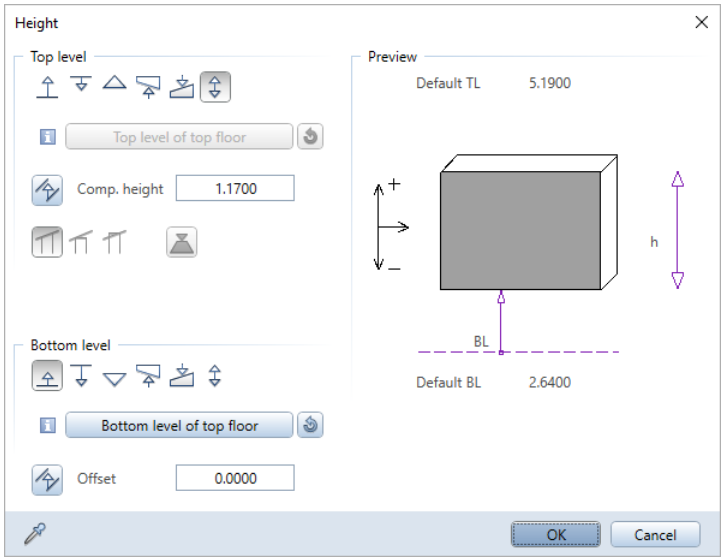
5 Change the **Properties**

on the **Surface elements** tab:
Hatching: off

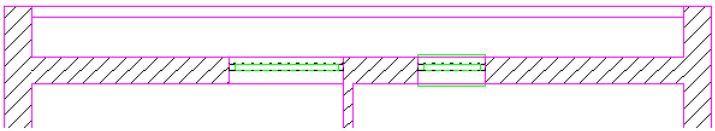
Parameters, attributes tab:
Material: Brick
Thickness: **0.15**
Priority: **150**

Now click the **Height...** button and specify the following:

- In the **Top level** area, click **Fixed component height** and enter **1.17**.
- In the **Bottom level** area, click **Relative to lower plane** and enter an offset of **0.00**.



6 Draw the parapet. Check the wall's offset direction. If it is not correct, change it by clicking **Reverse offset direction**.

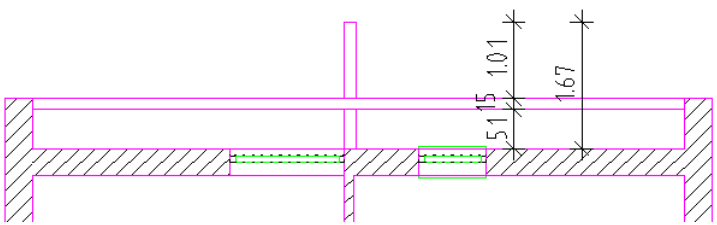


The **Wall** tool remains active!

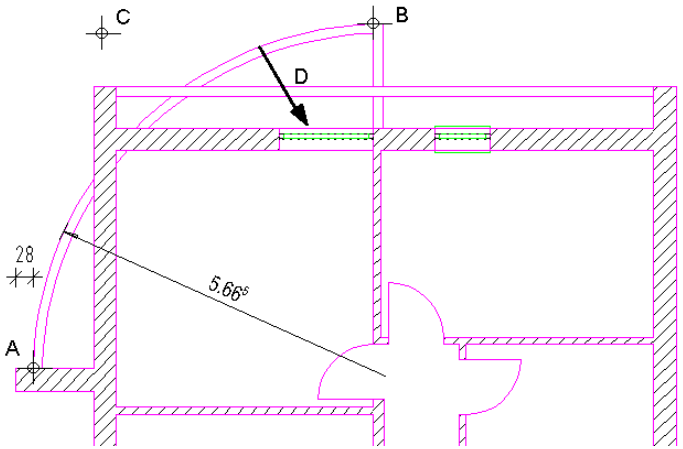
7 Change the **Properties**

Parameters, attributes tab:
Material: **B15**
Priority: **100**
Height:
Top level: **Fixed component height**: **0.25**
Bottom level: **Relative to lower plane**: **0.00**

8 Draw a straight wall. You can draw the wall in one go. Due to its lower priority rating, a 'hole' is automatically cut out of it where it intersects the parapet wall.

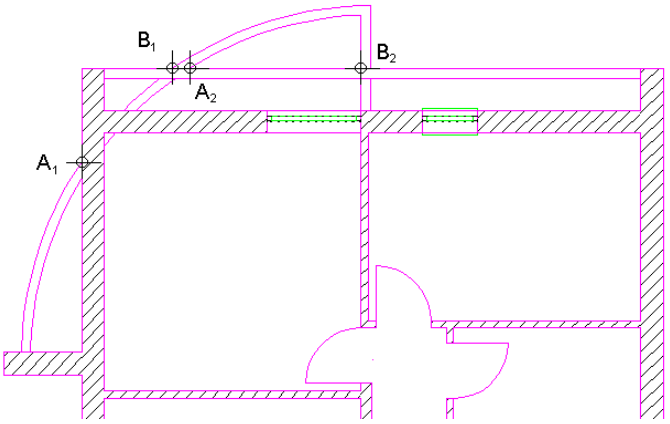


9 Select the ESC key to finish the straight wall. Now draw a curved wall that follows the path of the wall in the ground floor.



A = From point
B = To point
C = Arc's extension point
D = Wall's offset direction

10 Delete the wall sections that are not required by selecting **Delete Section of Linear Component** (shortcut menu).

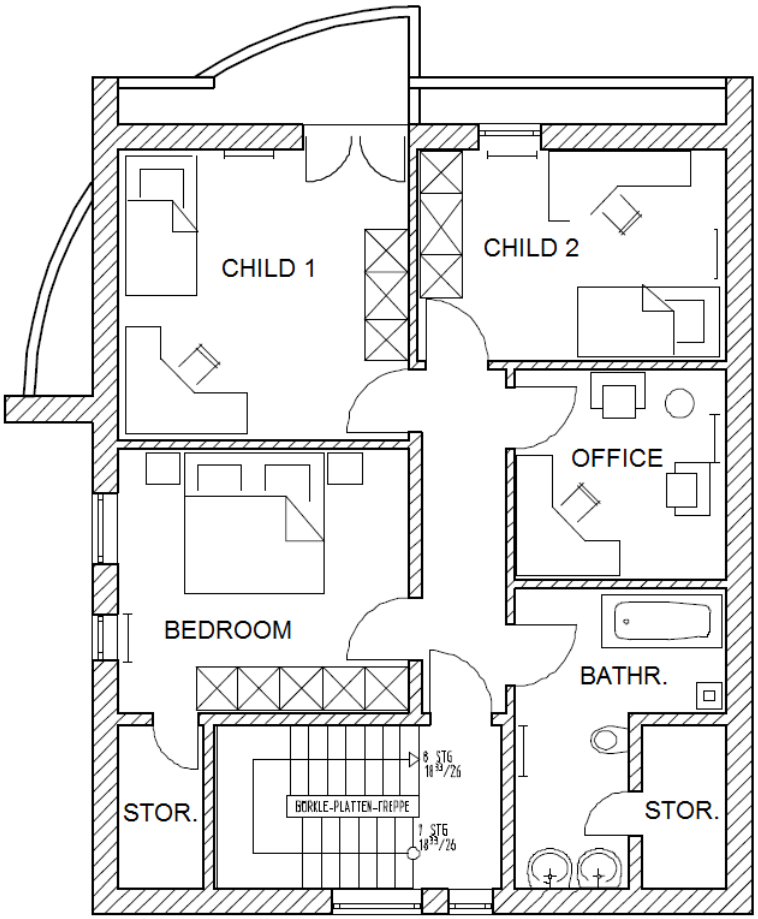


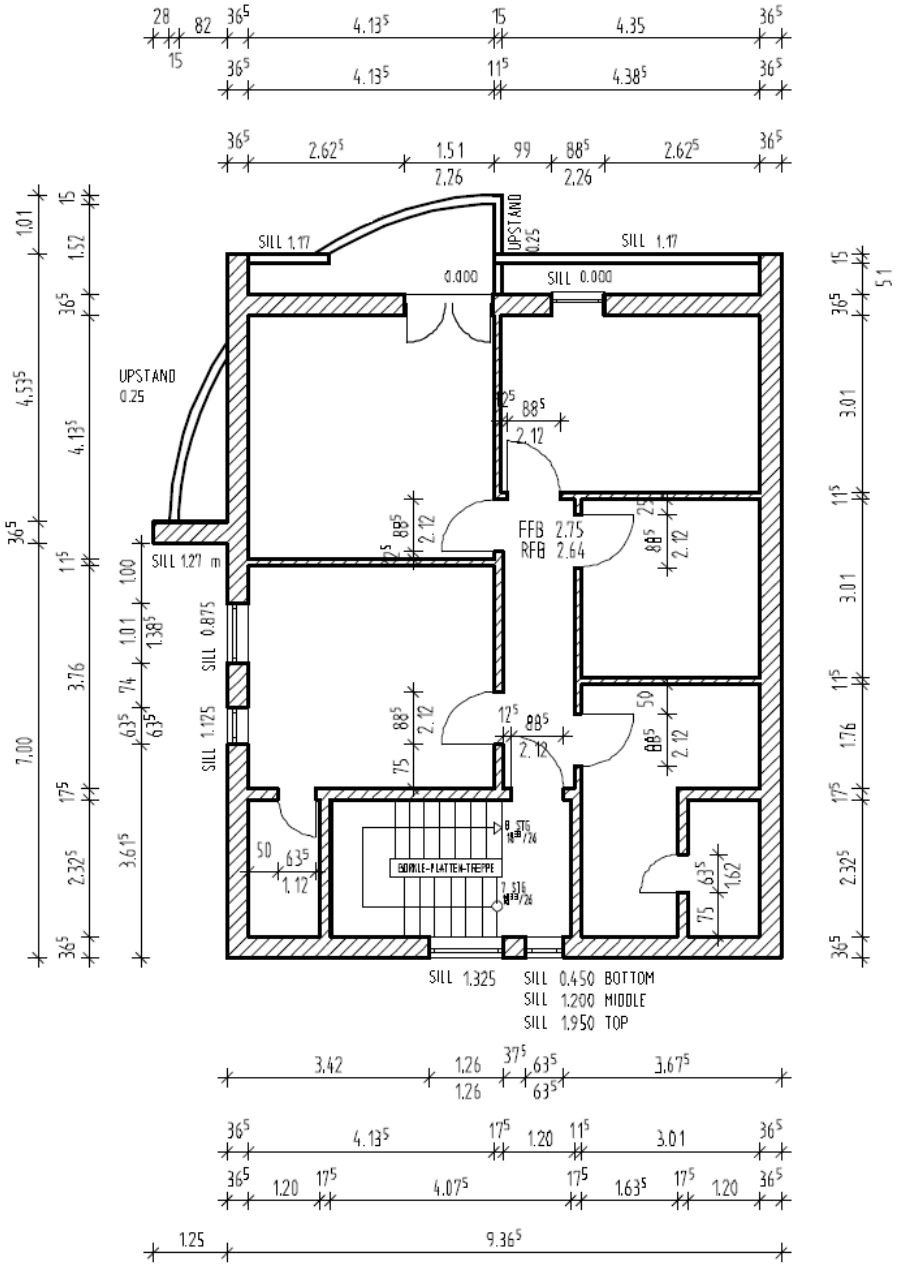
A_1 = From point
B_1 = To point
A_2 = From point
B_2 = To point

11 Select ESC to close the tool.

You can now complete the top floor yourself by adding dimensions, labels and furniture. Make sure that you assign the correct layers to the elements.

When you have finished, the plan of the upper floor might look something like this:




SILL 1.17
UPSTAND 0.25
SILL 1.17
0.000
SILL 0.000
UPSTAND 0.25
FFB 2.75
RFB 2.64
SILL 1.27 m
SILL 0.875
SILL 1.125
BOMBLE-FLATTEN-TREPPE
SILL 1.325
SILL 0.450 BOTTOM
SILL 1.200 MIDDLE
SILL 1.950 TOP

Exercise 4: basement

Now is a good time for you to start trying things out on your own. The best way to design the basement is to combine the **Draw the elements from scratch** and **Copy and modify** methods you are already familiar with.
As the following steps have been covered before, the descriptions are less detailed.

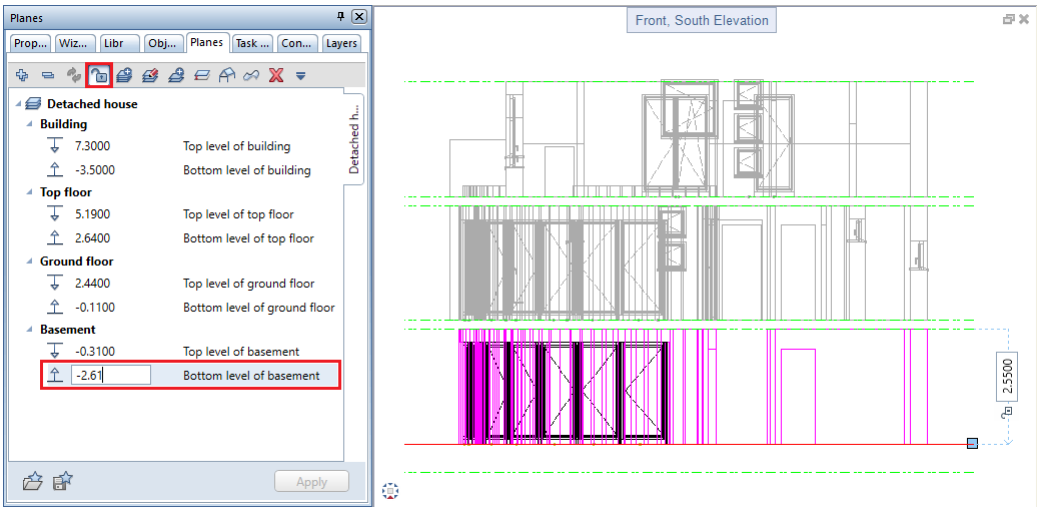
Copy the components from drawing file 100 to drawing file 120

- Make drawing file **100 Ground floor model** current and close all the others.
- Use **Copy, Move Elements between Documents** (drop-down list of the Allplan icon on the title bar) to copy the necessary components (curved wall, columns, stair outline and some of the interior walls) from drawing file **100 Ground floor model** to drawing file **120 Basement model**.

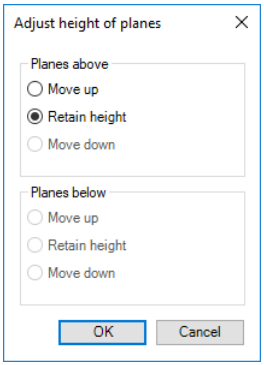
Modify the elevation specifications of the basement

- **Open on a Project-Specific Basis**; make drawing file **120 Basement model** current and open drawing files **100 Ground floor model** and **110 Top floor model** in reference mode.
- **1 Viewport**; select **Front, South Elevation**.
- Open the **Planes** palette and turn **Modification mode on**.

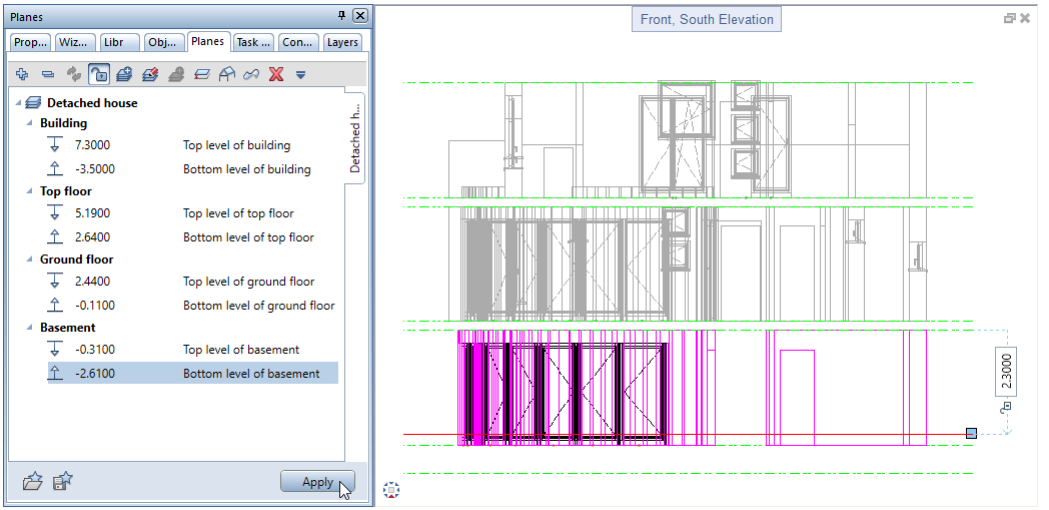
- Change the bottom level of the basement to **–2.61** m (corresponds to the unfinished basement floor).



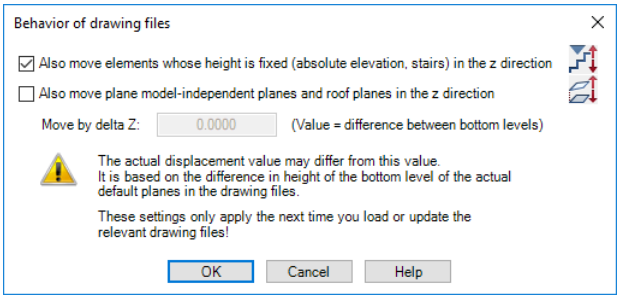
- Retain the height of the planes above.



- Click **Apply** in the **Planes** palette.



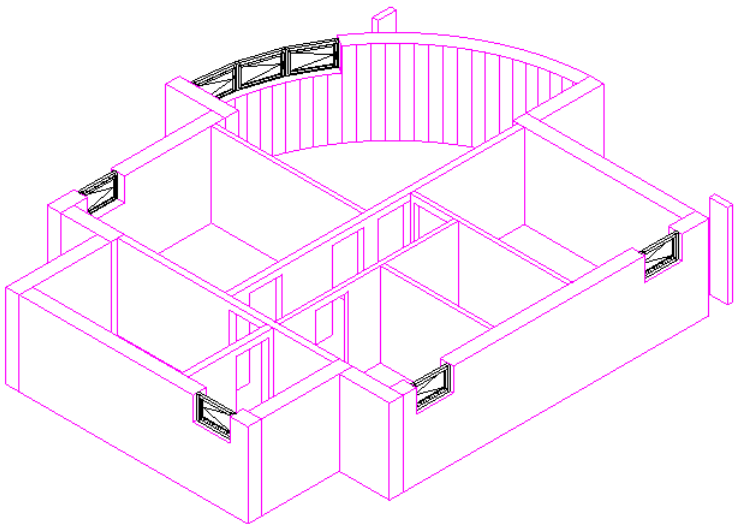
- Define behavior of drawing files:

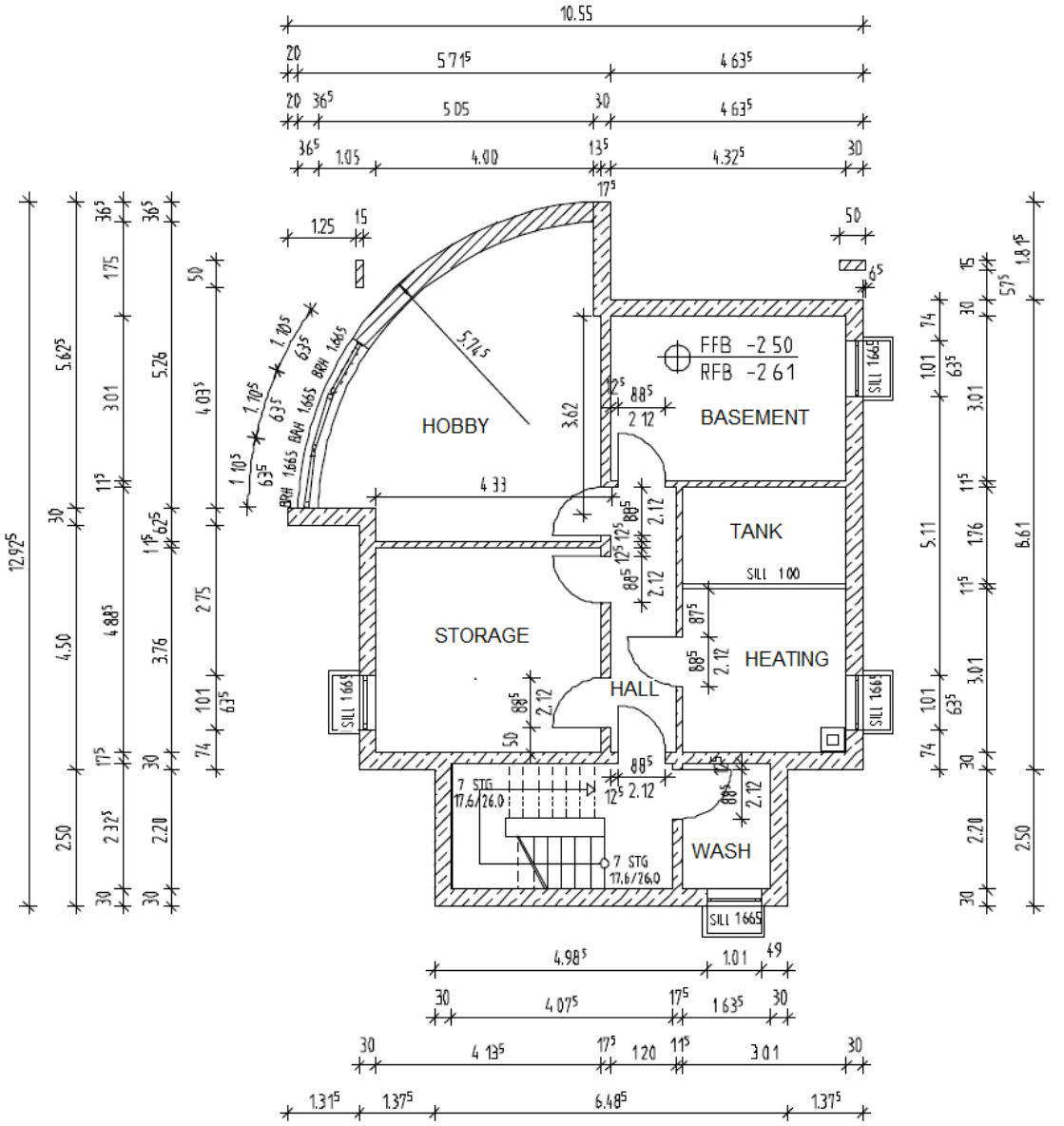


- Turn **Modification mode off** in the **Planes** palette.

Design the basement

- Make drawing file **120 Basement model** current and open drawing file **100 Ground floor model** in reference mode.
- Switch to **Plan view**.
- Here, it's quicker to create the exterior walls from scratch. Instead of making modifications, draw the exterior concrete walls along the inside edge of the ground floor walls.
- Close drawing file **100 Ground floor model**.
- You can now modify the components you copied to drawing file **120 Basement model**.
- Draw the slab in drawing file **129 Basement slab**. Assign the **Bottom level of ground floor** and **Top level of basement** planes to this drawing file. Do not forget the slab openings for the stair and the chimney!




HOBBY
BASEMENT
TANK
STORAGE
HEATING
HALL
WASH
FFB -2 50
RFB -2 61
SILL 1665
SILL 100
7 STG
17.6/26.0
10.55
12.92
8.61
6.48

Unit 3: Planes

➲ The exercises in this unit require the **Architecture** role on the **Actionbar**.

Planes help you work in 3D space, because you do not need to calculate the height settings for all components. Planes are very flexible; they come in two types:

- **Default planes** are horizontal and parallel to each other. They apply to the entire drawing file.
- **Custom planes** are not necessarily horizontal. They apply only to the area you define by entering the outline of the planes.

Default planes and **custom planes** always come in pairs – an upper plane and a lower plane.

The general approach is as follows:

- Define the position of the pair of planes in space.
- Define the height settings of the components (walls, columns, windows, niches and so on) relative to the planes. In other words, attach the top level and bottom level of a component to the upper or lower plane at an offset of your choice.

This might appear complex at first. However, experience has shown that this is a simple, elegant and accurate approach, which is particularly useful for designing multistory buildings.

Planes are the backbone of building design in **Allplan**. **Default planes** are ideally suited for early planning phases involving planar components. Subsequent

planning phases (LOD 300/400) usually require inclined components. Here, you can use several **custom pairs of planes**. Depending on the component shape, you might need several discrete triangular surfaces for the custom planes. However, these planes cannot be edited quickly or easily.

In addition, Allplan provides two other plane types: **reference surfaces** and **offset planes**. These planes do not come in pairs; instead, you use them as single planes.

Reference surfaces are easy to use; so, they are real alternatives to custom pairs of planes. You can use a **reference surface** locally in one drawing file or you can integrate a reference surface in a plane model, thus using this reference surface across drawing files. When a reference surface is part of the plane model, you can define the height settings of components based on this reference surface in all drawing files.

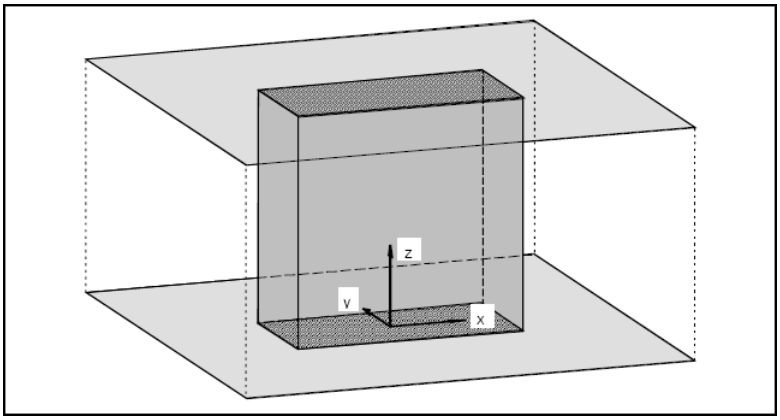
An **offset plane** is linked with another plane. When you change the linked plane, the offset plane adapts automatically, including all components that are defined based on this offset plane. This also works across stories.

Using planes

Default planes

You have already worked with the default planes in this tutorial. The section that follows explains the concept of the default planes in more detail.

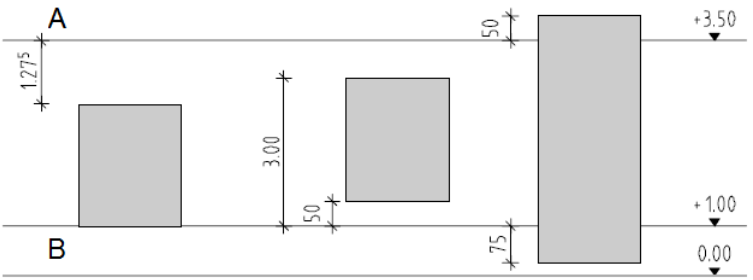
Imagine two horizontal planes in three-dimensional space, parallel to each other and at different elevations. When you position a component (for example, a wall) between the two planes, the program "stretches" the wall so that its top and bottom levels are flush with the upper and lower planes respectively. Every drawing file has an imaginary pair of planes (these are called the default planes). Default planes are invisible and stretch to infinity.



The default planes can be defined at different heights in different drawing files. By attaching a component's top and bottom levels with these planes, you ensure that any changes you make to the height of the planes also apply to the component. So, you can change the story height for all components by changing a single value.

You can enter a distance between the top level (TL) and bottom level (BL) of the component and the upper and lower planes respectively. You can also define whether this distance is constant.

For example: **Elevation at top** is **3.50**; **elevation at bottom** is **1.00**.



A = upper default plane; **B** = lower default plane

Top level:
Relative to upper plane **–1.275 m**

Top level:
Relative to lower plane **3.00 m**

Top level:
Relative to upper plane
0.5 m

Bottom level:
Relative to lower plane **0.00 m**

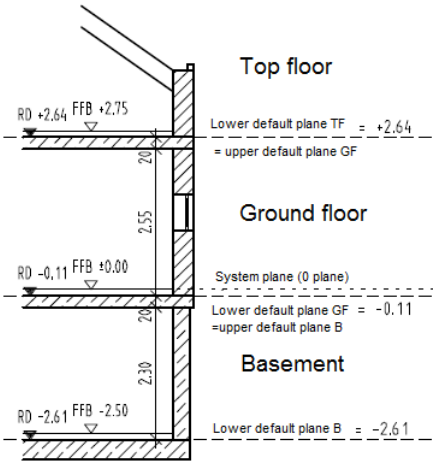
Bottom level:
Relative to lower plane **0.5 m**

Bottom level:
Relative to lower plane **–0.75 m**

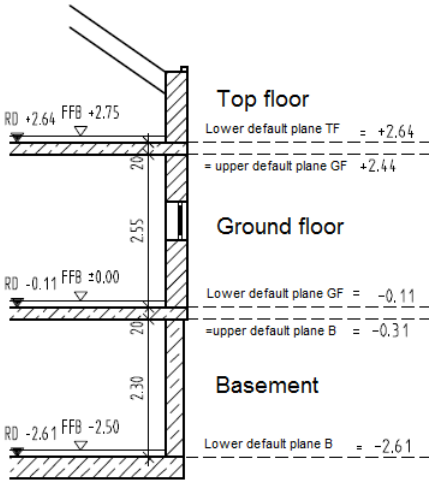
Changing the default planes in a drawing file affects all components whose height settings are based on these planes.

There is no rule as to how place the reference planes. However, as a rule of thumb, you might consider the following:

- Default planes at top level of unfinished floor



- Lower default plane at the top level of the unfinished floor
  Upper default plane at the bottom level of the unfinished floor
  (used in this tutorial)



- Lower default plane at the top level of the finished floor
  Upper default plane at the bottom level of the suspended ceiling
  (for example, for interior designers)

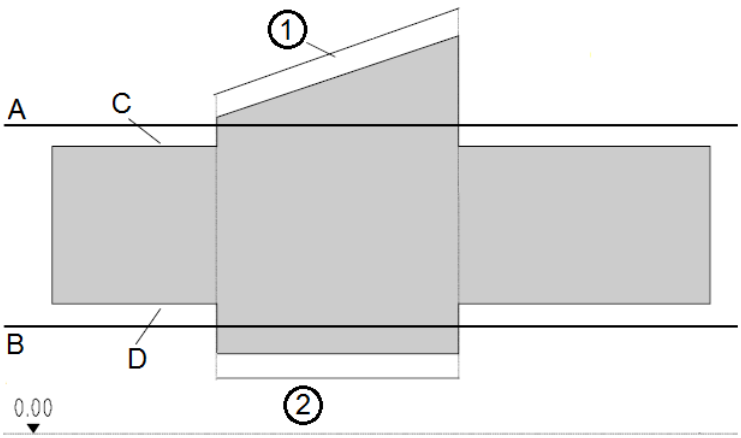
Custom planes

Default planes do not afford the possibility of accounting for height differences within a component – sloping walls, for example. In this case, you can use custom planes.

Custom planes also come in pairs. However, they do not stretch to infinity; they have a boundary. You can define the outline of the planes in plan – any shape you want. These planes (there are always two) can be inclined at any angle and any height that you assign to them.

Tip: Components can also be linked with planes that do not necessarily envelop the components.

You can define as many custom pairs of planes as you like in a drawing file; these planes take precedence over the default pair. All the components whose height settings are based on planes adapt to the envelope defined by these planes. If no custom plane has been defined, then the components default to the default planes.



(A) Upper default plane

C = Top level of component attached to the upper plane at an offset

① Upper custom plane

(B) Lower default plane

D = Bottom level of component attached to the lower plane at an offset

② Lower custom plane

When you design a roof frame, you are in effect creating a whole series of custom pairs of planes in a simple and elegant manner – you will see how this is done in the next exercise.

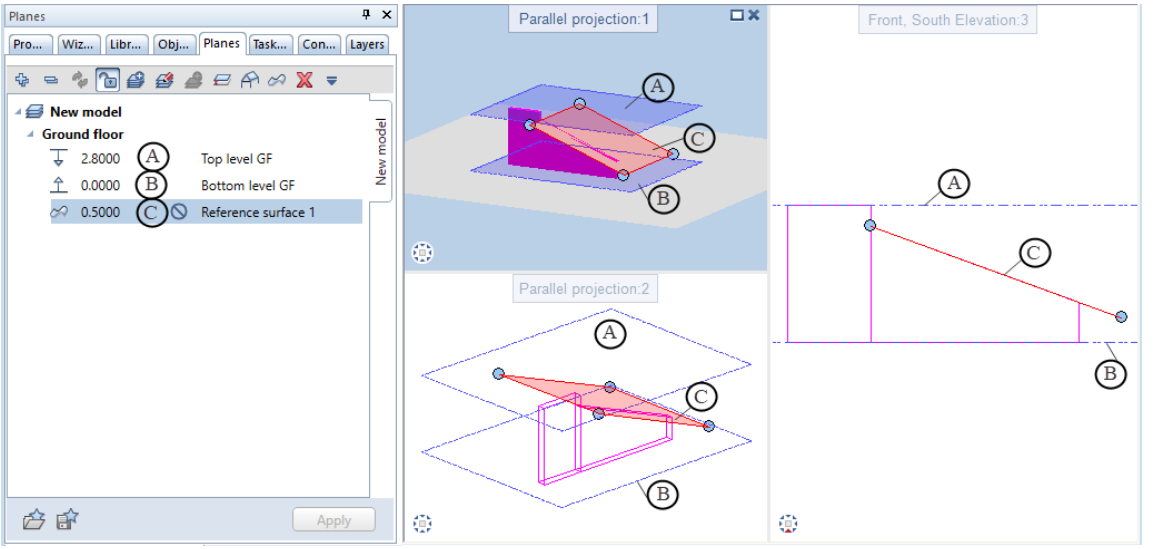
The **Custom Planes** and **Modify Planes** tools can be combined, providing enormous design flexibility. Presenting these tools is beyond the scope of this workbook – however, by experimenting a little, you will quickly master what these tools are capable of.

Reference surfaces

You can create **reference surfaces** from any polygonal or freeform 3D surfaces. To do this, you can use the **3D surface to reference surface** tool, which you can find on the shortcut menu of any 3D surface.

At first, reference surfaces are local reference surfaces. This means that they are in the drawing file in which they were created from a 3D surface. Like components, reference surfaces can be copied, mirrored, moved or deleted. You can even copy them across drawing files. To tell them apart, you can use the shortcut menu to rename reference surfaces that you copied or mirrored.
Local reference surfaces apply only to the drawing file in which they are located. When components are within the area of reference surfaces, you can define the height settings of these components based on the reference surfaces.

If your project has a plane model, you can insert a local reference surface in the plane model by using the **Insert or replace reference surface** tool in the **Planes** palette. The height of the reference surface is defined by the z-value of the lowest point in the reference surface. After you have integrated the reference surface in the plane model, you can define the height settings of components based on this reference surface in all drawing files. Unlike a roofscape, the reference surface need not be assigned to other drawing files.



In this example, a part of the wall is attached to the sloping **reference surface** (C) and another part of the wall to the **Top level of ground floor** (A) default plane.

You cannot change the geometry of a reference surface in a plane model. Instead, adjust a local reference surface and replace the reference surface in the plane model by using **Insert or replace reference surface**. This does not change the height definition of components.

Note: The reference surface in the plane model is no longer linked with the local reference surface in the drawing file.

Note: **Reference surfaces** cannot replace **Roof Frames** or roofscapes in all cases: Timber elements like **Rafters** do not have their own height definition. Instead, they take their height settings from the roof frame.

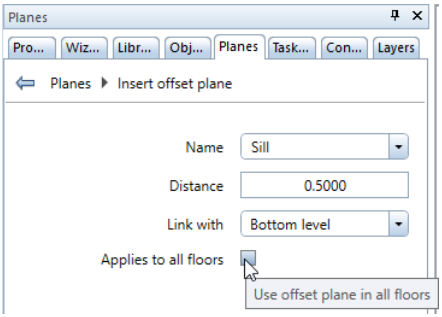
In **Allplan** most architectural elements can be associated with reference surfaces. This includes not only walls and slabs but also components created with the **Path** or **Planning and Planting** tool.

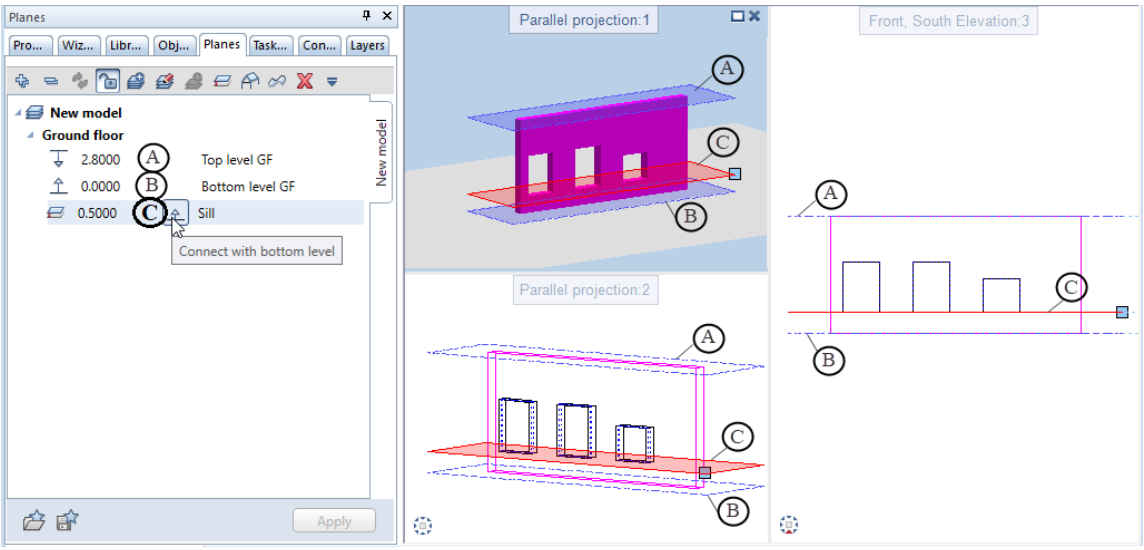
You can find further information about reference surfaces in the Allplan Help.

Offset planes

You can create an **offset plane** in the plane model in the **Planes** palette. To do this, you can use the **Offset plane** tool on the toolbar of the **Planes** palette. You can also find this tool on the shortcut menu of a story.

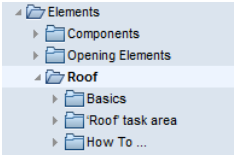
The offset plane is linked with a default plane at an offset you define. When you change the linked plane, the offset plane adapts automatically, including all components that are defined based on this offset plane. When defining the offset plane, you can select the **Applies to all floors** option to apply this offset plane to all stories of the plane model. When an offset plane applies to all stories, you can see the symbol in floor manager.





Exercise 5: roof

Tip: Read the chapter "Roof – Basics" in the Allplan Help:



The **Roof** task area in the **Elements** task contains tools you can use to create custom planes quickly and easily.
A roof frame is comprised of several pairs of reference planes: Each slope in the roof represents one pair of reference planes. The upper plane lends a shape to the roof while the lower plane in the pair remains horizontal. Thus, you can easily construct flank walls between the planes. If the walls are already plane-associated (as in this example), then they will adjust automatically to the reference planes in the roof frame.

A roof can consist of several roof frames. All you need to do is draw the outlines of the additional roof frames in plan. They can cover an existing roof in its entirety or parts thereof. Allplan will automatically calculate and intersect the roof planes.

How to design a roof

1 Enter the roof outline and the top level and bottom level of the roof.

  Allplan will initially create a cube-like frame.

2 Apply slopes to the frame and make settings for the height.

  Height setup:

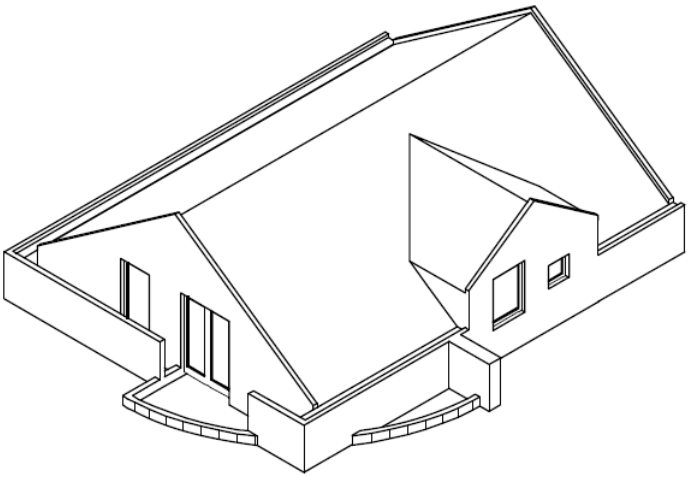
  - Enter the absolute height of the eaves or
  - Define a point through which the slope is to pass.

  This will form the roof shape.

3 Use the **Roof Covering** or **Slab** tool to apply a roof covering.

Roof frame

In this sample building, you will add a roof with a dormer. The main roof and the dormer pitch is 35°. The flank of the roof joins with the flank walls at the sides of the building. The roof pitches extend to the inside edge of the exterior walls to create a hidden eaves gutter. The position of the roof slopes will be defined by the height for the line of the eaves.



Isometric view of the top floor with the roof

To create the main roof

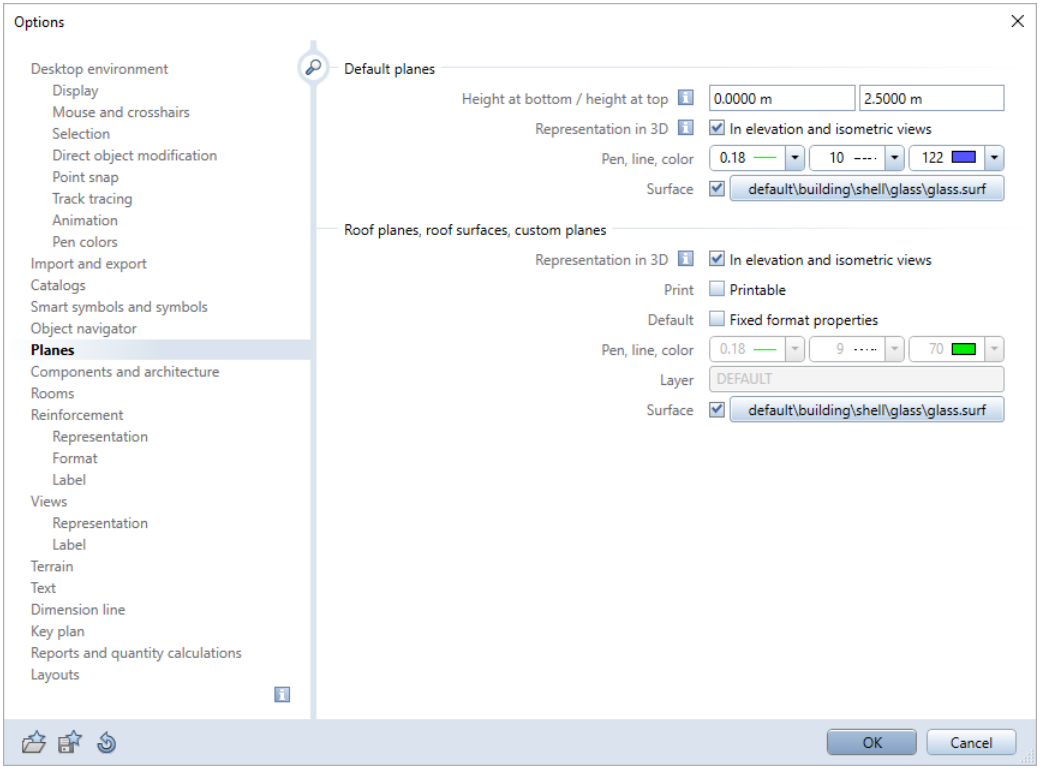
➲ Make drawing file **112 Roof** current and open **110 Top floor model** and **3 Chimney** in edit mode.

➲ Make sure only the layers **AR_WALL**, **AR_ROOF** and **AR_CHIMN** are visible.

➲ The **Architecture** role and the **Elements** task are open. Expand the **Roof** task area.

1 Click **Roof Frame** (**Roof** task area) and check the **Properties** palette to see whether the **AR_ROOF** layer is selected. If it isn't, select it now.

Note: If you cannot select the layer in the **Properties** palette, open the **Options** (**Default Settings** drop-down list on the Quick Access Toolbar) on the **Planes** page and check the setting of the **Default setting – fixed format properties** option. This option must not be selected.



2 Click **Gable/hip roof**.

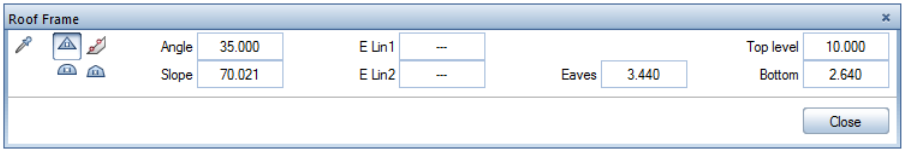
3 Click **Angle** and enter **35**.

The bottom of the roof frame is to be flush with the lower default plane of the top floor.

4 Click **Bottom level** and enter **2.64**.

5 Click **Top level** and enter **10**, as the top level of the roof frame must be above the future ridge.

6 Click **Eaves** and enter the height of the eaves: **3.44**.

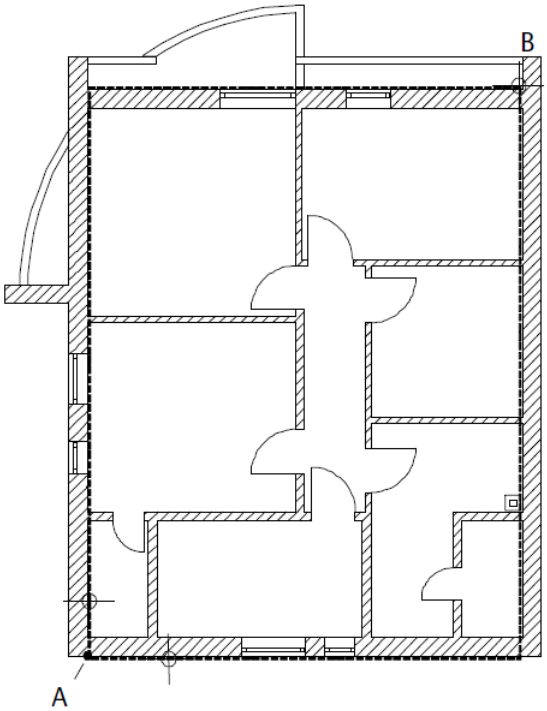


Tip: When you enter the outline of a roof, you can define an offset as you would when enclosing entities in a parallel offset polyline.
The polyline entry tools are also available here.

Now enter the rectangular outline of the roof (lines representing the eaves):

7 Right-click in the empty workspace (do not click an element!), select **Point of Intersection** on the shortcut menu and click the first corner.

8 Click a diagonally opposite point and then select the ESC key. This defines a rectangle.

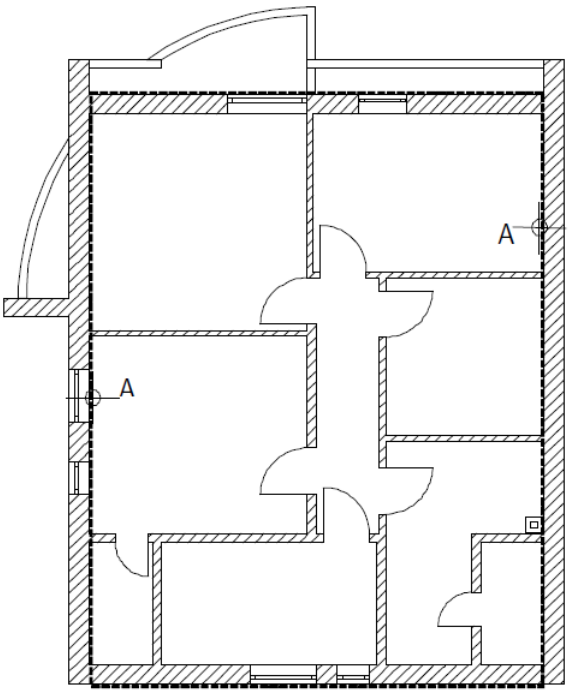


A = 1st point = point of intersection

B = diagonally opposite point

9 Click **3 Viewports**.
The roof frame is still a simple cube.

10 In plan view, click the edges of the roof to indicate where the slopes are to be applied.
Observe the changes as they happen in the isometric view.



A = Click edges of roof frame to apply slopes

11 Select ESC to finish defining the roof.

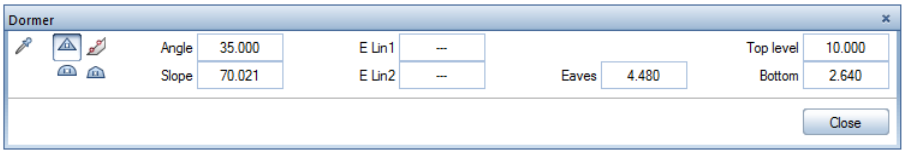
You can now create the dormer by using two more pairs of custom planes. To define the position of the slopes, you will use the height of the eaves. The dormer's eaves are 4.48 m high and consequently higher than the eaves of the main roof.

To create a dormer

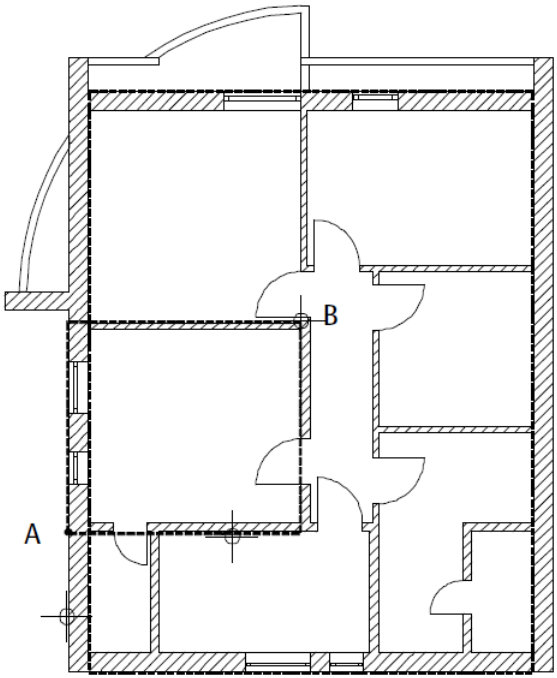
1 Click **Dormer** (**Roof** task area).

2 Click an edge of the main roof.

3 Check the roof parameters and modify the **Eaves** to **4.48**



4 Define the outline of the dormer in plan by clicking diagonally opposite points. Use **Point of Intersection** (**Point Assistant** on the shortcut menu) to help you. The outline must define the starting point and the width of the dormer exactly. The length toward the middle of the building is sufficient for the intersection of the roof planes.



A = 1st diagonal point (point of intersection)

B = 2nd diagonal point

5 Select ESC to finish. Now you have defined the outline of the dormer.

6 Click the dormer on both sides.
This will form the slopes.

7 Select ESC to close the tool.

Modifying the roof frame

Roof planes can easily be modified. You can find the relevant parameters on the context toolbar.

In this exercise, you will draw a 1-m elevation line. This will be a useful aid later on.

To draw an elevation line

1 Click **Modify Roof Frame** (**Roof** task area).

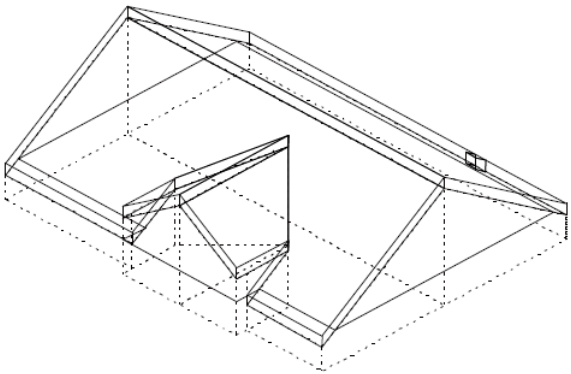
2 Click the ridge of the roof.

3 To specify the absolute height of **Elevation line 1**, enter **3.75** (1 m above finished floor on the top floor). Enter **0.00** for **Elevation line 2**.
The elevation line is drawn as a construction line.

4 Select ESC to close the tool.

Roof covering

To apply the roof covering, use the **Roof Covering** tool. The bottom level of the roof covering is flush with the upper roof plane. The distance between the planes and the top of the roof covering will determine the thickness of the roof covering.



To create a roof covering

➲ Make drawing file **3 Chimney** current and open **110 Top floor model** in reference mode.

1 Select the **Roof Covering** tool (**Roof** task area) and check the **Properties** palette to see whether the **AR_ROOFC** layer is selected.

2 Click **Properties**.

3 You want to create a roof covering that consists of a single layer and that covers all roof planes and dormer planes. Select the following settings:

- 1 Roof covering consisting of a single layer
- Roof covering above all roof and dormer planes

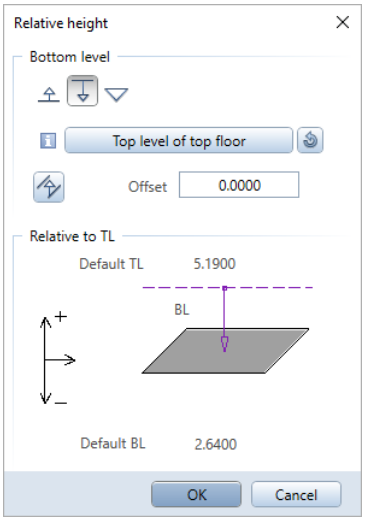
4 Click the **Relative height** button.

You will place the roof covering in the area of the roof frame that you have just created. The roof frame stretches between the two roof planes (= custom planes).

Note: Custom planes (and consequently roof planes, too) have precedence over default planes. This means that all plane-based components in the drawing file will adapt to the custom roof planes.

In this example, the upper plane is the top of the roof frame.

5 Click **Relative to upper plane**.



By clicking the button to the right of the info button, you can select the reference plane in the plane model. As the custom planes have precedence over default planes, this setting is irrelevant in this example.

6 Enter **Offset** = **0.0**.

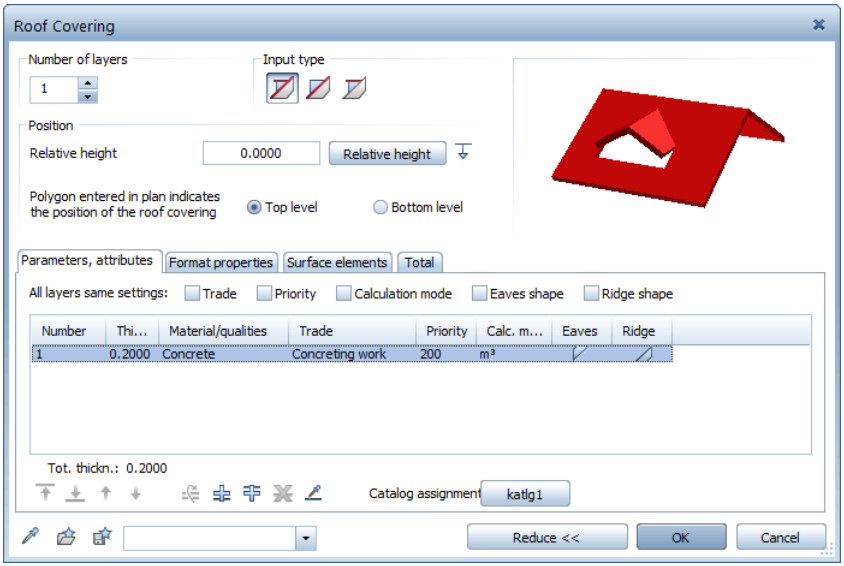
So, the bottom level of the roof covering is flush with the roof plane.

7 Click **OK** to close the **Relative height** dialog box.

8 The polygon you enter for the roof covering in plan is to apply to the **top level** of the roof covering. Select the corresponding option.

9 Open the **Parameters, attributes** tab and enter the following:

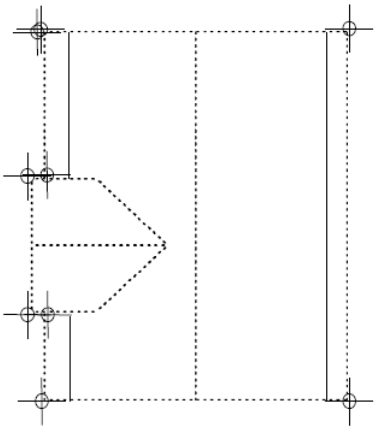
- **Thickness**: 0.2
- **Material, qualities**: Concrete
- **Trade**: Concreting work
- **Priority**: 200
- **Calculation mode**: m^3
- **Eaves**:
- **Ridge**:



10 Click **OK** to confirm the dialog box.

11 Click **Multi** in the input options.

12 Click the corners of the roof outline. Make sure the last corner you click coincides with the first one.



13 Click **Minus** in the input options.

14 Draw a "minus" roof covering; in other words, cut out a section for the chimney.

15 Select ESC to close the tool.

16 Close drawing files **3 Chimney** and **110 Top floor model** again.

You can use **Multi** in the input options to specify whether the area you enter is to be added (**Plus**) or subtracted (**Minus**).

By placing a check mark in the box, you can specify how the polyline entry tools handle architectural lines and how these tools behave when you generate polylines based on existing elements.

Slab or roof covering?

In theory, both of these tools can be used to create a roof covering. The difference is:

- When a **Roof Covering** protrudes beyond the area of the roof planes, it retains its slope setting.
- The areas of a **Slab** that protrude beyond the roof planes automatically adapt to the default planes.
- You can use the **Roof Covering** tool to enter different shapes for eaves and ridge.
- With the **Roof covering** tool, you ensure that the representation will be accurate when the masking plane tool is used.
- With the **Slab** tool, the masking plane has the same effect as when it is applied to walls and columns.
- Openings in the **Roof Covering** are created with the **Skylight** tool. You can also insert skylight SmartParts in these openings.
- When you use the **Slab** tool, you create openings by using the **Recess, Opening in Slab** tool. Smart 3D symbols inserted in these openings do not adjust to custom planes or roof frames.

Joining walls with the roof

Use floor manager to join the flank walls and interior walls with the roof. Drawing file **112 Roof** contains the roof planes and the roof covering. This forms the roofscape that you will integrate in floor manager. After this, you can assign the custom roof planes to all plane-based components in drawing file **110 Top floor model**. Custom planes (and consequently roof planes, too) have precedence over default planes. This means that all plane-based components in the drawing file will adapt to the custom roof planes.

To insert a roofscape

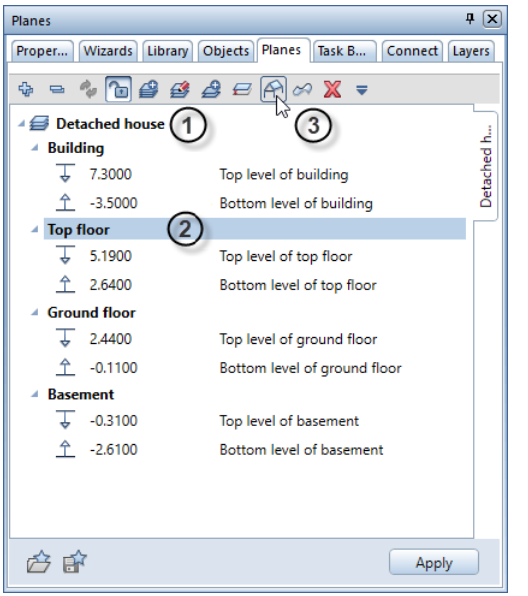
➲ Drawing file **112 Roof** is current. All the other drawing files are closed.

1 Open the **Planes** palette and turn **Modification mode on**.

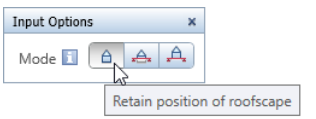
2 Select the **Top floor** structural level. This is the level into which you want to integrate the roofscape.

3 Click **Insert or replace roofscape**.

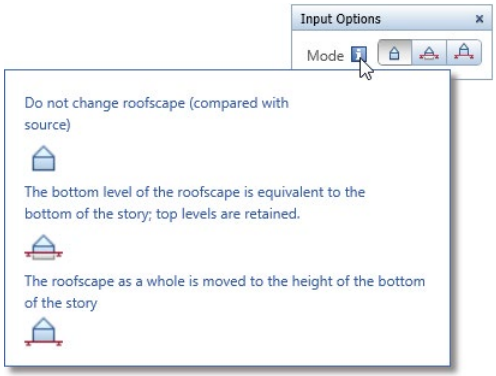
Tip: You can also find the **Insert or replace roofscape** tool on the shortcut menu of the selected structural level.



4 Do not change the roofscape planes compared with the planes from the source drawing file **112 Roof**.
Therefore, select the **Retain position of roofscape** option in the input options.

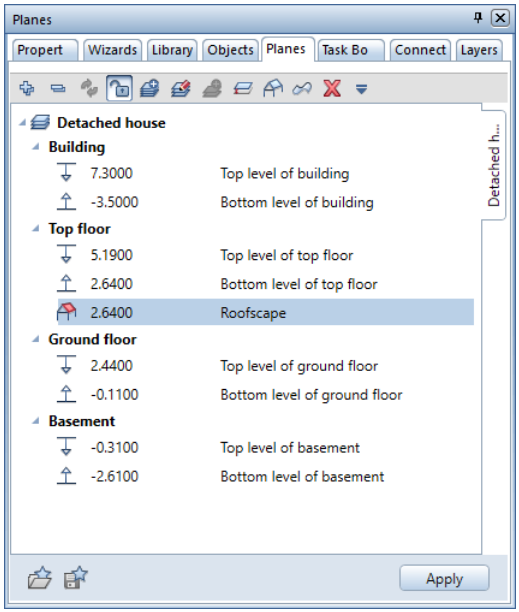


Note: Click the info button in the input options to get more information on the three options.



5 *Select roof plane or custom plane*
Click the roof plane.

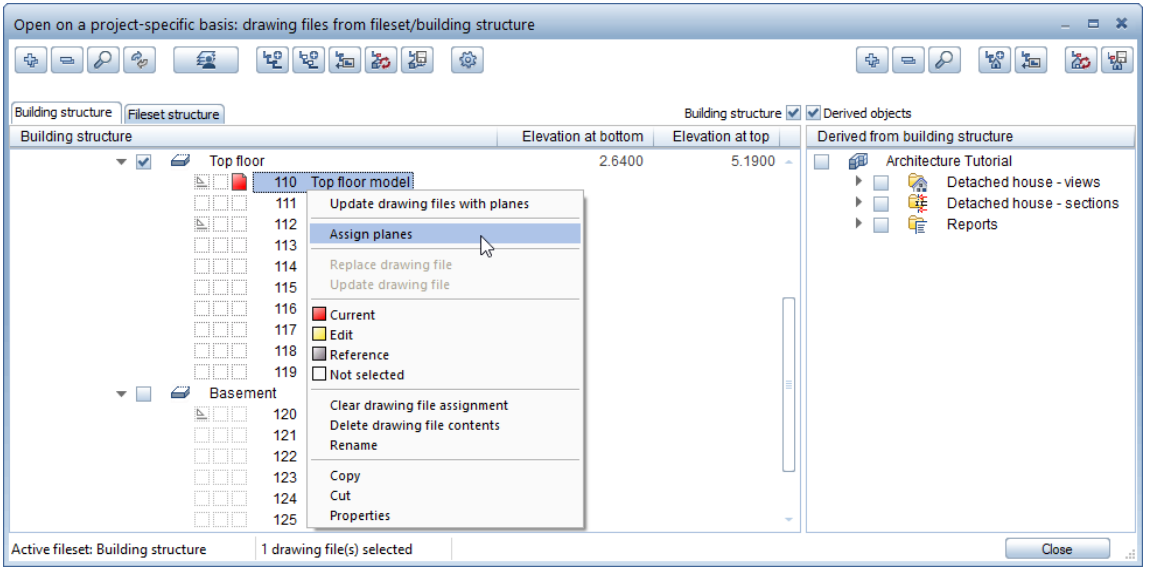
Allplan takes the roofscape from drawing file **112**, adding the roofscape to the **Top floor** structural level in the **Planes** palette.



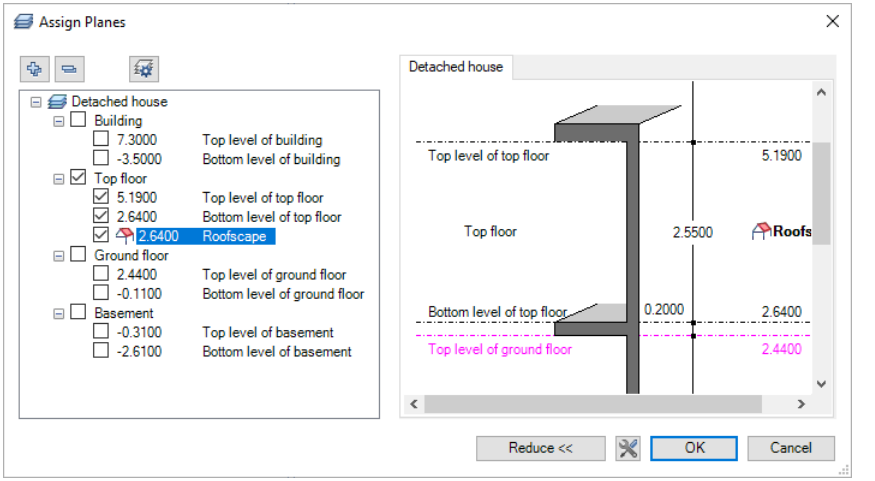
6 Click **Apply** in the **Planes** palette.

7 Click **Open on a Project-Specific Basis** (Quick Access Toolbar).

8 Open the shortcut menu of drawing file **110 Top floor model** and select **Assign planes**.

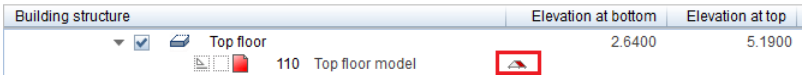


9 Select the **Roof** check box in the **Assign Planes** dialog box and click **OK** to close the dialog box.



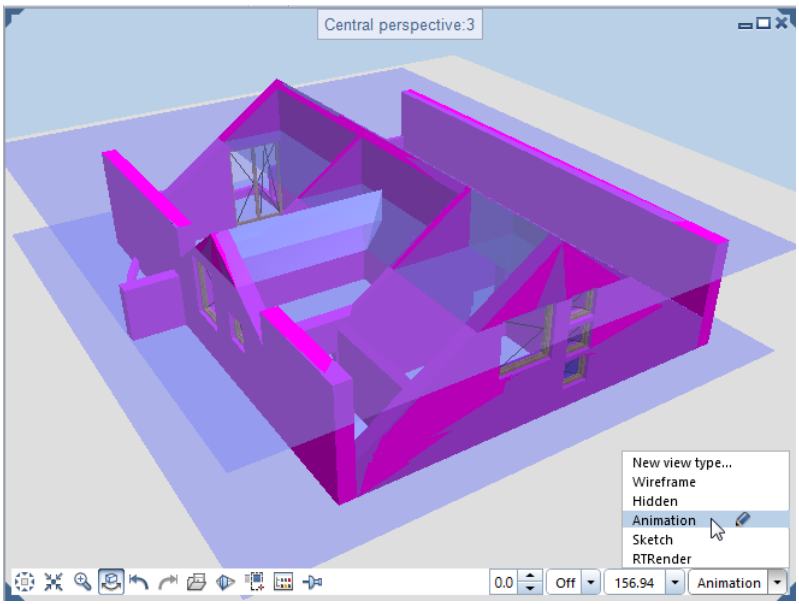
10 Click **OK** to confirm the **Behavior of drawing files** dialog box without selecting an option.

You are back in the **Open on a project-specific basis: drawing files from fileset/building structure** dialog box. As you can see, drawing file **110 Top floor model** has been given the planes of the roofscape.



11 Make drawing file **110 Top floor model** current and close all the others.

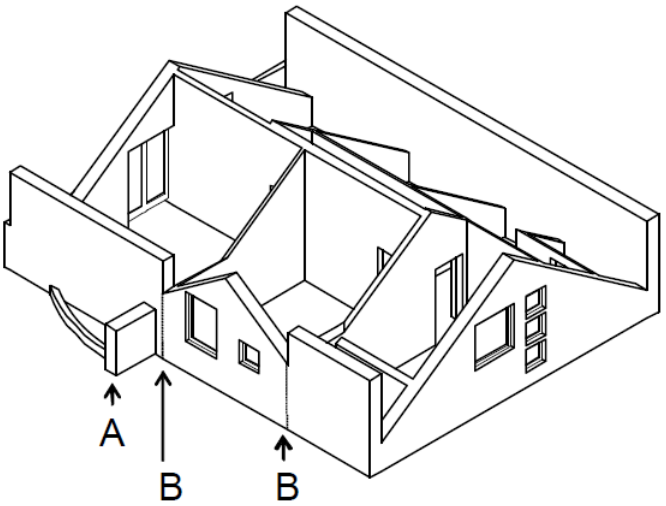
You selected **3 Viewports** at the beginning of this exercise. If you look at the isometric view, you can see that the flank walls and interior walls of the top floor have adapted to the roof planes. To display the design in animation, select F4 or click **View Type** on the viewport toolbar and select **Animation**.



The exterior walls on the side are not beneath the roof planes and are thus unaffected.

Joining walls with the roof

As you can see, the interior and exterior walls on the top floor are joined with the roof planes.
The side wall on the right is not enveloped by the roof frame; therefore, this wall adapts to the upper default plane.
The side wall on the left is enveloped by both the planes in the dormer and the default plane. You must divide this wall segment into three wall sections so that you can handle each section separately.

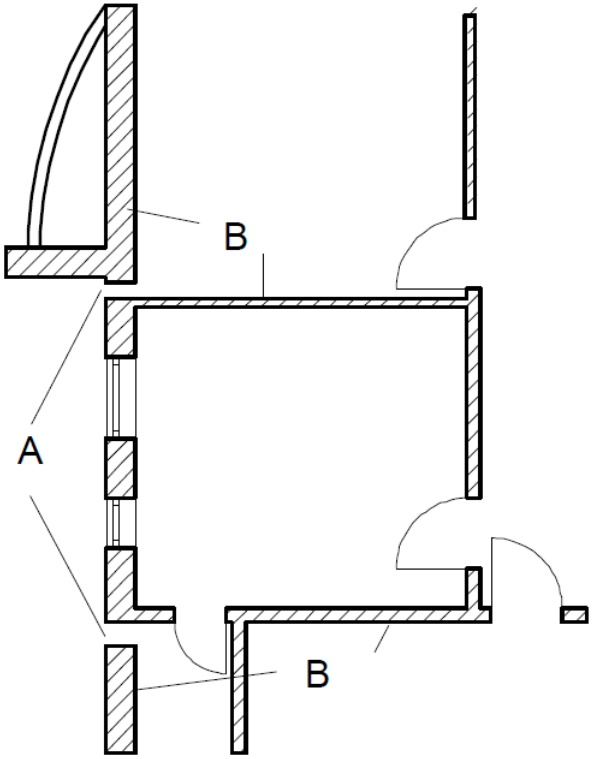


A = Do not join wall segment
B = Divide wall here

To join walls with the roof

➲ Only drawing file **110 Top floor model** is open.

1 Click **Delete Section of Linear Component** (**Components** task area) and delete a section of the wall, starting at the division point.



A = Delete wall sections
B = Join wall with line

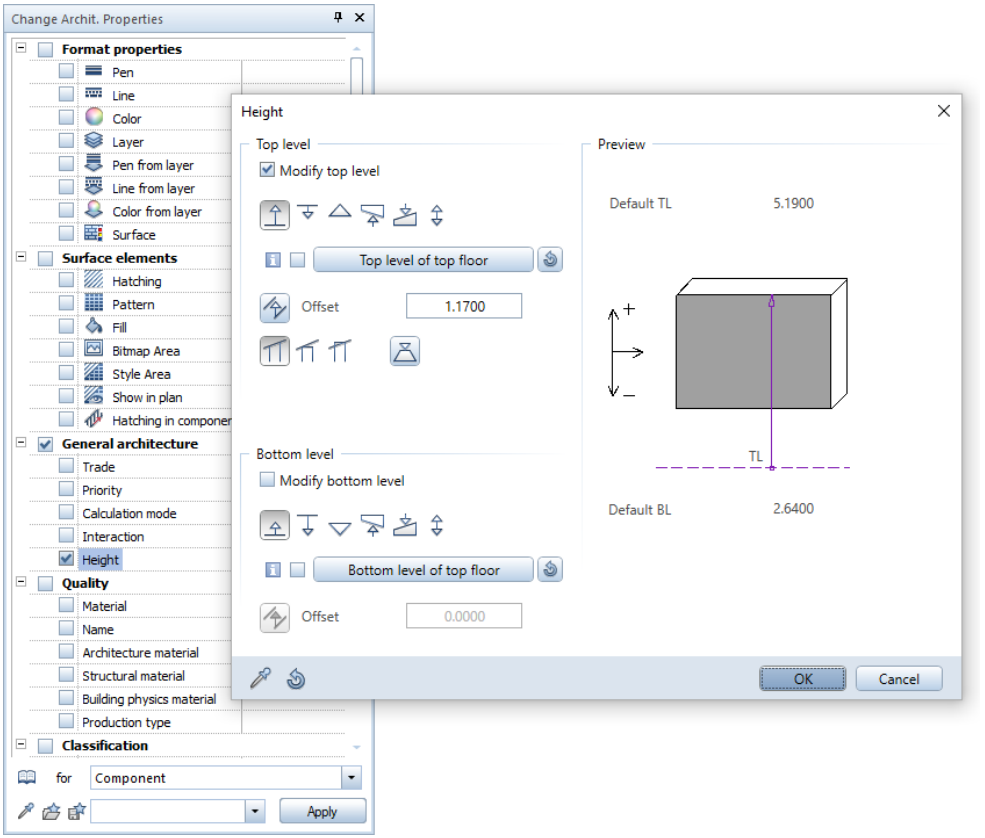
Tip: Selection preview – point to the wall without clicking: The relevant wall section appears in the selection color.

2 Click **Join Linear Component with Line** (**Components** task area) and join the wall sections again. There are still three wall sections, even if the edges are no longer visible.

3 Click **Change Archit. Properties** (**Change** task area) and change the height for the top level of the side walls that are not below the roof frame.

4 Select the check box beside **Height**.

The **Height** dialog box opens.



Tip: If the walls do not assume the full new height, you must update the wall junction between adjacent exterior walls by using **Join Linear Components**.
Check the wall junction lines: Open the **Options**, **Components and architecture** page, **Components** area and select the **Display lines where components intersect** option.

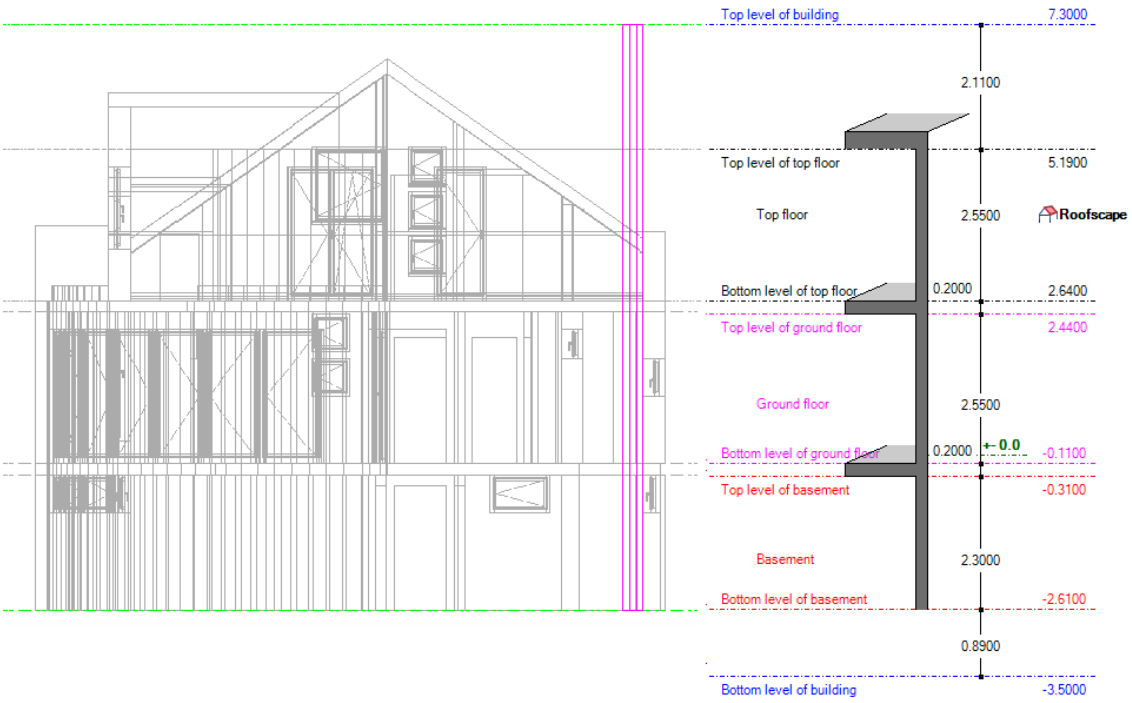
5 In the **Height** dialog box, select **Modify top level** and **Relative to lower plane**, enter an offset of **1.17** and click **OK** to confirm. Leave the bottom level as it is.

6 Click the exterior walls to be modified. They appear in the selection color.

7 When you have selected all components, click **Apply** in the **Change Archit. Properties** dialog box.

Modifying the height of the chimney

The bottom level of the chimney is attached to the bottom level of the basement and the top level of the chimney is attached to the top level of the building. When creating the plane model, you assumed a building height of 7.30 m.



Now you will modify the top level of the chimney so that it adapts to the height of the top level of the top floor.

To modify the height of the chimney

1 Click **Open on a Project-Specific Basis**.

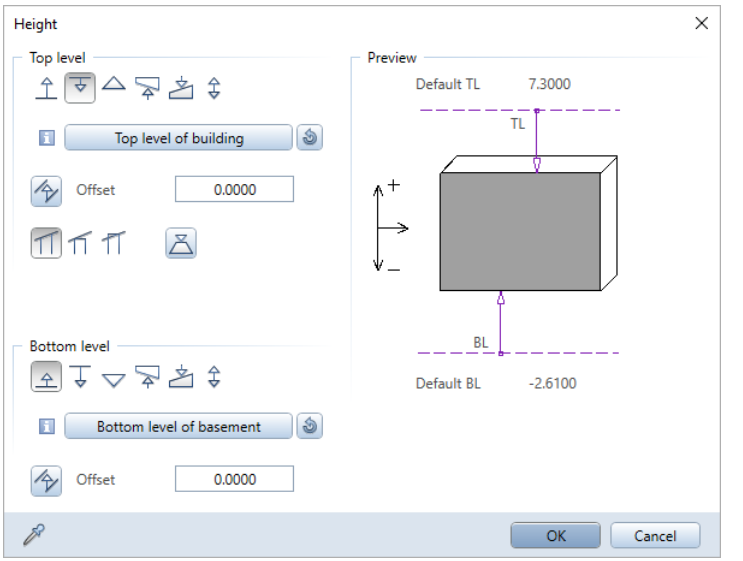
2 Make drawing file **3 Chimney** current; open drawing files **100**, **109**, **110**, **112**, **120** and **129** in reference mode.

3 Display the building in **Front, South Elevation** (viewport toolbar).

4 Double-click the chimney.

5 Click **Height...** in the **Chimney** dialog box.

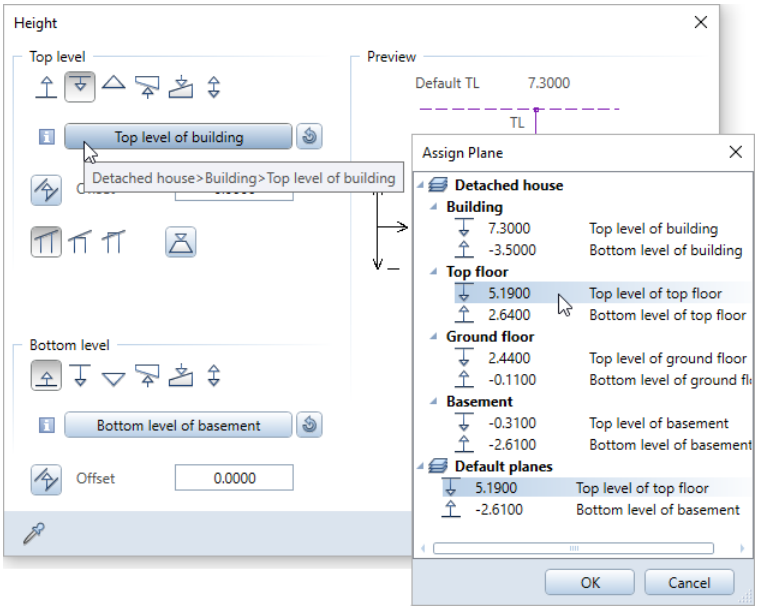
As you can see, the chimney has the height settings of drawing file **3**: **Top level of building** (**7.30** m) and **Bottom level of basement** (**–2.61** m).



6 To attach the top level of the chimney to the top level of the top floor, click the **Top level of building** button.

The **Assign Planes** dialog box opens.

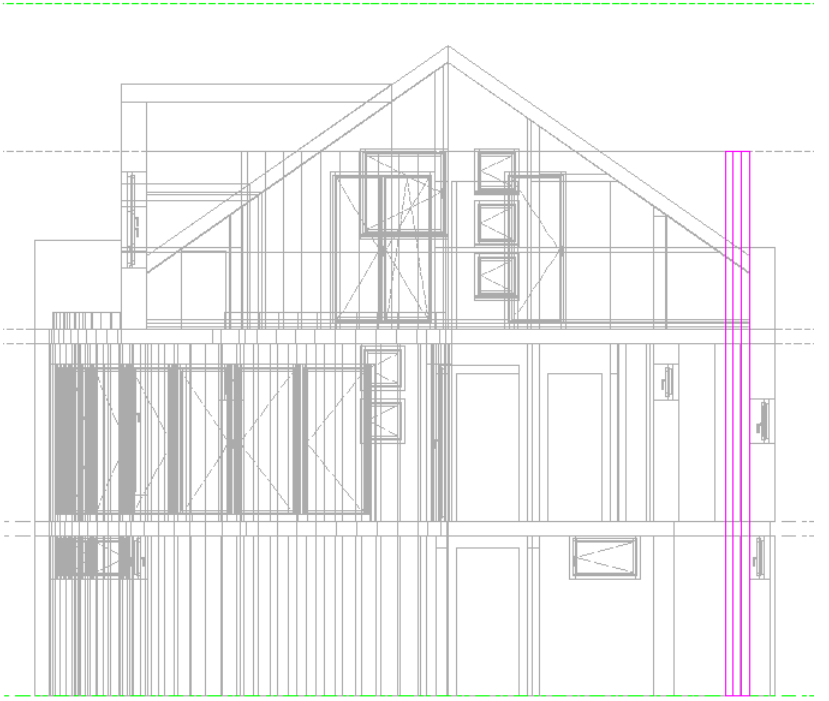
7 Select **Top level of top floor** (**5.19** m).



8 Click **OK** to close the **Assign Planes** dialog box.

9 Click **OK** to close the **Chimney** dialog box.

The chimney has been given the correct height settings.



Using a masking plane for the top floor

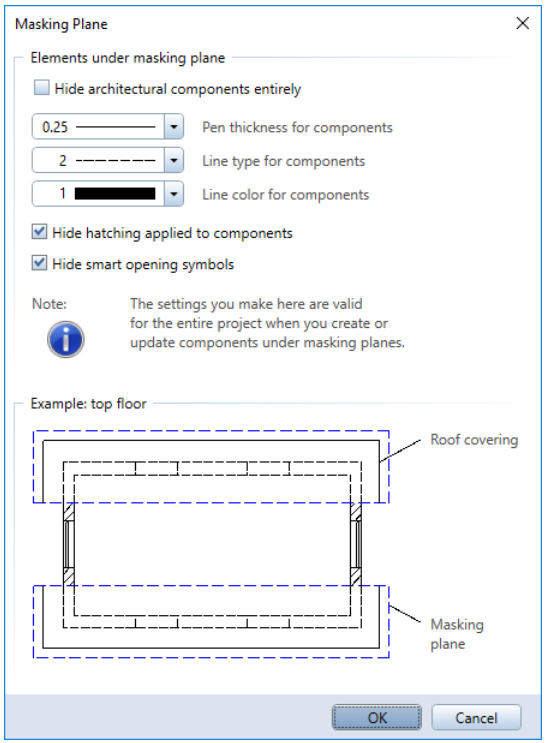
You can use the masking plane to change how architectural elements look in specific areas or to hide architectural elements entirely.

To enter masking planes

➲ Make drawing file **115** current.
Open drawing file **110 Top floor model** in edit mode.
Open drawing file **112 Roof** in reference mode.
Close all the other drawing files.

➲ Choose **Plan view** (viewport toolbar).

1 Click **Masking Plane** (**Roof** task area) and specify how the components below the masking plane are to look: Select pen **1 0.25** and line type **2**. Hide component hatching and smart symbols.



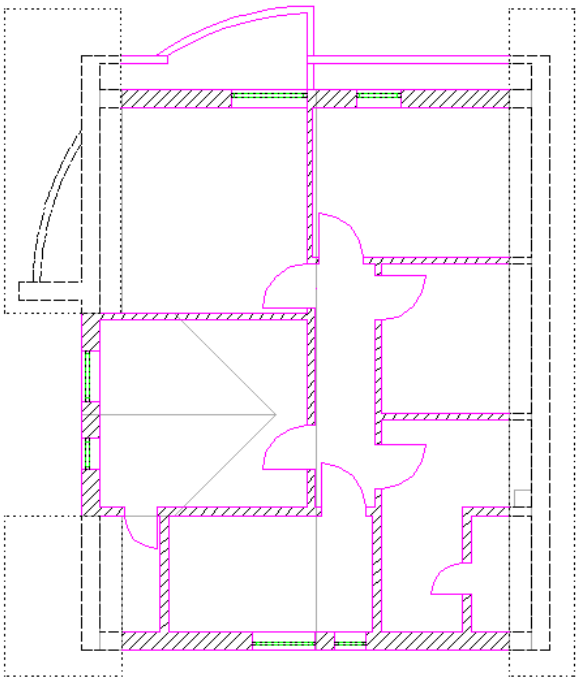
2 Click **OK** to confirm.

3 Check the **Properties** palette to see whether the layer **AR_MASKP** is selected.

Change how the component looks below the 1-m line.

Note: Check the **Input Options**:
To create several regions at once, click **Multi** and then **Plus**.

4 Draw the plane areas as rectangles based on two diagonally opposite points.
The **1-m line** serves as the boundary inside the building. On the outside, the region will stretch somewhat beyond the walls.



5 Close the tool and open drawing file **112 Roof** in edit mode.

6 Click **Restore 3D View** (**Update** task area) and click the right mouse button twice in the workspace (do not double-click!). Allplan recalculates the components, taking the masking plane into account. This does not change the way the roof covering looks.

7 Close drawing files **112 Roof** and **115** and make drawing file **110 Top floor model** current. Click **Restore 3D View** again (**Update** task area). The elements appear again without the masking plane.

Note that when you use the **Restore 3D View** tool to recalculate the display, the masking plane applies to the current drawing file and all those open in edit mode.
The masking plane applies even if the layer on which it resides is hidden.

Drawing the upstand

The roof will now be given an upstand that is 11.5 cm wide and 10 cm high. You will draw this upstand in a separate drawing file. First, however, you need to assign the roofscape to this file.

You should always make a point of giving your drawing files meaningful names!

To draw the upstand

Tip: To draw upstands, you can also use the **Upstand** tool (**Components** task area). Here, the top level of the wall below serves as the height of the upstand. But as this is not suitable for creating upstands on flank walls, you will use the **Wall** tool instead.

1 Click **Open on a Project-Specific Basis**.

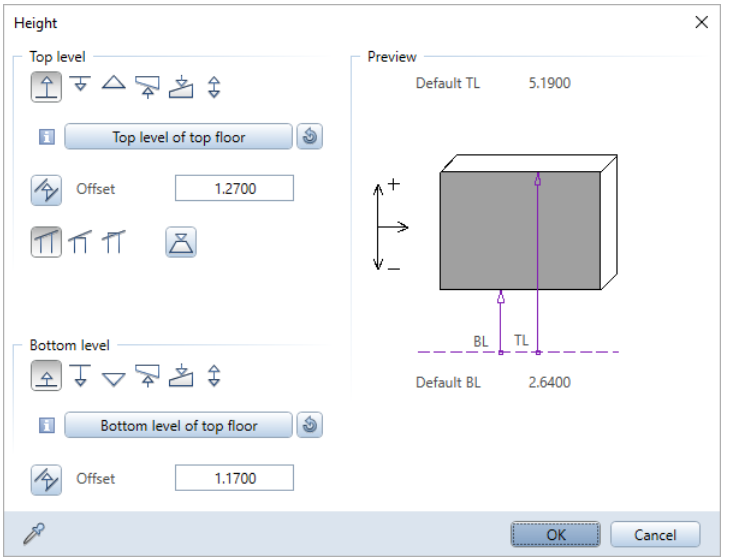
2 Open the shortcut menu of drawing file **116**, click **Assign planes** and select the height settings of the story and the roofscape. Click **OK** to confirm the **Behavior of drawing files** dialog box without activating an option, as the drawing file is still empty.

3 Make drawing file **116** current and open drawing file **110 Top floor model** in edit mode.

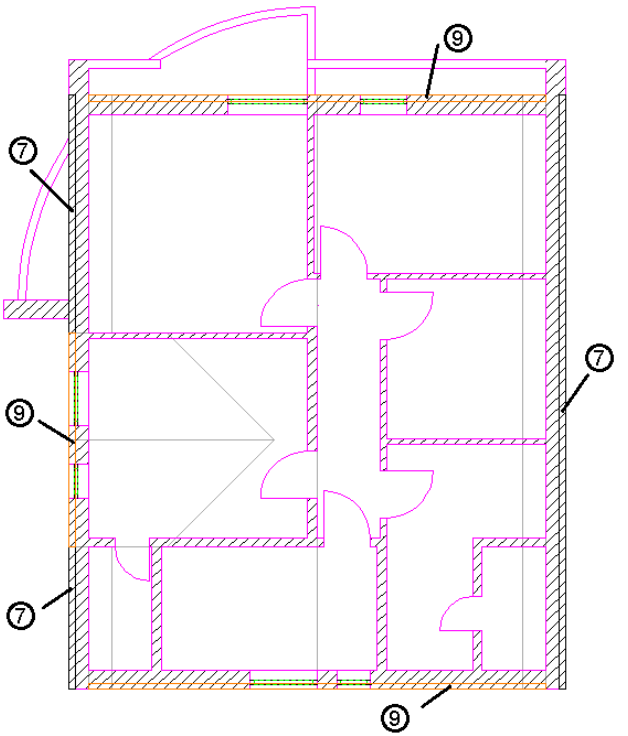
4 Use **List Default Planes** (**Annotations** task area) to check the height settings of the new drawing file **116**: **Default lower plane** = **2.64** m and **Default upper plane** = **5.19** m and roofscape

5 Click **Wall** (**Components** task area) or double-click an existing wall with the right mouse button.

6 Define **Properties**:
Thickness: **0.115**
Material: **Concrete**
Height: Associate the top level and bottom level with the lower plane and enter the following values for the offset.
Then click **OK** to confirm.

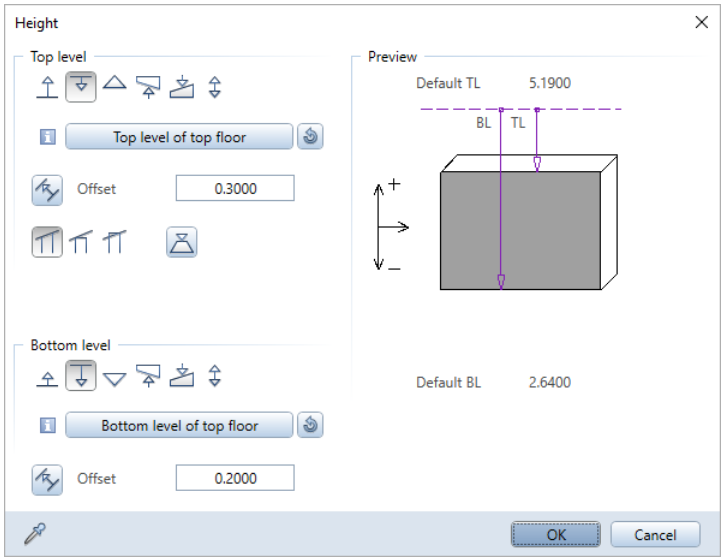


7 Draw the upstand on the flank walls but not over the dormer.



8 Now change the **Height** for the end walls in the main roof and the dormer. The upstand must be flush with the roof covering.

Note: To ensure that the distance between the upstand and the roof plane stays at 10cm, switch both toggles to **Offset perpendicular to plane**.



9 Draw the upstand on the end walls and above the dormer.

Designing alternatives

With just a few clicks of the mouse, you can design alternative facades for the balcony.

To design an alternative

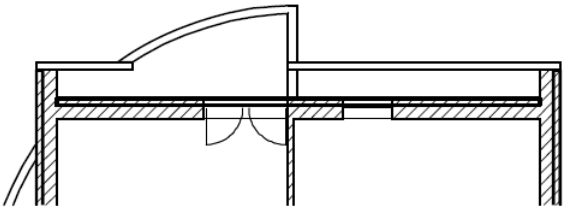
➲ Open drawing files **110 Top floor model** and **116**. Copy them to an empty drawing file – **117**, for example.

➲ Assign the roofscape to drawing file **117**.

➲ Make drawing file **117** current and close all the others.

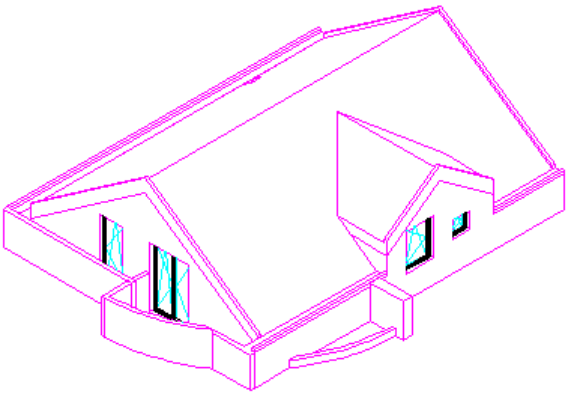
1 Use **Join Linear Component with Line** to alter the wall junctions as shown in the illustration.

Tip: Instead of having the parapet pass through the exterior wall, first use **Join Linear Component with Line** to reset the exterior wall and lengthen the parapet.



2 Use **Change Archit. Properties** to change the height of the parapet to **1.27** m.

Select the **Hidden** view type. The resulting image of the new drawing file together with drawing file **112 Roof** should look like this:



Exercise 6: reference surfaces

Next, you will apply a pitch of 8 degrees to the roofs of the carports. To do this, you will use reference surfaces (on page 207) that you place over the outlines of the carport roofs.
So that you can compare the alternatives, start by copying drawing file **101 Ground floor carport** to an empty drawing file. You will learn how to use ProjectPilot to copy drawing files

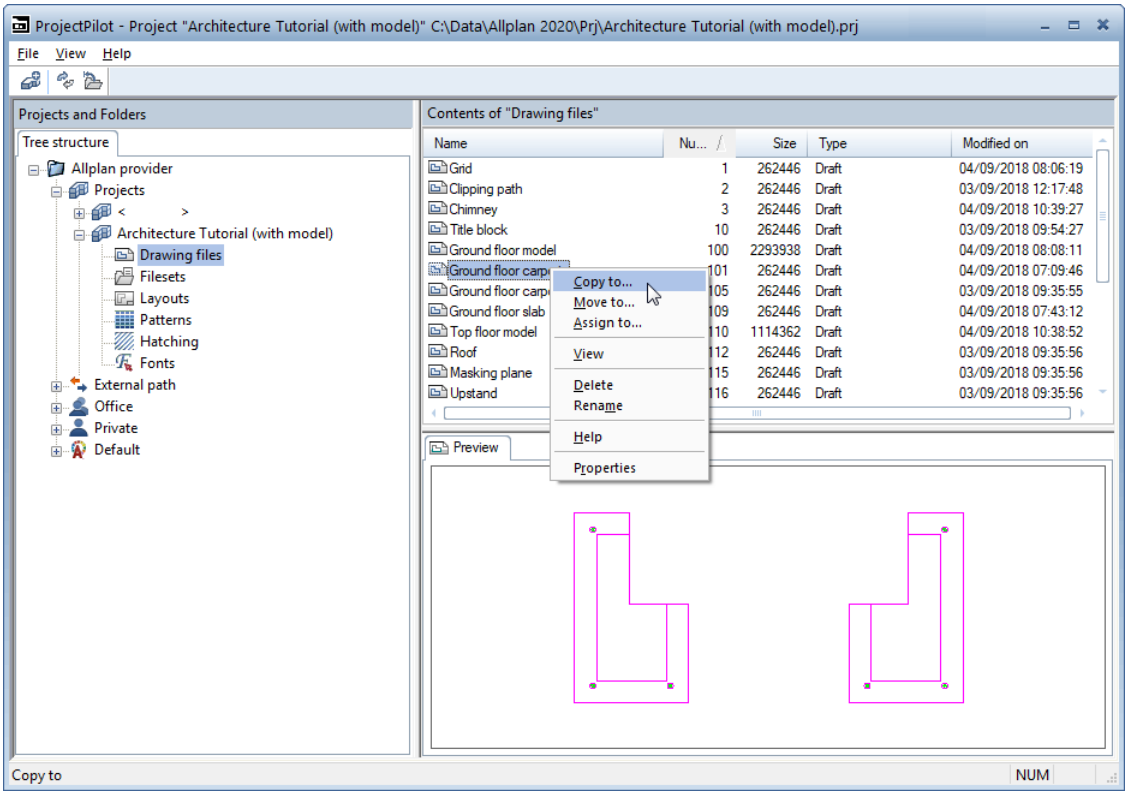
Copying and moving drawing files

Copy, Move Elements between Documents...	ProjectPilot – drawing files
• Within the project only • You can copy or move individual elements and elements in reference drawing files. • The destination drawing file can contain elements; new elements will be added. • You can position elements as you need.	• Within the project and in other projects • You copy or move the entire contents of drawing files. • You copy or move any number of drawing files in one go. • The contents of drawing files will be overwritten (after you confirm a prompt).

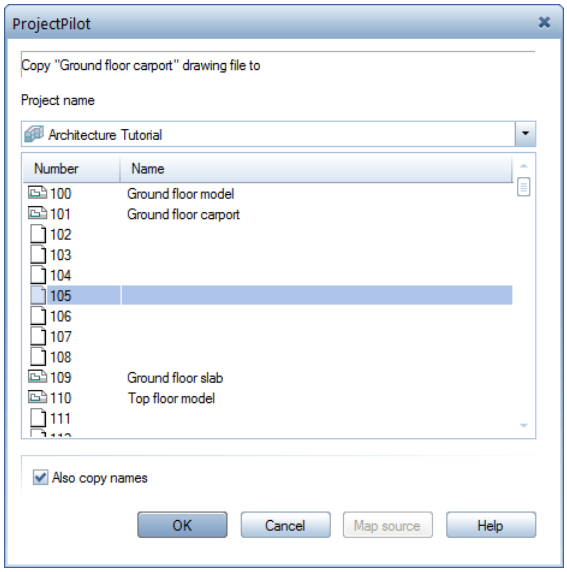
To copy drawing files by means of ProjectPilot

1 Click **ProjectPilot** (drop-down list of the Allplan icon).

2 Open the folder with the tutorial project, select drawing file **101 Ground floor carport** and click **Copy to...** on the shortcut menu.



3 Select the destination drawing file **105** and click **OK** to confirm.



4 Rename drawing file **105**: Ground floor carport – alternative

5 Close **ProjectPilot**.

Defining reference surfaces

You will create two 3D surfaces in the drawing file with the carport that you have just copied. Each carport roof gets its own surface. To position the surfaces correctly, you will move and rotate them. After this, you will use the **Planes** palette to integrate these surfaces as reference surfaces in the current plane model. Finally, you will link these two reference surfaces with the carport roofs.

To create 3D surfaces

Select the copied drawing file **105 Ground floor carport – alternative** and open drawing files **101 Ground floor carport** and **109 Ground floor slab** in reference mode.

➲ Select **2+1 Animation Window** (**Window** drop-down list on the Quick Access Toolbar).

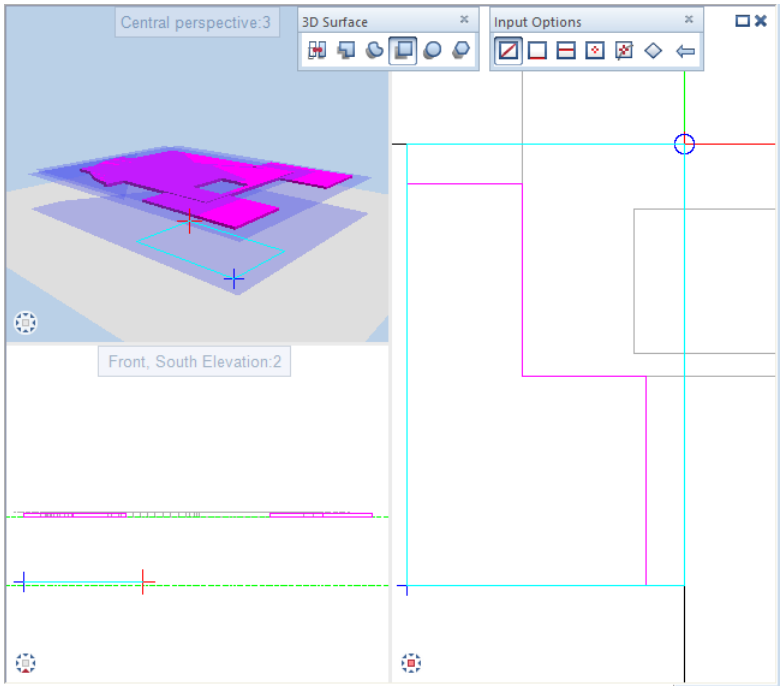
1 Make layer **AR_SLAB** visible and hide all the others.

2 Go to the Actionbar, switch to the **Modeling** task and select **3D Surface** (**3D Objects** task area).

3 Go to the **Properties** palette and select pen (**7**) **0.13** and line type **1**.

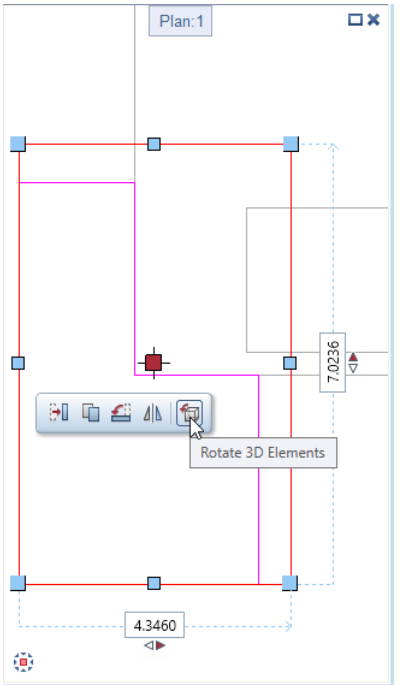
4 Go to the **3D Surface** Context toolbar and click **Rectangular 3D Surface**; select **Based on diagonal line** in the input options.

5 To define the starting point, click the lower-left corner of the carport roof. Open a rectangle to the upper right and click somewhere beyond the outline of the carport roof.



6 Select ESC to finish.

7 To rotate and move the 3D surface, you will use direct object modification. Click the 3D surface. Point to an edge of the surface and select **Rotate 3D Elements** on context toolbar.



8 *1st point of rotation axis*
The rotation axis is the left edge of the 3D surface. Click the lower-left corner.

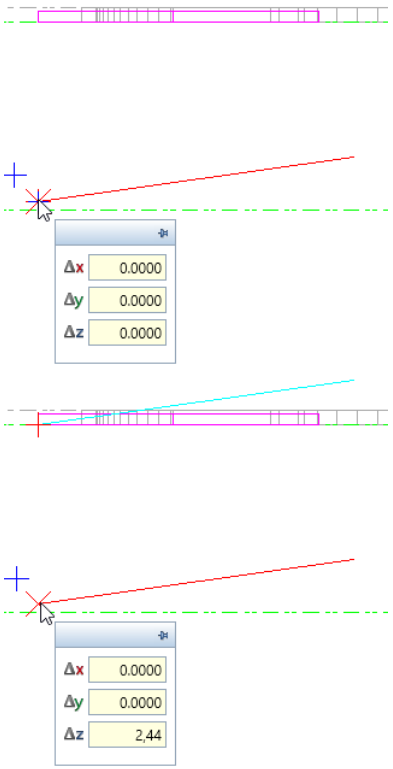
9 *2nd point of rotation axis*
Click the upper corner of the left edge.

10 *Start point, reference line or rotation angle*
Enter the angle of rotation = **-8**° in the coordinate dialog box and select ENTER to confirm.

11 Next, move the 3D surface in the z-direction.
The 3D surface is still selected. Point to an edge and select **Move**.

12 *From point or enter offset:*
Click the left point in the **Front, South Elevation**.

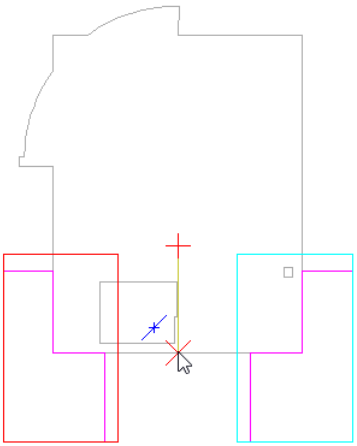
13 *To point or enter offset:*
Enter Δz **dz** = **2.44** m.



Now, the first 3D surface is in the correct position. You will create the second 3D surface by copying and mirroring the first one.

14 The 3D surface is still selected. Select the **Copy and Mirror** tool on the context toolbar and switch to plan view.

15 To define the first point of the mirror axis, click the midpoint of the lower edge of the slab (ground floor slab). To define the second point of the mirror axis, enter a value other than zero for Δy.



So that you can use the 3D surfaces as reference surfaces, you will use the **3D surface to reference surface** tool, which you can find on the shortcut menu of 3D surfaces. This tool creates local reference surfaces, which you can use in the current drawing file. So that you can use the 3D surfaces as reference surfaces in all drawing files of your project, you can integrate the 3D surfaces as reference surfaces in your plane model.

To define reference surfaces

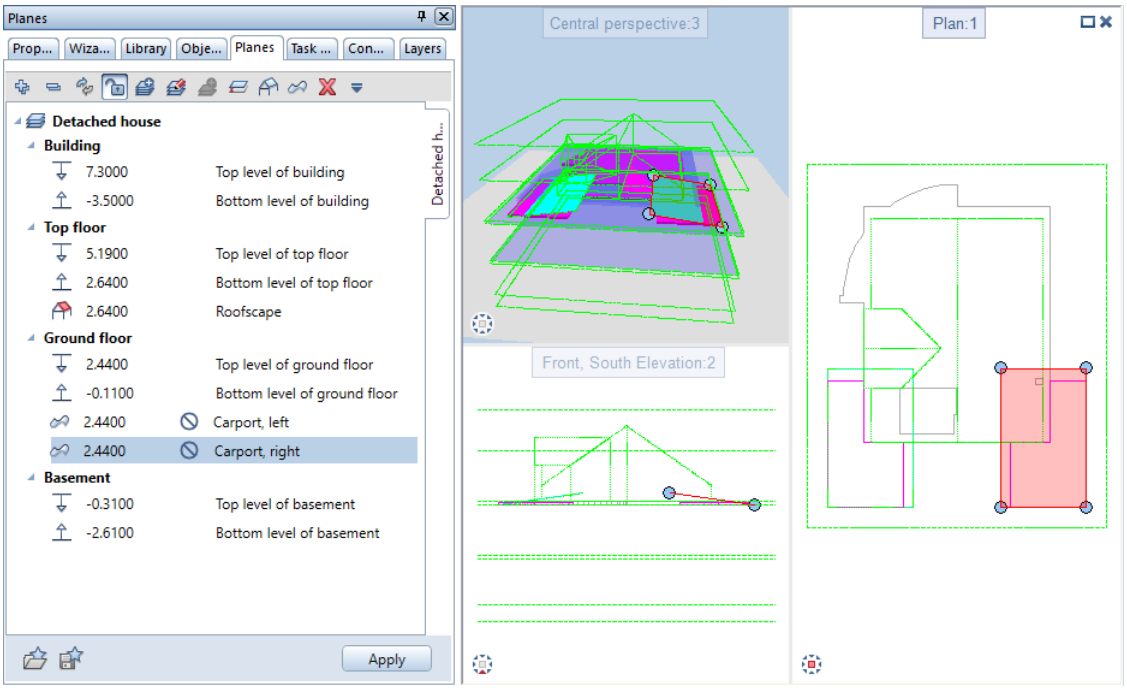
1 Open the **Planes** palette and turn on **Modification mode**.

2 Open the shortcut menu of the ground floor and click **Insert or replace reference surface**.

3 Click the left 3D surface and enter its name (for example, **Carport, left**).

4 Click **Apply** in the **Planes** palette.

5 Repeat steps 2 to 4 for the right 3D surface. Enter a name for this reference surface (for example, **Carport, right**).



6 Turn off **Modification mode** in the **Planes** palette.

Next, you will link the carport slabs in this drawing file with the reference surfaces.

To link the carport roofs with the reference surfaces

1 Select the left carport slab by double-clicking it.

The **Slab** dialog box opens.

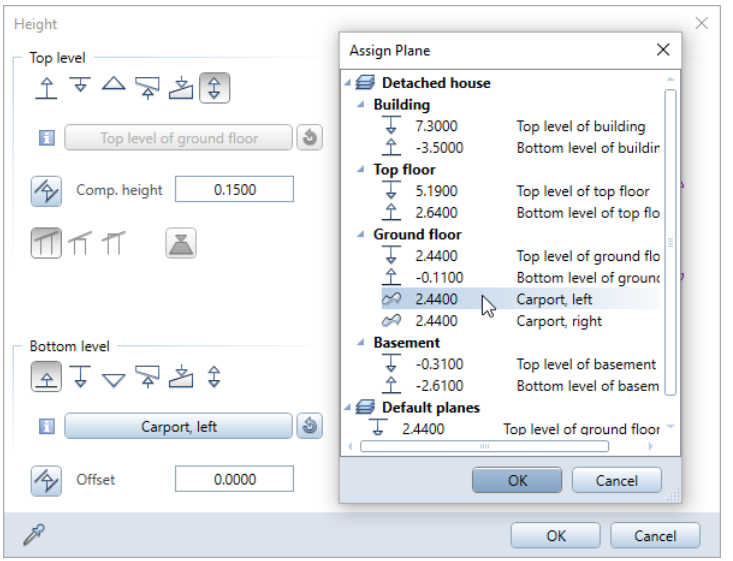
2 Click the **Height...** button.

Do not change the settings in the **Top level** area. The component thickness of the carport slab is 15 cm.

3 The bottom level of the carport slab is flush with the **Carport, left** reference surface. Go to the **Bottom level** area and check that **Relative to lower plane** is selected.

4 Enter the **Offset** = **0.00**.

5 Click the button to the right of the info button to open the **Assign Plane** dialog box. Select the **Carport, left** reference surface.



6 Click **OK** to confirm all three dialog boxes.

The left carport roof is in the correct position.

7 Double-click the right carport slab.

8 Click **Height...**. Click the button to the right of the info button to open the **Assign Plane** dialog box. Select the **Carport, right** reference surface. Here, too, enter the **Offset** = **0.00**. Do not change the other settings.

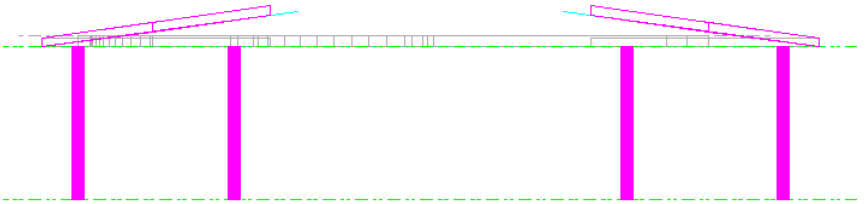
9 Click **OK** to confirm the **Height** and **Slab** dialog boxes.

The right carport roof, which is sloping, is in the correct position.

10 Open the **Layers** palette and make layer **AR_COL** visible.

Adapting the columns

Create a wireframe model of the **Front, South Elevation**. You can see that the top levels of the columns are linked with the top level of the ground floor. This is a result of the height settings you defined when you created the columns (see "Columns" on page 82).

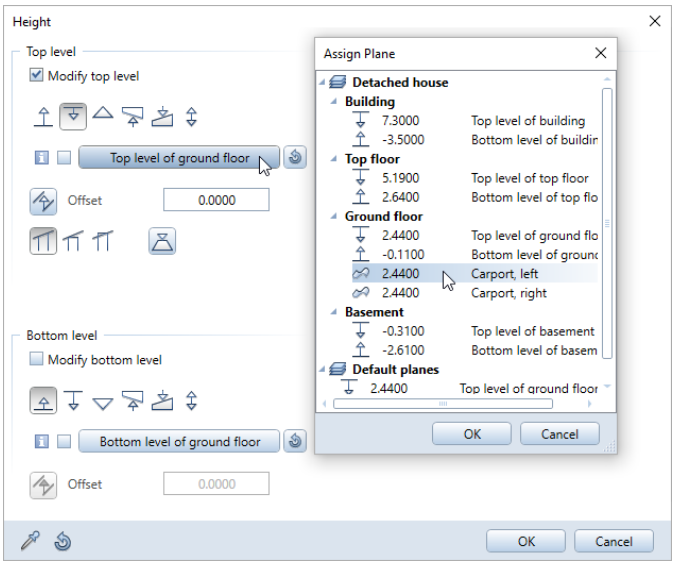


To adapt the columns

1 Select **Change Archit. Properties**.

2 Click **Height...**.

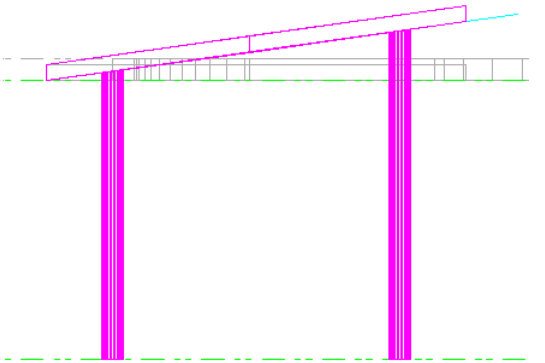
3 Select the **Modify top level** check box. Do not change the **Relative to upper plane** setting for the **top level**. Click the button to open the **Assign Plane** dialog box. Select the **Carport, left** reference surface.



4 Click **OK** to confirm the **Assign Plane** and **Height** dialog boxes.

5 Apply the new height settings to the columns: Select the architecture filter, choose **Column** and enclose the three columns of the left carport in a selection rectangle.

The columns end below the carport roof:



6 Repeat steps 1 to 4 for the three columns on the right. Do not forget to select the **Carport, right** reference plane in the **Assign Plane** dialog box.

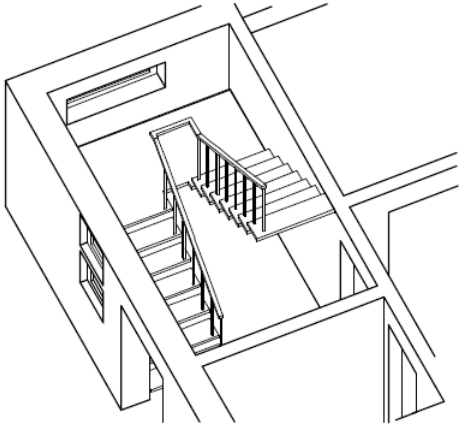
7 Here, too, use the architecture filter and choose **Column**. Enclose the three carports on the right in a selection rectangle.

Unit 4: Stair

➲ The exercises in this unit also require the **Architecture** role of the **Actionbar**.

You still need to design the stairs between the ground floor and the upper floor. With the tools in the **Stair** task area of the **Actionbar**, you can design both standard stairs and freeform stairs in three-dimensional space. The stair outline, steps, stringers, handrails and so on are freely definable.

In this tutorial, we can cover only one of the wide range of possibilities. If you want to use the **Stair** task area effectively, spend some time experimenting with other stair shapes and try out different parameters. Each exercise begins with remarks that are also valid for the other stair shapes.



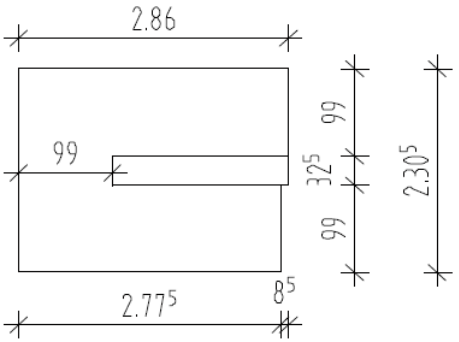
Before you start designing the stair, draw the outline in construction-line format. This will be a useful aid to orientation when you enter the staircase.

To draw the stair outline in construction-line mode

➲ Make drawing file **100 Ground floor model** current and close all the others.
Make the layer **DE_GEN02** (stair outline) visible and hide all the other layers.

1 Click **Line** (**Quick Access** task area). Go to the **Properties** palette and select the **Construction line** option and the layer **DE_CLINE**.

2 Trace the outline of the stair.



3 Turn off the **Construction line** option (**Properties** palette).

4 Keep the layer **DE_CLINE** visible and hide all the other layers.

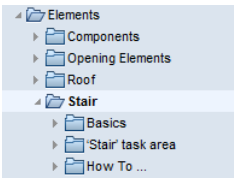
The procedure for creating a stair is always the same. Once you have created a stair, it can always be altered with **Modify Stair**.

How to create stairs

- Select the stair type.
- Enter the outline of the stair. This also defines the flight length from the bottom of the stair.
- Define the height and position the line of travel. The system will initially create a basic stair design that can be modified to your specific needs.
- You can change the settings, such as number of steps, position of last step, and step angle.
  This completes the initial design. Only the treads are visible.
- Define stair components (optional) such as handrails and carriages.
- Lock the stair and label it.

Exercise 7: u-type stair

Tip: Read the chapter "Stairs – Basics" in the Allplan Help:



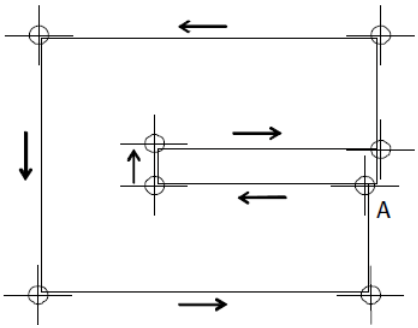
Start by creating the basis for the stair.
The stair outline you enter depends on the stair type you select. For example, if you select the straight stair type, the system will close the outline after you have placed four points. The outline of a u-type stair is defined by 8 points. A spiral stair is defined by two arc radii and a free-form stair can be based on as many points and shapes as you want – even splines.

To create the basic stair

1 Click **U-Type Stair** (**Stair** task area) and check the **Properties** palette to see whether the **AR_STAIR** layer is selected.

2 The first point you click will define the point where the bottom of the stair and the inner stringer meet. In all stairs, this is one of the points at the bottom (inner or outer stringer).

Click the other corners along the outline of the stair you created earlier. In total, you must place 8 points.



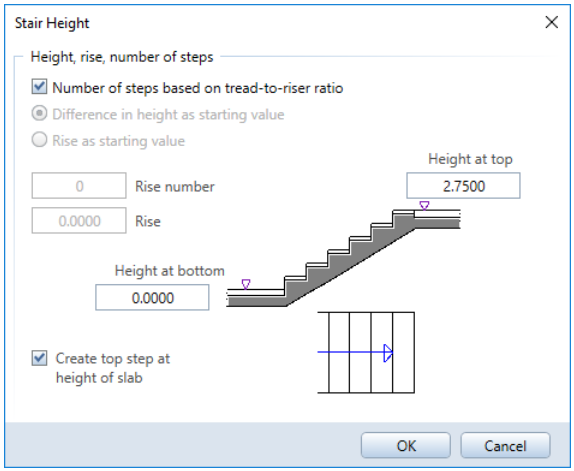
A = First point, inner stringer (from bottom)

3 Click the **Height** box.

4 Select the **Number of steps based on tread-to-riser ratio** check box and enter the following height settings:

- Height at top: **2.75** (top floor's elevation at bottom + 11 cm; finished floor on top floor)
- Height at bottom: **0.00** (ground floor's elevation at bottom + 11 cm; finished floor on ground floor)

Then click **OK** to confirm.



You can see the height of the stair – **2.75** m – in the **Stair Outline / Line of Travel / Height** dialog box.

5 Click **OK** to confirm the settings.

Allplan creates a stair, displaying the dialog box with the parameters for the stair geometry.

6 Select ESC to finish entering stair parameters.
Click **Yes** when you see the confirmation prompt and place the label.
If you do not want to label the stair, simply select the ESC key.

7 Open drawing file **109 Ground floor slab** in reference mode.

8 Make layers **AR_WALL** and **AR_SLAB** visible too.

9 Click **3 Viewports**.
Check the height and orientation of the stair in the isometric and elevation views.

Modifying the stair geometry

You can modify the parameters proposed in the **Stair – Outline** dialog box. In this exercise, you will

- Position the last step.
- Change the step angle (u-type stairs only).

The tread and rise are calculated automatically by the system. In the case of u-type stairs, the landing cannot be modified; its position is locked by the stair outline. The number of steps, however, can be altered – this is true for all the stair types.

Stair symbols

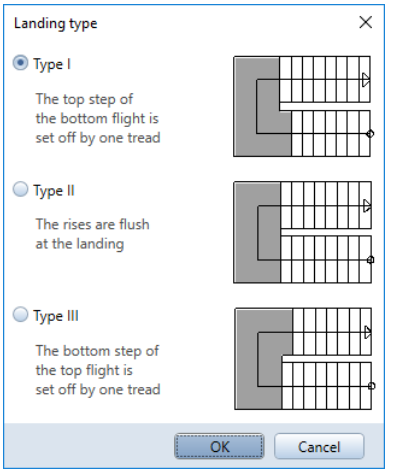
Large arrows on the steps indicate that the components are at different heights.

Small arrows on a short line indicate that two components (steps or landings) are at the same height.

To modify the stair geometry

1 Click **Modify Stair** (shortcut menu of the stair).

2 Click **Landing Type**, select **Type I** and click **OK** to confirm.



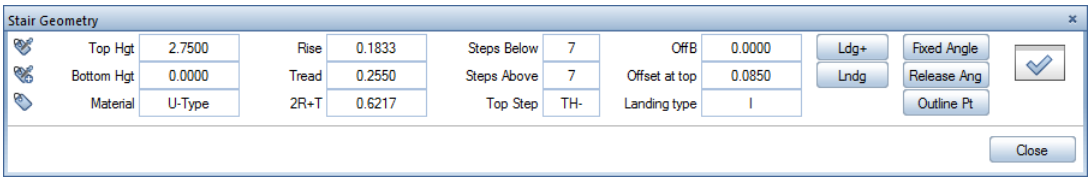
3 Click **Top Step**. The display will change to **TH-**.
In elevation, you can see how the last step is one rise below the top of the stair. The top flight thus has 7 steps and 8 rises. The value of the rise changes automatically and the tread is calculated based on the length of the first flight.

In plan, you can see how the top flight doesn't quite reach the border of the stair outline. The flight needs to be moved along the line of travel.

4 First, check the distance between the last rise and the boundary of the outline. To do this, use **Measure Length** (**Measure** task area).

5 Click **Offset at top** (defining the overlap above) and enter the value for the distance (calculated): **0.085**.
The program lengthens the landing by the same value, moving the steps accordingly.

The **Stair Geometry** dialog box should now look like this:



Defining stair components

On the screen, the stair is represented by treads only. If you want, you can add other stair components. The program presents these components and offers options for displaying them in a single, easy-to-use dialog box. In addition, each component has its own dialog box where you can enter the dimensions. In the following exercise, you will learn how to define the treads, the inner handrail and the balusters.

To define stair components

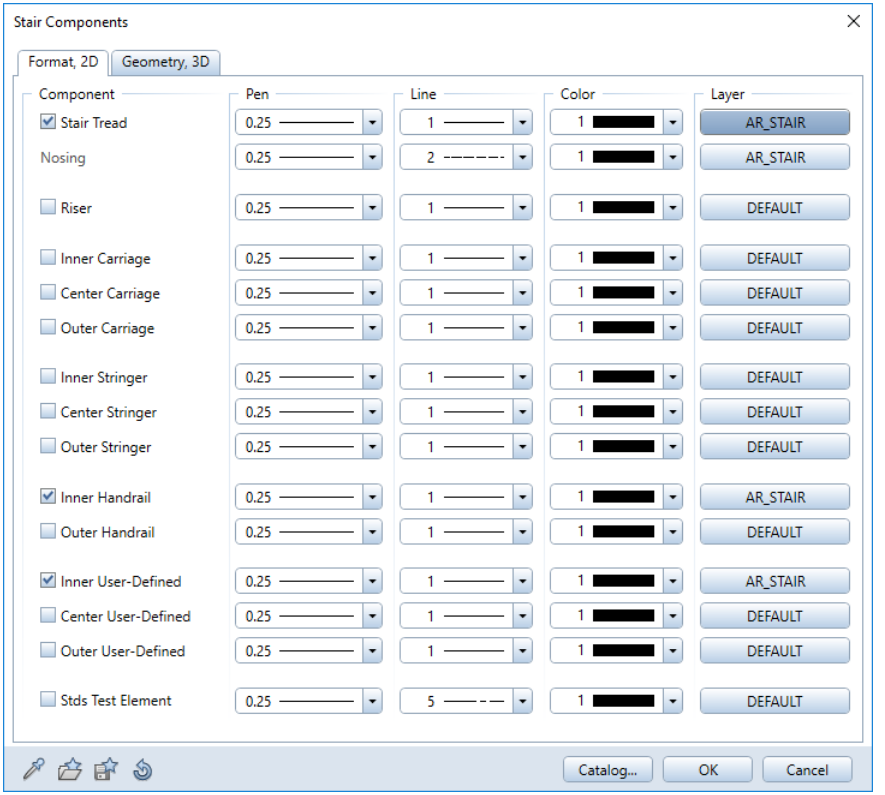
➲ The **Stair Geometry** dialog box is open.

1 Click to access the **Stair Components** dialog box.

2 In the **Stair Components** dialog box, select the **Format, 2D** tab.

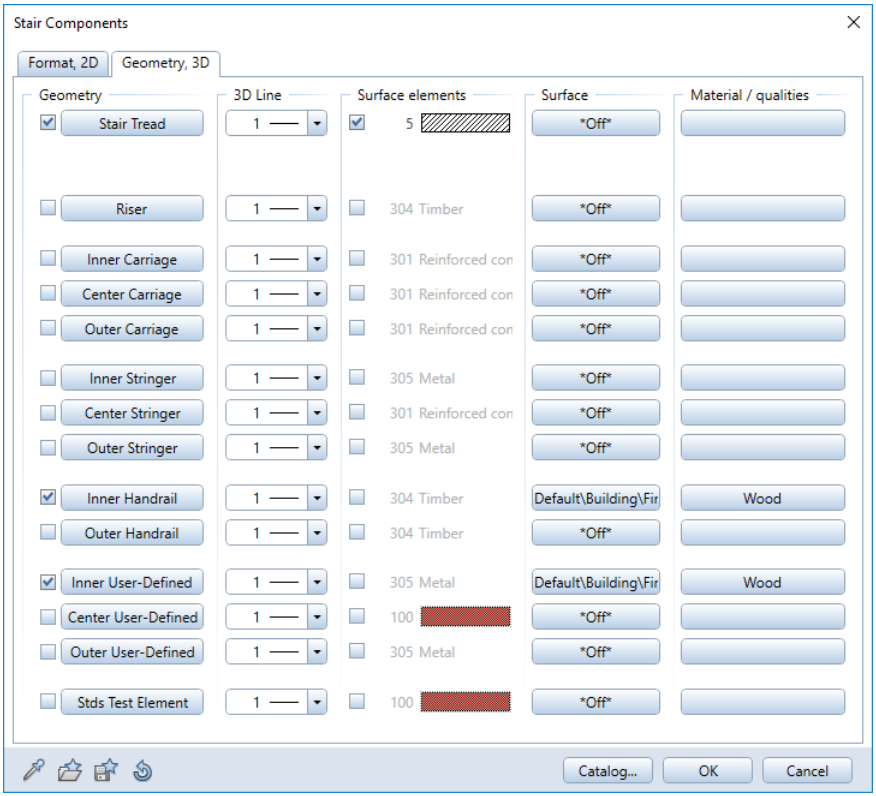
Tip: User-definable components can be used for balusters, panel walls, flanges and other stair elements.

3 Select **Stair Tread**, **Inner Handrail** and **Inner User-def** (here baluster).
Click the button in the **Layer** area and assign the **AR_STAIR** layer to the components you have just selected.



On the **Format, 2D** tab, you can also modify the format properties used to display the selected components in plan view.

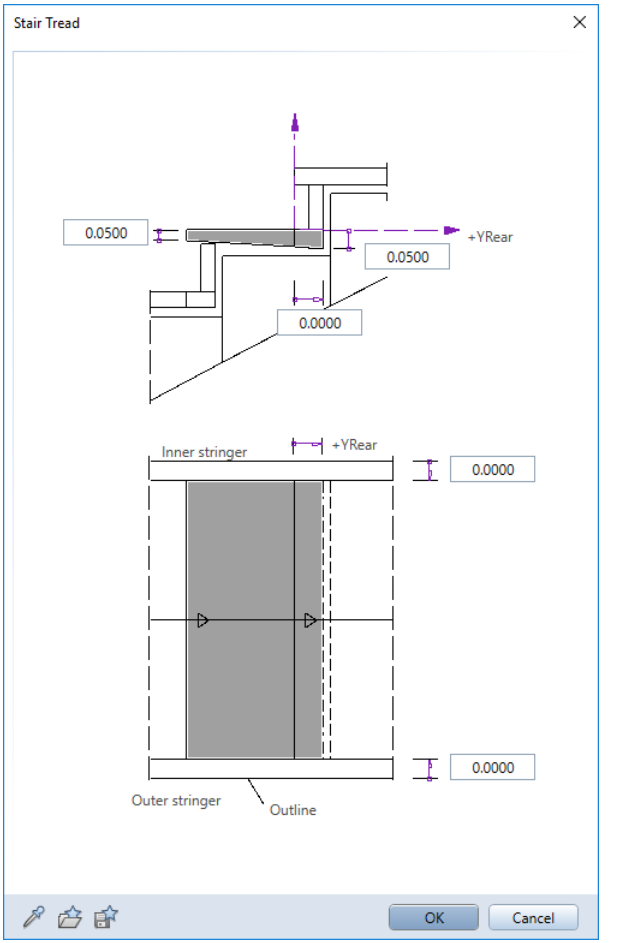
4 Now switch to the **Geometry, 3D** tab.



You can use the **Geometry, 3D** tab not only to enter the geometry of the stair components but also to define a wide range of parameters:

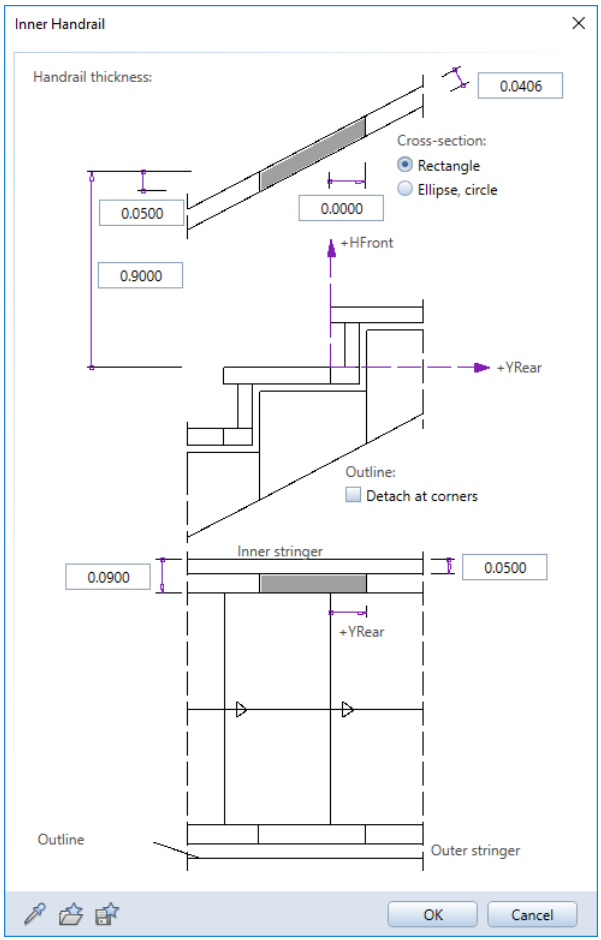
- In the **3D Line** area, you define the line types that are used to display the components in 3D views.
- In the **Surface elements** area, you define the hatching style, pattern, fill or style area that is used to display the components in architectural sections.
- In the **Surface** area, you can assign custom surfaces to the components.
- In the **Material** area, you can assign materials to the components. These materials can be analyzed and evaluated in specific stair reports.

5 On the **Geometry, 3D** tab, click **Stair Tread** and enter the **Thickness** of the tread at the **front** and **rear** and the **Distance between the tread and the outline of the stair**. Click **OK** to confirm the dialog box.



6 On the **Geometry, 3D** tab, click **Inner Handrail**.

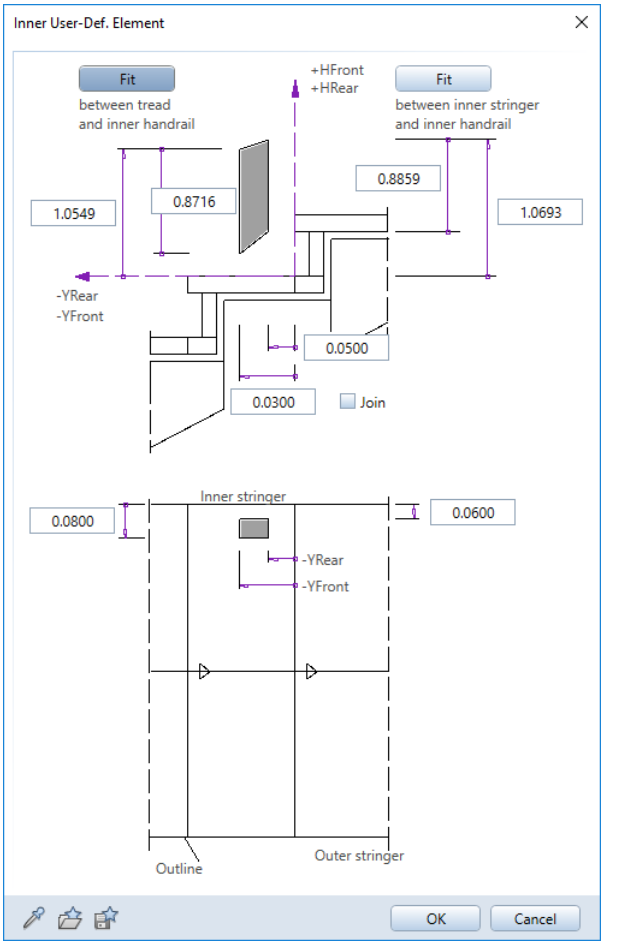
7 Enter the distance between the edges of the handrail and the outline polygon and the position of the handrail element relative to the front edge of the steps. This defines where the handrail is to begin. In this example, the baluster will be on the first step. Click **OK** to confirm the dialog box.



8 On the **Geometry, 3D** tab, click **Inner User-Def.** (inner user-definable component).

9 Enter the distance between the edges of the component and the outline polygon and the position relative to the front edge of the steps. In this example, the baluster will be on the first step.

Tip: If you change the dimensions of the tread, handrail or user-definable component, you must select the **Fit** option again to recalculate the result.



10 Click **Fit between tread and inner handrail**. The program will automatically calculate the height of the component. Click **OK** to confirm the dialog box.

11 Click **OK** to confirm the **Stair Components** dialog box.

Allplan creates the components, displaying the **Stair Geometry** dialog box again.

12 Click **Close** and confirm the prompt by selecting **Yes**.

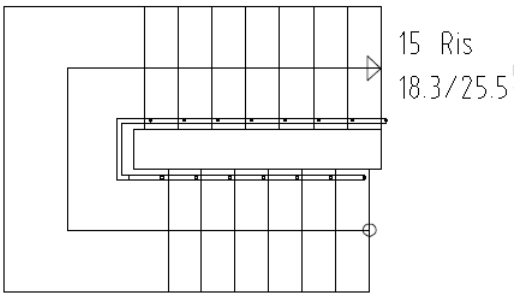
This locks the stair. The label is attached to the crosshairs.

Tip: You can skip labeling by selecting ESC.

13 Click in the boxes you want to include in the label.

14 Select the number of decimal places.

15 Place the label beside the stair.



Creating a section in plan

You will now display a section of the stair in plan as is usual in construction drawings.

To create a section in plan

1 Click **Section in Plan** (shortcut menu of the stair) and select the layer **AR_STAIR**.

2 In the **Section in Plan** dialog box, click **Properties**.

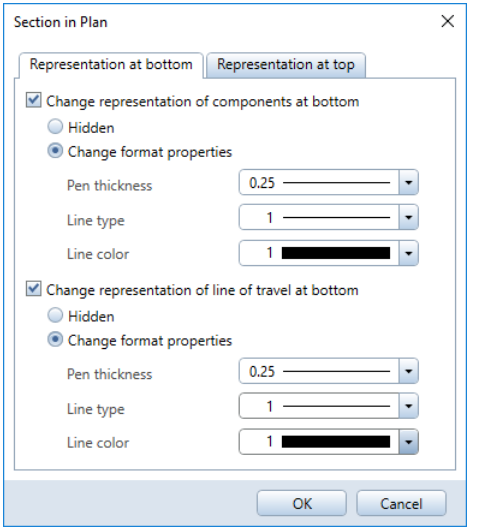
Tip: To use the line type from the drawing for the initial region, click the **Line Below** button: "–" is visible.

3 Open the **Representation at bottom** tab and specify how the stair looks **below** the section line:

Select the check boxes for **Change representation of components at bottom** and **Change representation of line of travel at bottom**.

Select the **Change format properties** option in both areas and enter the following:

- Pen thickness: 0.25
- Line type: 1
- Line color: 1 black



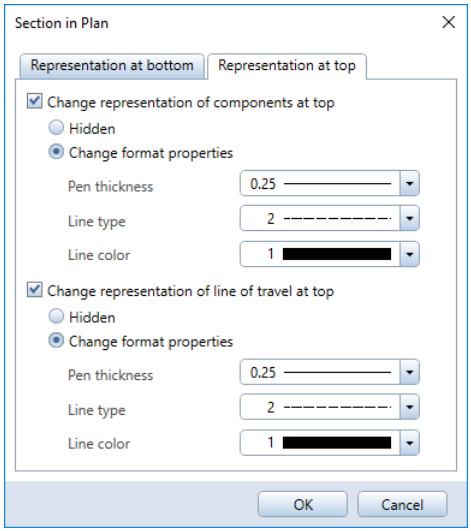
Tip: To hide a stair component, just click the corresponding option.

4 Open the **Representation at top** tab and specify how the stair looks **above** the section line:

Select the check boxes for **Change representation of components at top** and **Change representation of line of travel at top**.

Select the **Change format properties** option in both areas and enter the following:

- Pen thickness: 0.25
- Line type: 2
- Line color: 1 black

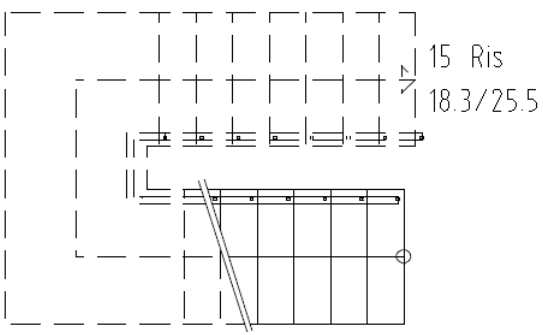


5 Click **OK** to confirm the dialog box.

6 Enter the offset between the section lines. This offset is scale-dependent. You must enter it in the current unit (m).

7 Define the starting point and end point of the section lines by clicking slightly outside the stair outline. The plan view changes accordingly; the elevation view and isometric view stay the same.

Tip: If you change the stair later, you must re-create the section in plan manually by using this tool.



Unit 5: SmartParts

➲ The exercises in this unit also require the **Architecture** role of the **Actionbar**.

If you want to model your own SmartParts, you can use the **Window SmartPart**, **Door SmartPart**, **Shading SmartPart** and **Domed Roof-Light SmartPart** tools. You can find all these tools in the **Opening Elements** task area. In addition, there is the **Skylight SmartPart** tool, which you can find in the **Roof** task area.
You can save these SmartParts and insert them at any time.

Modeling a SmartPart

Requirements: you have created an opening.

- Select a SmartPart tool in the **Opening Elements** or **Roof** task area and click an opening. The SmartPart adapts to the size of the opening clicked.
- Select elements for the SmartPart (for example, frame, mullion transom, muntins for a window) and define their parameters in the **Properties** palette.
- Define parameters for the SmartPart in 2D and 3D.
- Select additional elements (for example, window sill or roller shutters for a window) and define their parameters.
- You can specify how far the SmartPart is from the opening.
- Save the SmartPart as a favorite file (**Save as a favorite**) or save it to a **folder** in the **Library** palette.

Next, you will create three openings and insert SmartParts you modeled yourself in the only windowless wall on the ground floor. Start by creating the openings for the windows.

To create window openings

➲ Drawing file **100 Ground floor model** is open. Make the **AR_WALL** layer visible and hide all the other layers.

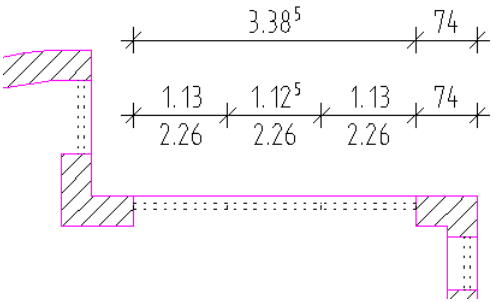
1 Use the right mouse button to double-click within the window opening at door height in the straight wall beside the curved wall.

2 Create three window openings as shown.

The **Properties** are taken from the element clicked.

Height: **Top level**: **Fixed component height**; comp. height: **2.26**
Bottom level: **Relative to lower plane**; offset: **0.00**
Reveal: **Window depth**: **0.07**
Outer reveal: **0.09**
Representation of sill: **Outside**
Library element 1 to n: off

Position:



3 Select ESC to close the tool.

Exercise 8: modeling a window SmartPart

You will now design a three-part glass window SmartPart for the openings. The SmartPart can then be inserted in any opening.

To make sure that the window SmartParts you have used so far and the new SmartPart match, you will use the same settings for the frame thickness, color and surface of the elements and so on.

To model a window SmartPart

➲ The reference scale is **1:100**.

➲ Drawing file **100 Ground floor model** is open.

1 Click **2+1 Animation Window** in the **Window** drop-down list on the Quick Access Toolbar.

2 Change the reference scale to **1:50**.

3 In all three viewports, zoom in on the window opening you just created.

4 Click **Window SmartPart** (**Opening Elements** task area).

You can use this tool to model SmartParts for windows and window sills.

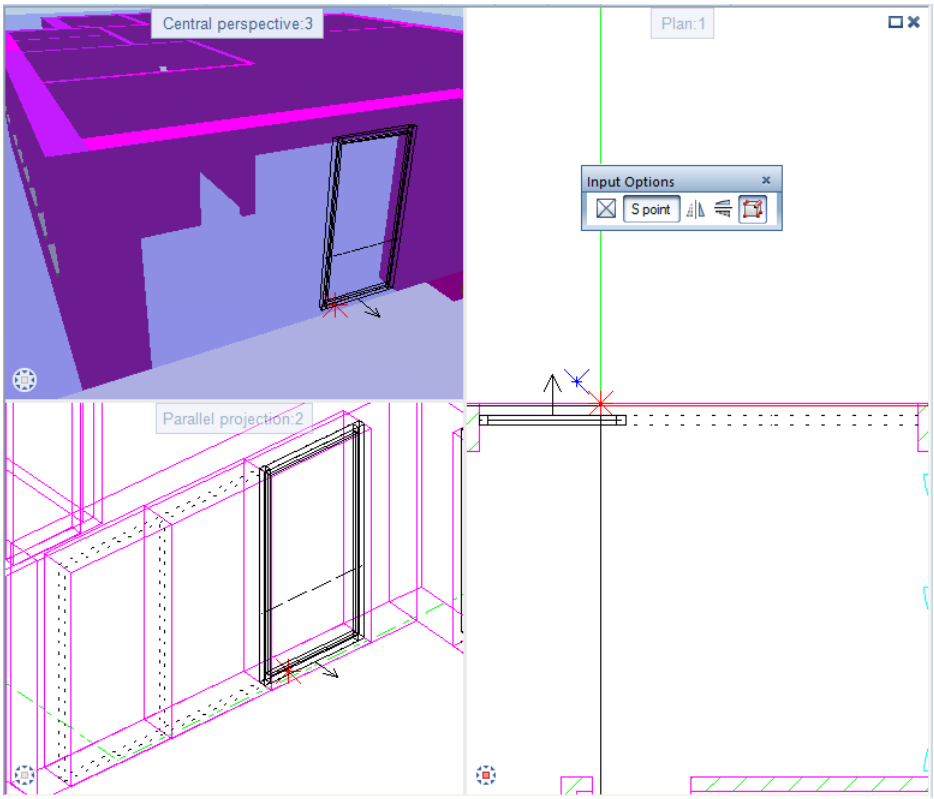
5 Select **Window** in the list box at the top of the palette.

The **Elements** tab of the window SmartPart opens. The preview displays the frame, which serves as the basis for modeling the window SmartPart.

Note: When you point to the lower edge of the preview in the palette, the cursor turns into a double-headed arrow. Now, you can change the size of the preview.

6 When you move the crosshairs across the workspace in plan view, you can see that the SmartPart, which is currently not more than the frame, is attached at its drop-in point to the crosshairs. The drop-in point is the lower-left corner of the SmartPart.

When you place the SmartPart, an arrow appears in the middle of the SmartPart, indicating its outside. Make sure this arrow points toward the outside of the building.

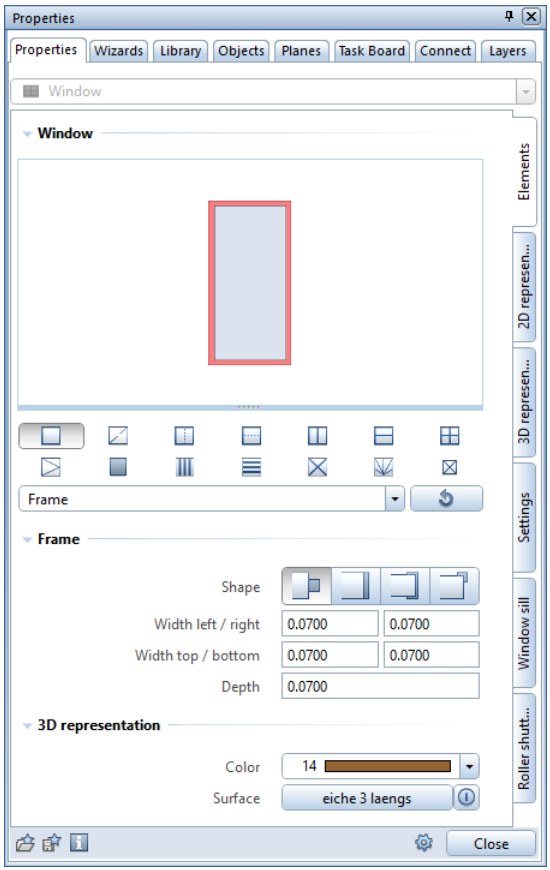


7 Start modeling the window SmartPart by clicking inside the left window opening.

This places the SmartPart, which means that it assumes the size of the opening. The preview in the palette also adapts to the new size.
As you have created the window opening with a reveal, Allplan places the SmartPart in the middle of this reveal element.

8 You can now define the dimensions of the frame in the **Properties** palette.
Make the following settings:

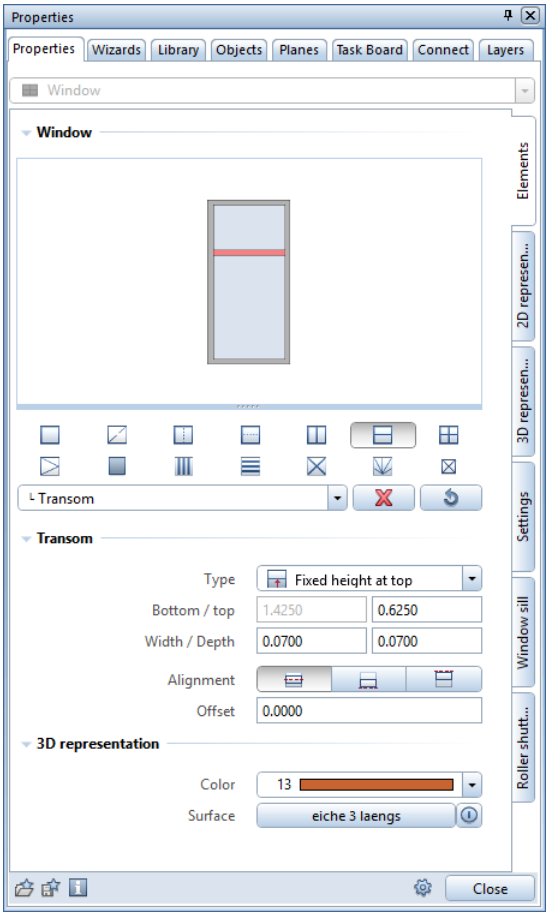
- **Frame** area:
  Shape: Block frame
  Width left / right: 7 cm
  Width top / bottom: 7 cm
  Depth: 7 cm
- **3D representation** area:
  Color: 14
  Surface: oak 3 portrait.surf



9 The window with fixed glazing gets one mullion and one transom.
Start by modeling the transom.
Click in the middle of the preview and select **Transom**.

10 Make the following settings for the transom:

- **Transom** area:
  Type: Select the **Fixed width at top** option. For the **Top**, enter **0.625** m.
  Width / Depth: 7 cm
  Alignment: Centered
  Offset: 0
- **3D representation** area:
  Color: 13
  Surface: oak 3 portralt.surf

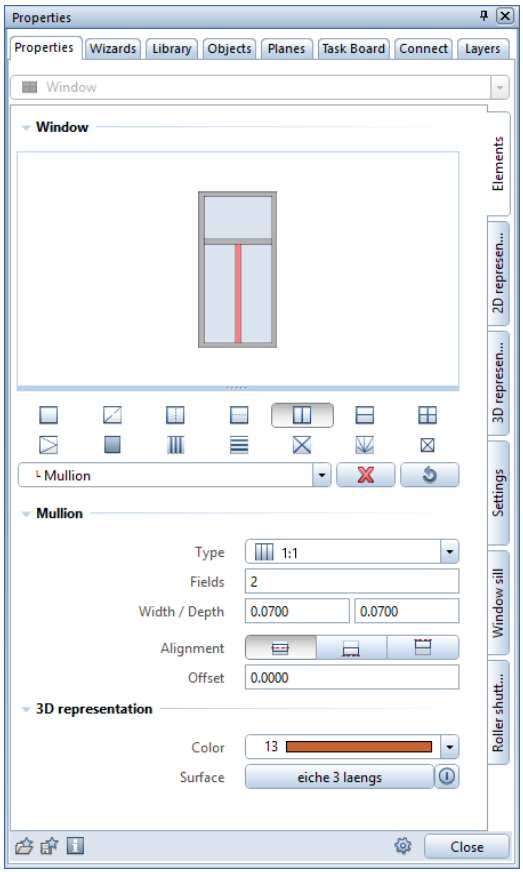


11 You will use a mullion to divide the lower part of the window into two parts of the same size.

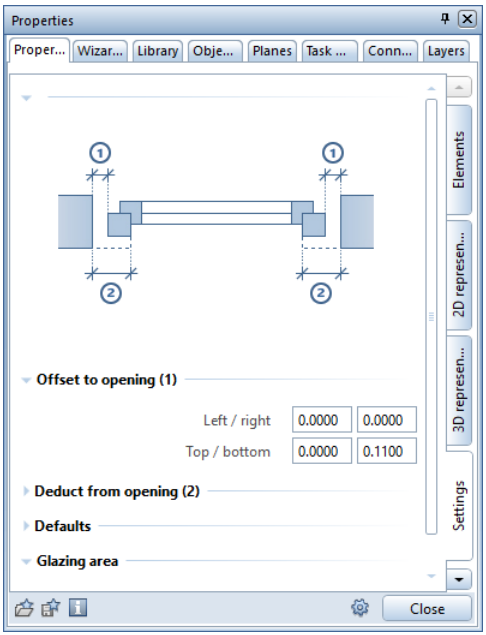
In the preview, click in the middle of the lower part of the window and select **Mullion**.

12 Make the following settings for the mullion:

- **Mullion** area:
  Type: **1:1**
  Fields: **2**
  Width / Depth: **7** cm
  Alignment: Centered
  Offset: 0
- **3D representation** area:
  Color: **13**
  Surface: **oak 3 portrait.surf**



13 Switch to the **Settings** tab in the **Properties** palette of the SmartPart. Go to the **Offset to opening (1)** area and enter **bottom** = **0.1100** m. This is to take the floor structure into account.

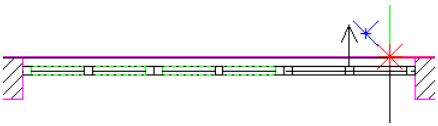


This completes the SmartPart.

14 To save your entries, click **Close** at the bottom of the **Properties** palette.

15 A copy of the SmartPart you just modeled is attached to the crosshairs. Place it in the second opening and select ESC.

16 Place the next copy in the third opening.
Check the direction of the blue arrow indicating the outside of the SmartPart.



17 Select ESC twice to close the **Window SmartPart** tool.

Saving the SmartPart

You can add the window SmartPart to the project folder in the library.

To save the window SmartPart to the library

1 Open the **Library** palette by clicking its tab.

2 Go to the **Project** folder and open the **Architecture Tutorial** project.

3 Open the **Windows** folder. At the bottom of the palette, click **Insert element** – **Insert SmartPart**.

4 Select SmartPart you want to save
Click one of the SmartParts you just inserted.

5 Save as
Enter a name for the SmartPart: **Window, fixed glazing**.
Click **OK** to confirm.

Allplan saves the SmartPart with a preview to the library.

Replacing SmartParts

You can replace SmartParts at any time. The only requirement is the presence of the two SmartParts (one to be replaced and the other to be used as a substitute) in the drawing file.

There are two methods for replacing SmartParts:

- To replace all instances of a SmartPart with another SmartPart, select the **Add identical objects** option.
- To replace single instances of a SmartPart, do not select the **Add identical objects** option.

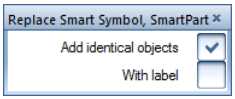
A SmartPart that has been placed in a drawing file is an 'instance' of a SmartPart.

In the following exercise, you will replace instances (in other words, the SmartParts you inserted in openings) with the new SmartPart you just created and saved. You will replace the instances of the SmartPart you inserted in the curved wall and in the wall to the right of the curved wall.

To replace SmartParts

1 Click **Replace Smart Symbol, SmartPart** (**Change** task area).

2 Select the **Add identical objects** option.



3 *Select smart symbol you want to replace*
Click a SmartPart in the curved wall.

All identical SmartParts appear in the selection color.

4 *Select smart symbol definition with which to replace*
Click the new SmartPart you modeled yourself.

5 Replace the window SmartPart to the right of the curved wall with your own SmartPart too.

6 Select ESC to close the tool.

Modifying SmartParts

To edit SmartParts you have placed, you can use handles (graphical modification) or a dialog box (alphanumeric modification) in the form of the 'Properties' palette. To modify SmartParts graphically, you can use the **Modify SmartPart using Handles** tool, which you can find on the shortcut menu of the SmartPart.
It is also possible to use the handles and the 'Properties' palette in combination. If you want to do this, double-click the SmartPart. Allplan opens the 'Properties' palette of the SmartPart and displays the handles.

Next, you will modify the window handles of the window SmartParts you inserted in the right exterior wall. You will adjust the handle position so that it is exactly in the middle.

To modify the window SmartPart

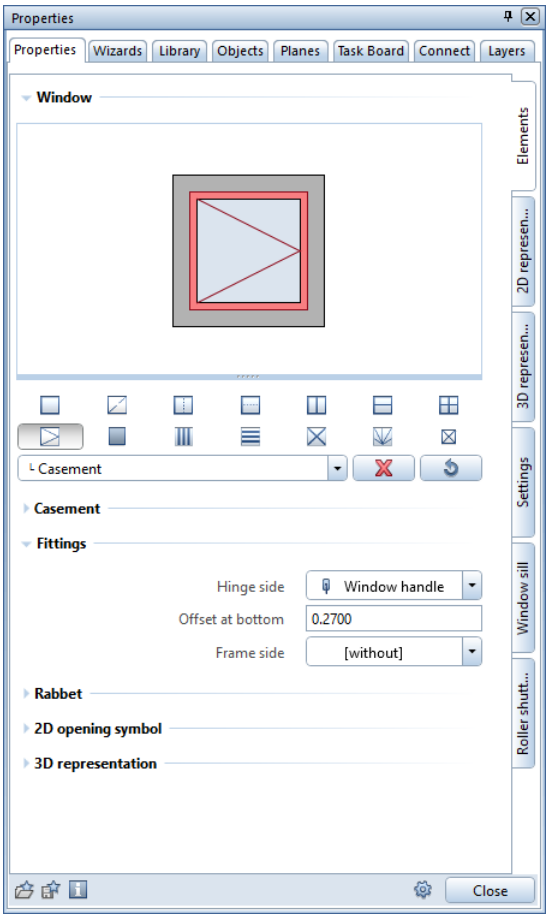
- The reference scale is **1:50**.
- Drawing file **100 Ground floor model** is open.
- **2+1 Animation Window** is selected.

1 Double-click the upper window SmartPart in the exterior wall on the right.

2 The **Properties** palette opens and you can see the **Elements** tab. To modify the casement of the SmartPart, you must select the casement. You can do this in two ways:

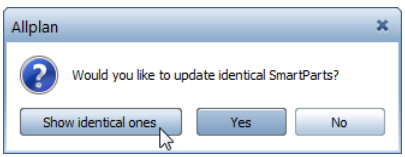
- Click the casement in the preview.
  Or
- Open the drop-down list below the window elements and select the casement by clicking it.

3 Go to the **Fittings** area and change the **Offset at bottom** to **0.27** m.

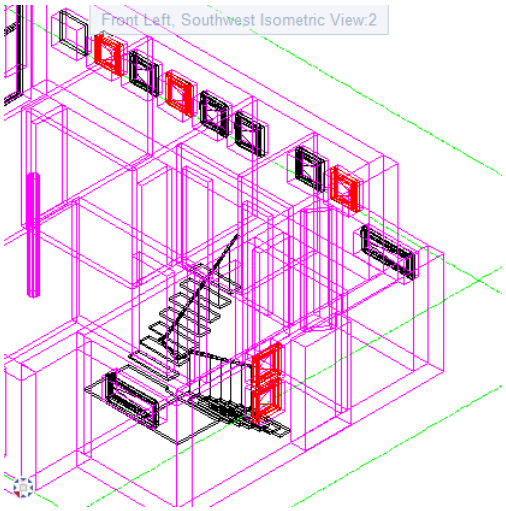


4 To save your entry, click **Close** at the bottom of the **Properties** palette.

5 **Would you like to update identical SmartParts?**
To see which SmartParts are identical, click **Show identical ones**.



Allplan displays the copies of the modified SmartPart in the selection color.



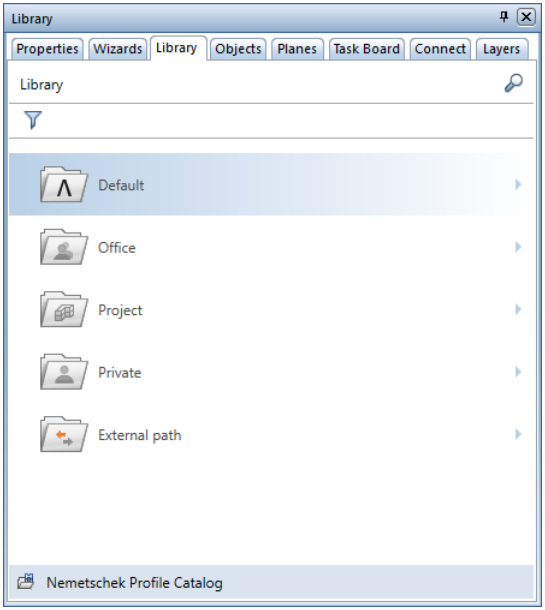
6 Click **Yes** to confirm the prompt.

7 Repeat these steps to modify the window handles of the remaining window SmartParts in the right exterior wall.

8 Check and adjust the position of the window handles for the other window SmartParts.

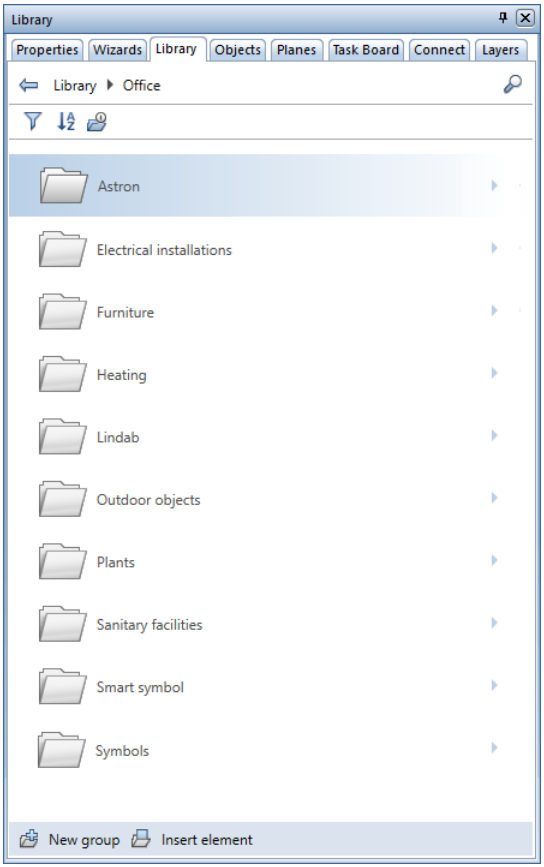
Library palette

You can find an overview of all symbols, smart symbols, SmartParts and PythonParts in the libraries.
Open the **Library** palette.



By using **Filter**, you can show or hide specific types of library elements (symbols, smart symbols, SmartParts, PythonParts).

After having opened a folder, you can see all subfolders with library elements (symbols, smart symbols, SmartParts and PythonParts) if you have not filtered out library elements.

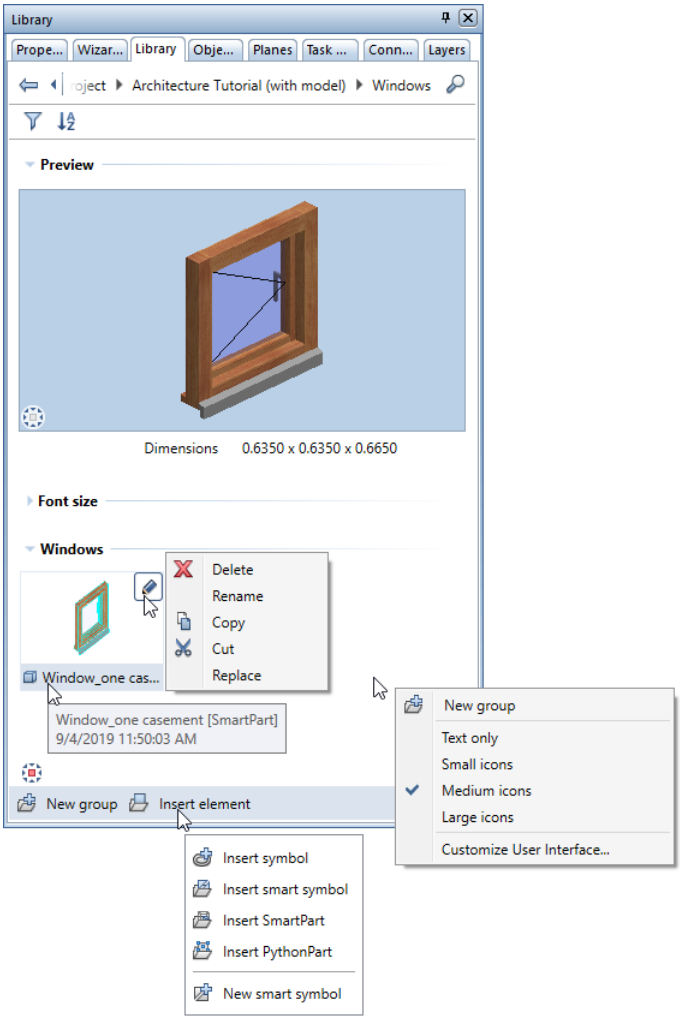


The area at the top helps you move through the **Library** palette: **Back** takes you up one level in the hierarchy; use **Find** to find a name in the current folder and its subfolders.

By using **Sort criterion**, you can sort the library elements alphabetically or by date in ascending or descending order.

By using **Hide empty folders**, you can hide folders without library elements. If folders are hidden, the icon changes to .

For example, if you have selected a SmartPart, the palette provides a number of tools you can use to modify and display the SmartPart in the library:



By using View, you can select a view for the preview. This view is independent of the view in the viewport. When you point to the name of a library element, you can see a ToolTip with information on the type of the library element (SmartPart, smart symbol, symbol, PythonPart). In addition, you can see the date the library element was saved to the library.

When you point to a folder or a library element, you can use the **Modify** tool. Clicking this icon opens a shortcut menu with tools you can use to copy, rename, cut, replace and delete the folder or library element.

The shortcut menu that is available in folders where you can select library elements provides not only the **New group** tool, which you can find at the bottom of the palette, but also a number of additional tools, which you can use to define the size of the previews or hide them altogether. In addition, you can customize the palettes to suit your needs. To do this, select the **Customize User Interface...** tool and open the **Palettes** tab in the **Customize** dialog box.

Note: Library elements in the **Default** folder can be copied but not modified.

Insert element (at the bottom of the palette) provides four tools for inserting library elements plus the **New smart symbol** tool.

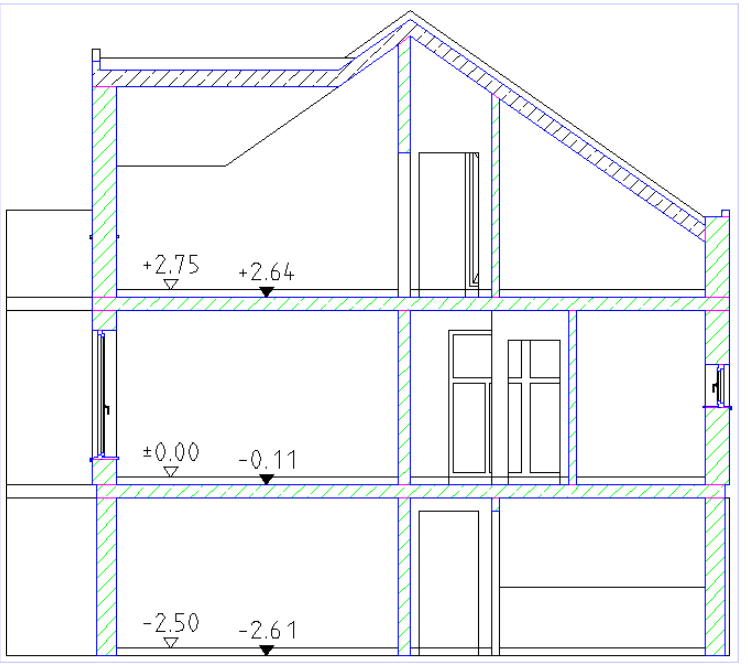
You can find advanced information on the 'Library' palette in the Allplan Help.

Unit 6: Sections and Views

➲ The exercises in this unit require the **Architecture** role of the **Actionbar**.

Although the building model is now finished, there are still a number of important tasks you must accomplish to produce a polished construction drawing.

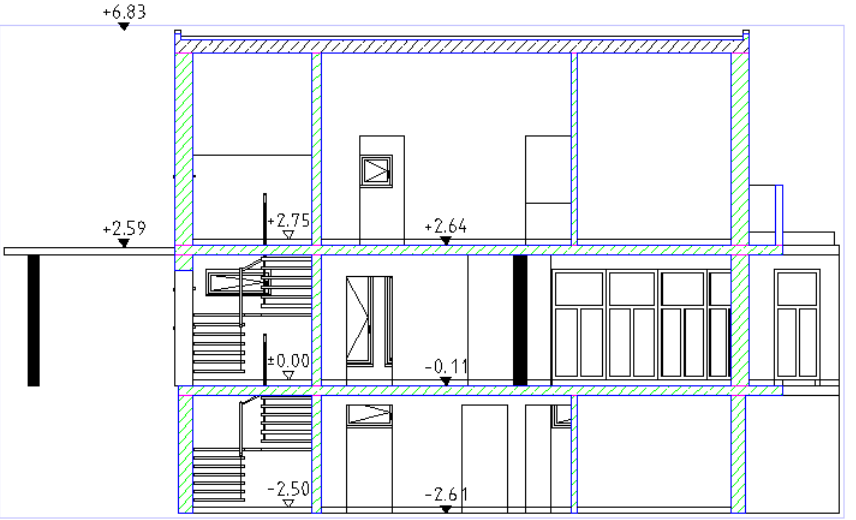
This unit shows how to create sections and views. An additional step involves calculating floor areas, which can be output to the drawing file or as reports.



Section A–A with elevation dimensioning

Exercise 9: sections

Section views of a building show it as if viewed from a specific viewing direction. A section clipping path defines the view and this can be saved as a hidden-line image in a separate drawing file. The look of intersected elements – for example, their hatching – will be transferred to the section view.
If you want, you can also choose to display intersected elements with a thick line.



Section B-B

First, open all the drawing files with the elements you want to include in the section in edit mode and make the layers visible. The section line itself will be in a separate drawing file, which is current. Define the clipping path by setting parameters.

To define the clipping path

➲ Expand the **Sections** task area.

➲ Make drawing file **2 Clipping path** current; open drawing files **100**, **101**, **109**, **110**, **112**, **116**, **120** and **129** in edit mode.

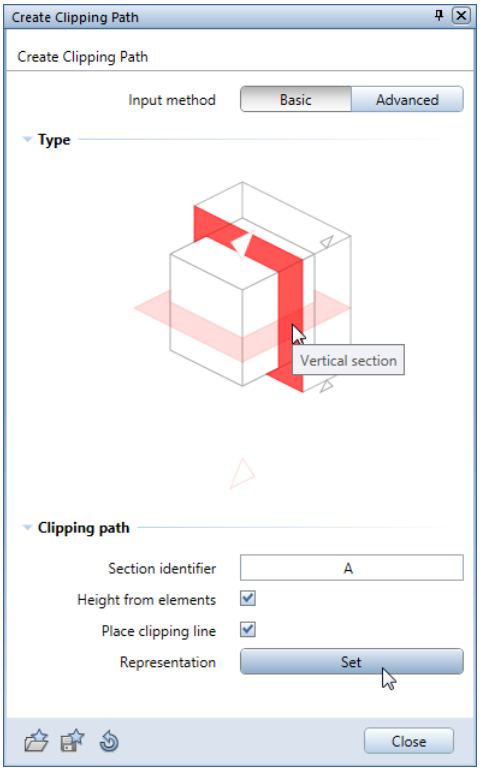
1 Open the **Layers** palette, click **Select Layer Print Set** and select the **Model** print set (all layers with 3D components).

2 Open the **Window** drop-down list on the Quick Access Toolbar and click **1 Viewport**.

3 Click **Clipping Path** (**Sections** task area).

4 Define the following settings in the **Create Clipping Path** palette:

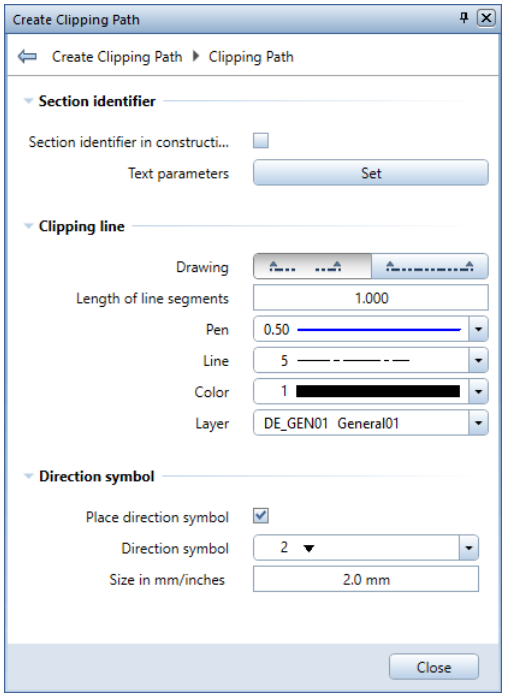
- Select the **Basic** input method by clicking this button.
- **Type** area
  Click in the graphic to select the **vertical section**.
- **Clipping path** area
  Section identifier: **A**
  Height from elements: Select this option.
  Place clipping line: Select this option.



5 In the **Clipping path** area, click the **Set** button to the right of **Representation**.

6 Define the following settings in the **Clipping Path** palette:

- **Clipping line** area
  Drawing: Select the dashed section line.
  Length of line segments: 1.000
  Pen: 0.50
  Line: 5
  Color: 1 black
  Layer: DE_GEN01
- **Direction symbol** area
  Place direction symbol: Select this option.
  Direction symbol: 2
  Size in mm, inches: 2.0 mm



7 In the **Section identifier** area, click the **Set** button to the right of **Text parameters**.
Choose appropriate parameters and click **OK** to confirm the **Text Parameters** dialog box.

Tip: Apart from orthogonal sections, you can define sections at angles or sections with offset section lines.

8 Click the starting point and end point of the section line beyond the building and select ESC to finish. Make sure the section line intersects the walls at right angles and not in an oblique manner.

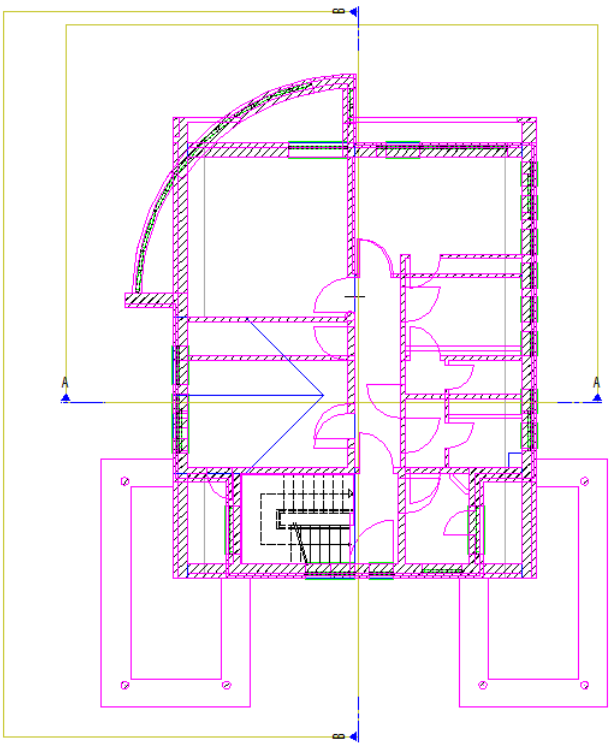
9 *Depth / viewing direction*
Click a point above the building.
The section depth defines an area behind the section line; the program displays all visible building elements in this area. The greater the depth of the section, the larger the volume of data generated.

10 Create a second vertical section. Enter **B** for the section identifier in the **Create Clipping Path** palette. Do not change the other settings.

11 Click the starting point and end point of the section line beyond the building and select ESC to finish. Define the viewing direction by clicking a point to the left of the building.

12 Select ESC to close the tool.

13 Switch to the **Layers** palette and make the **DE_GEN01** layer visible.



Calculating sections

The section is a three-dimensional wireframe model. Allplan creates a hidden-line image from this wireframe model in a separate drawing file. The result is a 2D image you can edit with the tools in the **2D Objects**, **Text**, and **Dimension** task areas.

There are two ways to create views and sections in Allplan. First, you can use the building structure. The building structure comes with drawing files for views and sections. You can find them on the right side of the **Open on a project-specific basis: drawing files from fileset/building structure** dialog box (**Open on a Project-Specific Basis** tool) in the **Derived from building structure** area in the **Detached house - Sections** and **Detached house - Views** folders. You can create views and sections via the shortcut menus of these drawing files.
Second, you can use the tools in the **Sections** task area on the **Actionbar**.

The following pages show how to define section A by means of the tools on the **Actionbar**. After this, you will use the building structure to create section B.

To create and save section A-A

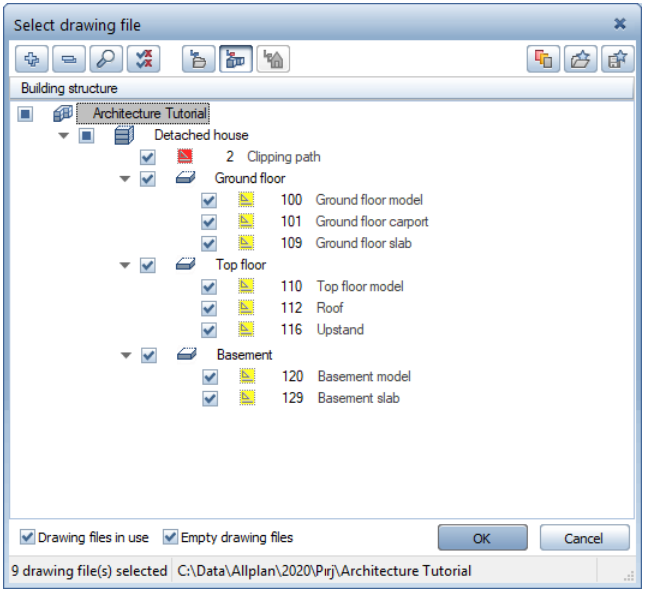
1 Click **Create Section** (**Actionbar** - **Architecture** role - **Elements** task - **Components** task area).

2 As you have already created clipping paths, **close** the **Create Clipping Path** palette.

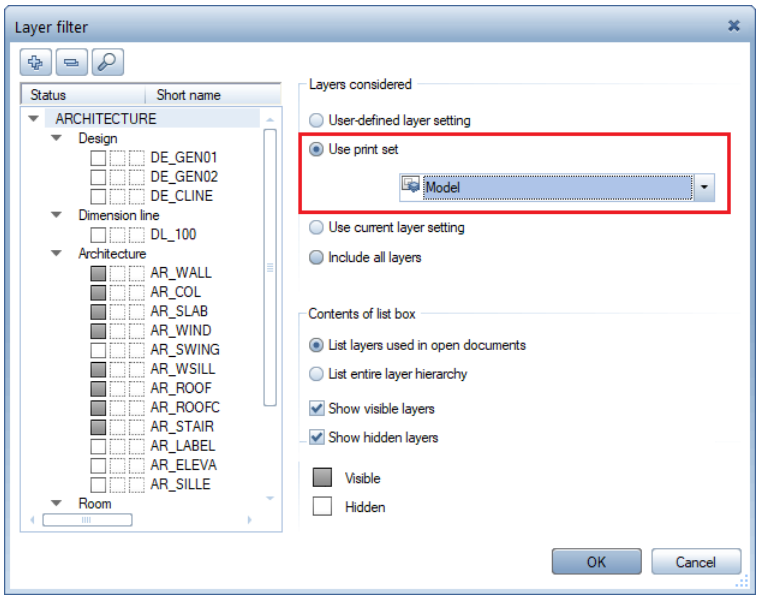
The **Generate Section** palette opens.

3 Define the following settings in the **Generate Section** palette:

- **Filter** area
  Drawing files: Click the button. You can see all the drawing files you selected for creating the clipping path. Click **OK** to close.



- **Filter** area
  Clipping path: Select **A (2)**. The number in parentheses indicates the number of the drawing file that contains the selected clipping path.
  Layer: Click the button to open the **Layer filter** dialog box. Select the **Use print set** option. Select the **Model** print set and click **OK** to confirm.

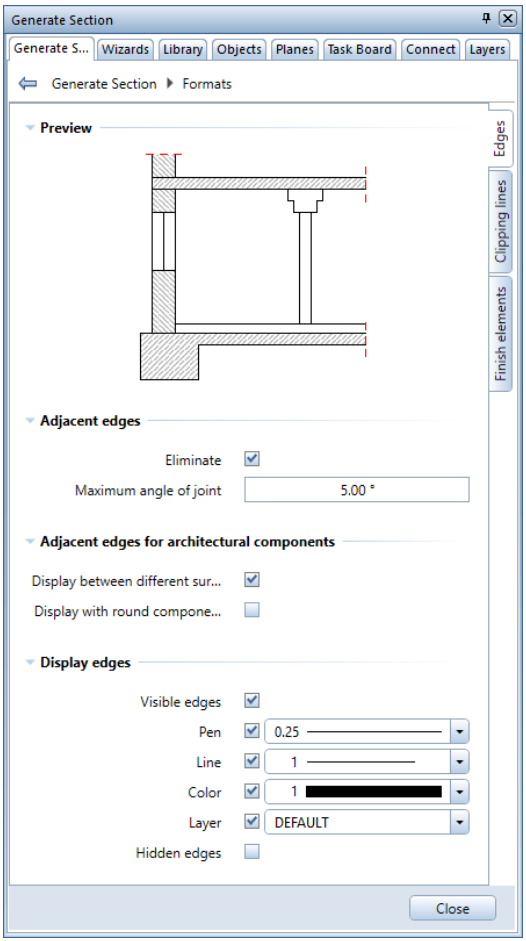


- **Filter** area
  Update automatically: Select this option to create an associative section. Consequently, the program updates the section automatically to reflect any changes you make to the 3D model. You do not need to generate the section again.
- **Surface elements** area
  Select the **No surface elements** button.
- **Representation** area
  Formats: Click the **Set** button.

The **Formats** palette opens.

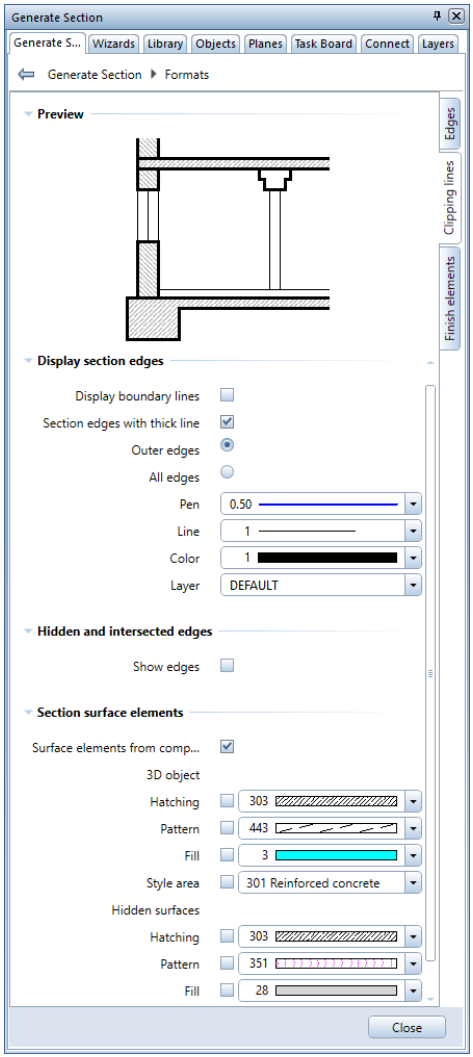
4 Select the **Edges** tab and define the following settings:

- **Adjacent edges** area
  Eliminate: Select this option.
  Maximum angle of joint: 5 degrees
  To represent curves in hidden-line images as smooth surfaces instead of faceted, adjust the maximum angle to 5 degrees, for example.
- **Adjacent edges for architectural components** area
  Display between different surface elements: Select this option.
- **Display edges** area
  Visible edges: Select this option.



5 Open the **Clipping lines** tab in the **Formats** palette and define the following settings:

- **Display section edges** area
  Display boundary lines: Clear this option.
  Section edges with a thick line: Select this option.
  Outer edges: Select this option.
- **Section surface elements** area
  Surface elements from components: Select this option.

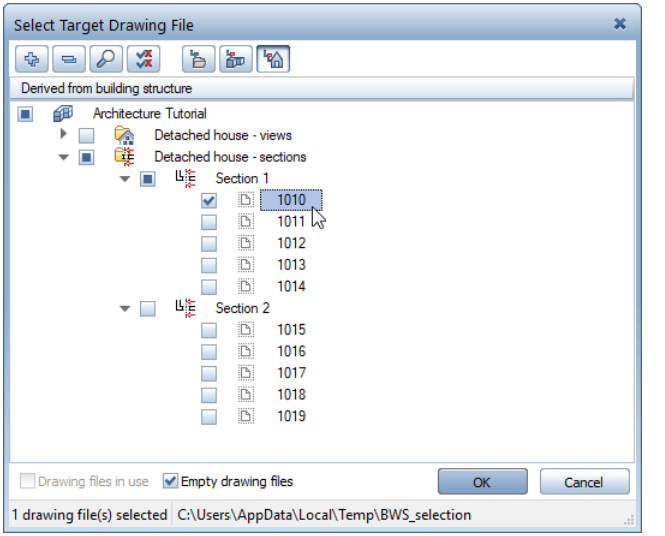


Tip: Sections can display finishing surfaces that you define by using the **Room** tool. To do this, use the **Finish elements** tab in the **Formats** palette. So, you do not need to edit sections later.

6 Click **Close** to confirm the **Formats** palette.

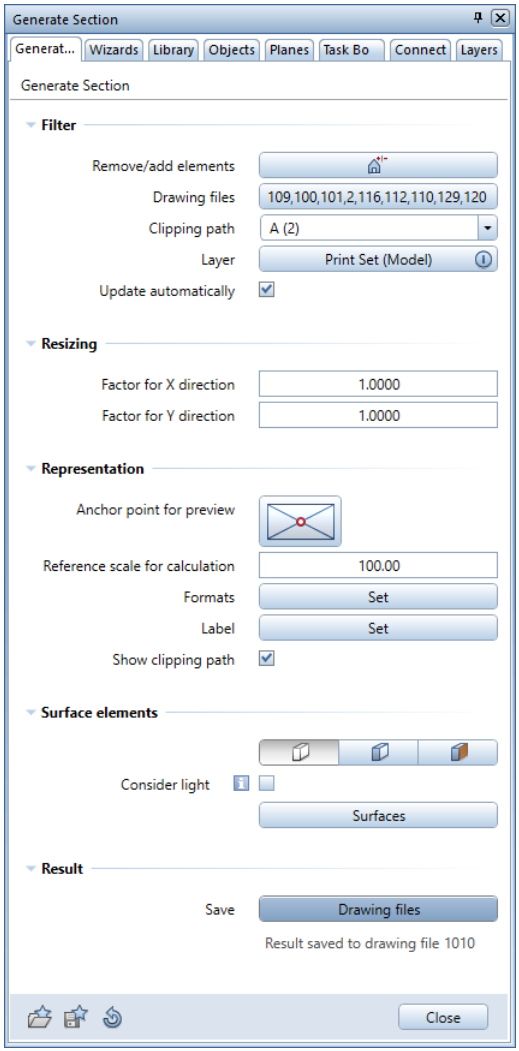
You are back in the **Generate Sections** palette.

7 Go to the **Result** area, click the **Drawing files** button and select drawing file **1010**.



8 Click **OK** to confirm the **Select destination drawing file** dialog box.

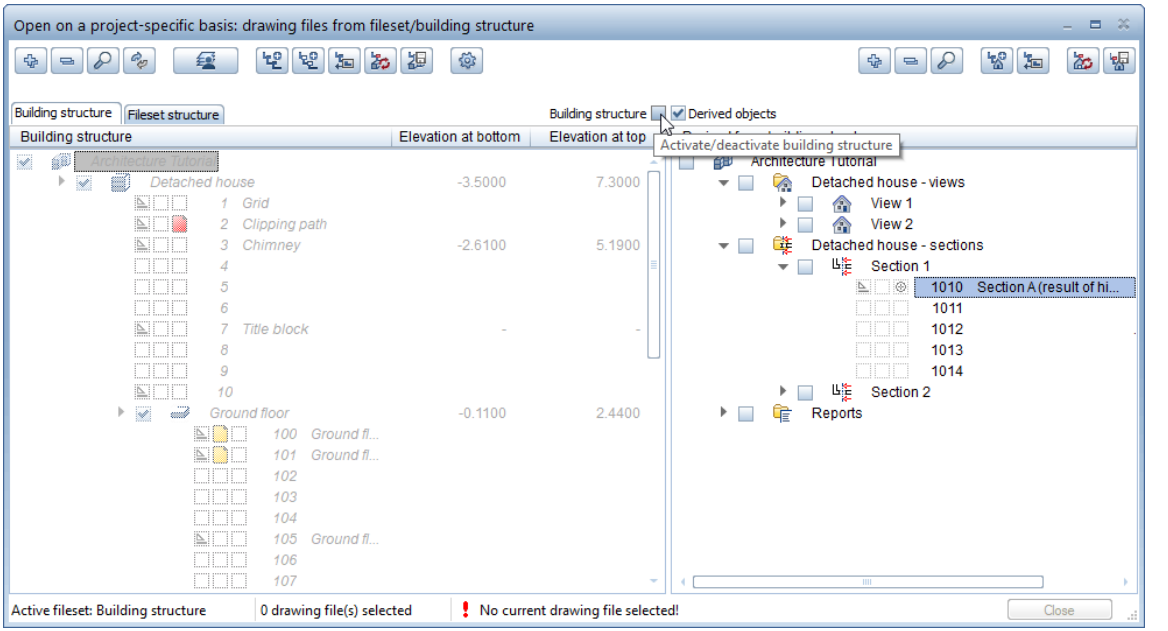
Section **A–A** is attached to the crosshairs. You have just saved this section to drawing file **1010**. If you want, you can also place this section in the current drawing file (**2**) or skip placing by clicking **Close** in the **Generate Section** palette.



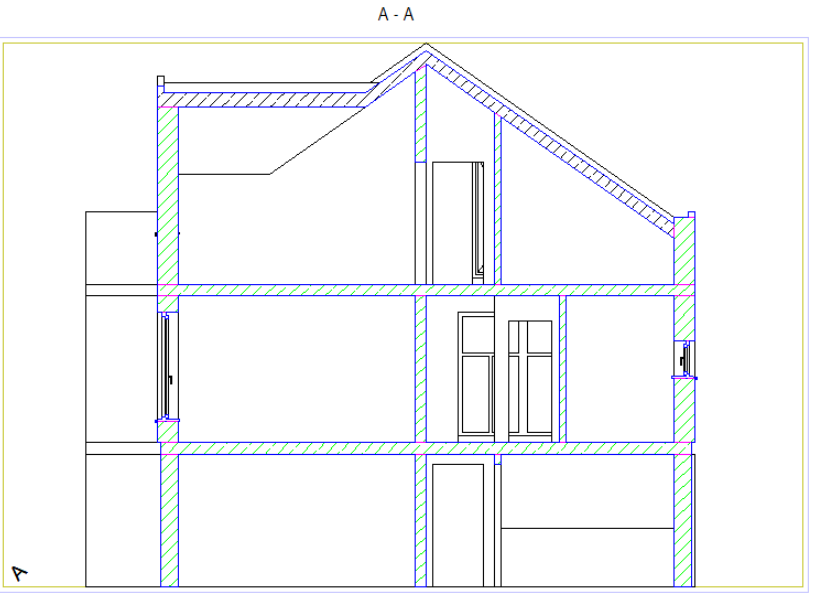
9 Click **Close** in the **Generate Section** palette.

10 Select the **Open on a Project-Specific Basis** tool.

11 Clear the **Building structure** check box, thus hiding all drawing files under **Building structure**.



12 Go to the **Derived from building structure** area on the right side, make drawing file **1010 Section: A (result of hidden-line calculation** current and close the dialog box.



Tip: If the drawing file looks empty, check that the view is **Plan**. If it is, the reason for this might be 2D data. In this case, click **Show/Hide** and select the **2D elements in 3D views** option.

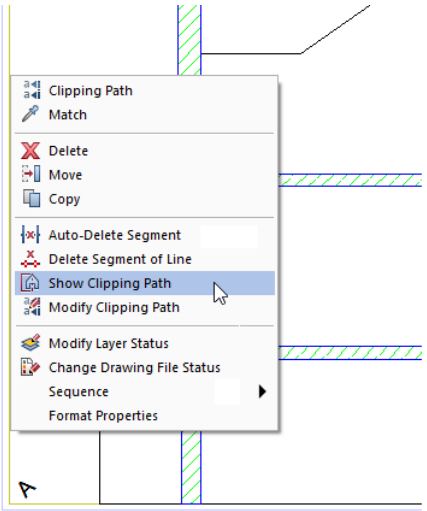
You can see the result of the hidden-line image in drawing file **1010 Section: A (result of hidden-line calculation)**.

Section A-A has two borders in different colors.
The outer border is the view border. The view border indicates that section A-A was created with the **Update automatically** option being selected. Sections that are **not associative** (= **Update automatically** option off) get a double view border. Double-click this single or double view border to open the **Modify Section** palette, which provides the same parameters as the **Generate Section** palette.

Note: You can define the line type, color and offset of the view border in the **Options** - **Reinforcement views** page - **View border** area. The line color always stays the same, regardless of the setting of the **Color stands for pen** option (**View** drop-down list on the Quick Access Toolbar - **Show/Hide**).
View borders are not included in printouts.

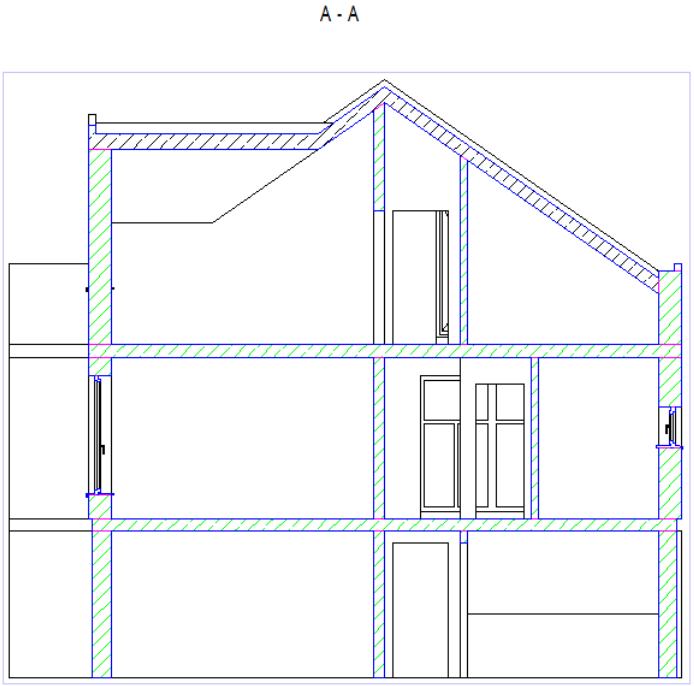
In addition to the view border, you can see the section object with its name. Allplan displays the section object in construction-line color. You can hide the section object via its shortcut menu.

13 Open the shortcut menu of the section object and select **Show Clipping Path**.



14 Select view:
Click the border of section A–A

The result should look like this:



Section A–A

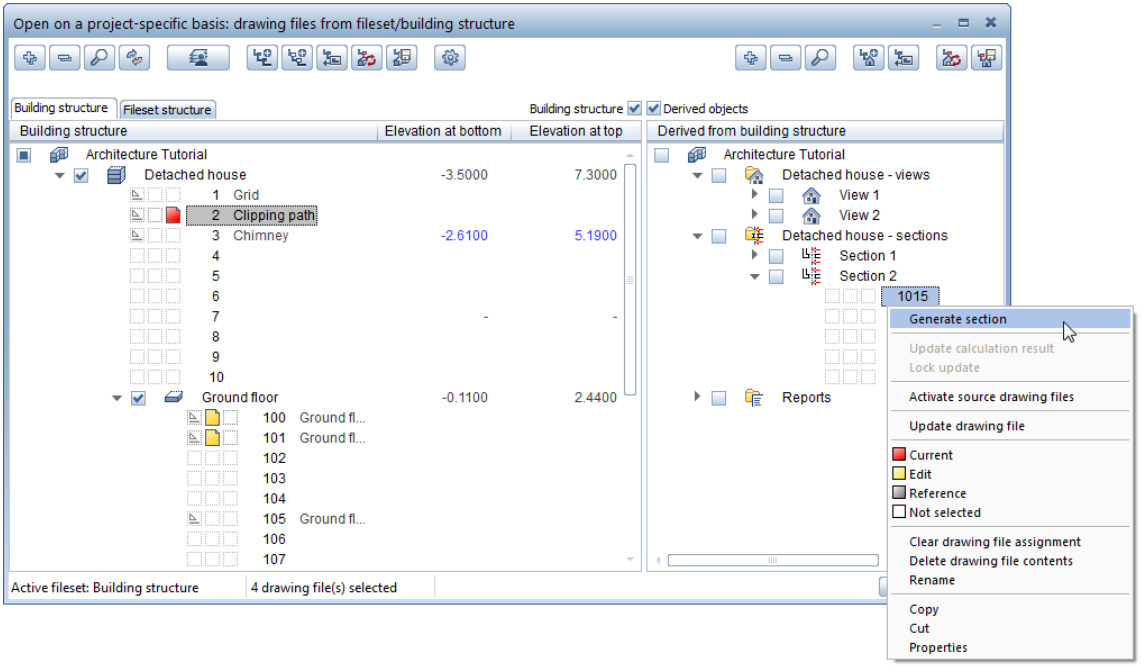
To calculate and save section B–B

1 Click **Open on a Project-Specific Basis**.

2 Select the **Building structure** check box again (see illustration).

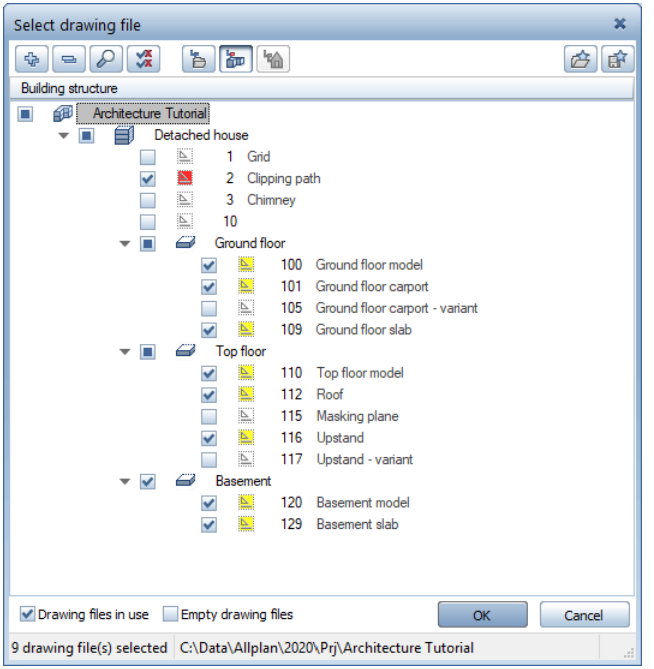
3 Go to the **Derived from building structure** area on the right side and select **Detached house – sections – Section 2**.

4 Open the shortcut menu of drawing file **1015** and select **Generate section**.



5 The **Generate Section** palette shows the settings of section A–A. Check the settings:

- **Filter** area
  Drawing files: Click the button. Drawing files **2**, **100**, **101**, **109**, **110**, **112**, **116**, **120** and **129** are selected. Click **OK** to close.



- **Filter** area
  Clipping path: Select **B (2)**.
  Layer: The **Model** print set is selected.
  Update automatically: This option is selected.
- **Surface elements** area
  The **No surface elements** button is selected.
- **Representation** area
  Formats: Click the **Set** button.

The **Formats** palette opens.

6 Select the **Edges** tab on the **Formats** palette and check the following settings:

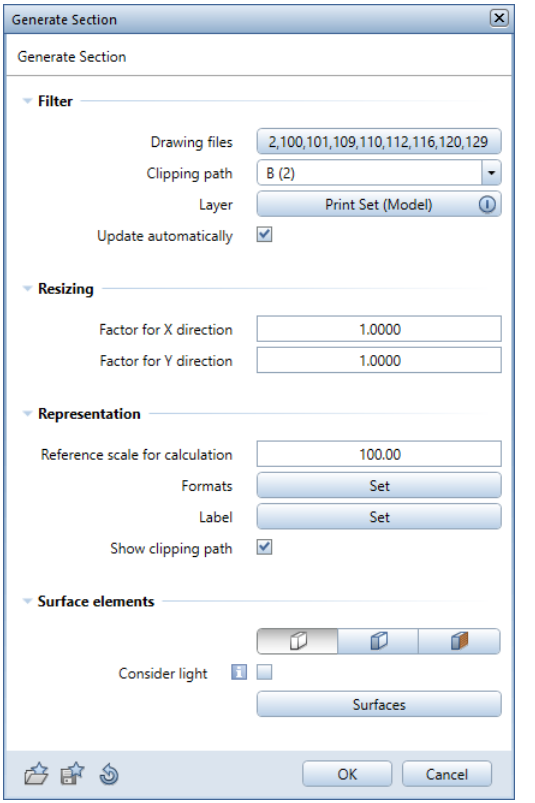
- **Adjacent edges** area
  Eliminate: This option is selected.
  Maximum angle of joint: **5** degrees
- **Adjacent edges for architectural components** area
  Display between different surface elements: This option is selected.
- **Display edges** area
  Visible edges: This option is selected.

7 Open the **Clipping lines** tab in the **Formats** palette and define the following settings:

- **Display section edges** area
  Display boundary lines: This option is not selected.
  Section edges with a thick line: This option is selected.
  Outer edges: This option is selected.
- **Section surface elements** area
  Surface elements from components: This option is selected.

8 Click **OK** to confirm the **Formats** palette.

You are back in the **Generate Sections** palette. The **Show clipping path** option is selected.



9 Click **OK** to close the palette.

Drawing file **1015** automatically gets the following name: **Section: B (result of hidden-line calculation)**.

10 Clear the **Building structure** check box, thus hiding all drawing files under **Building structure**.

11 Make drawing file **1015 Section: B (result of hidden-line calculation** current and close the dialog box.

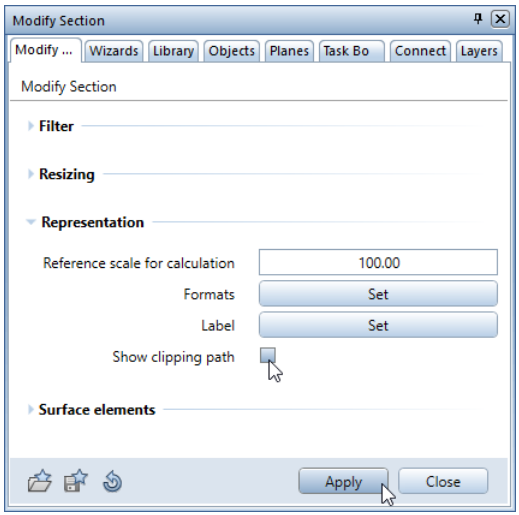
You can see the result of the hidden-line image in drawing file **1015 Section: B (result of hidden-line calculation)**.
Here, too, the section object is visible. When you generated section A-A, you learned how to hide the section object via its shortcut menu. With section B-B, we will show you another modification option.

12 Double-click the view border of section B-B.

The **Modify Section** palette opens.

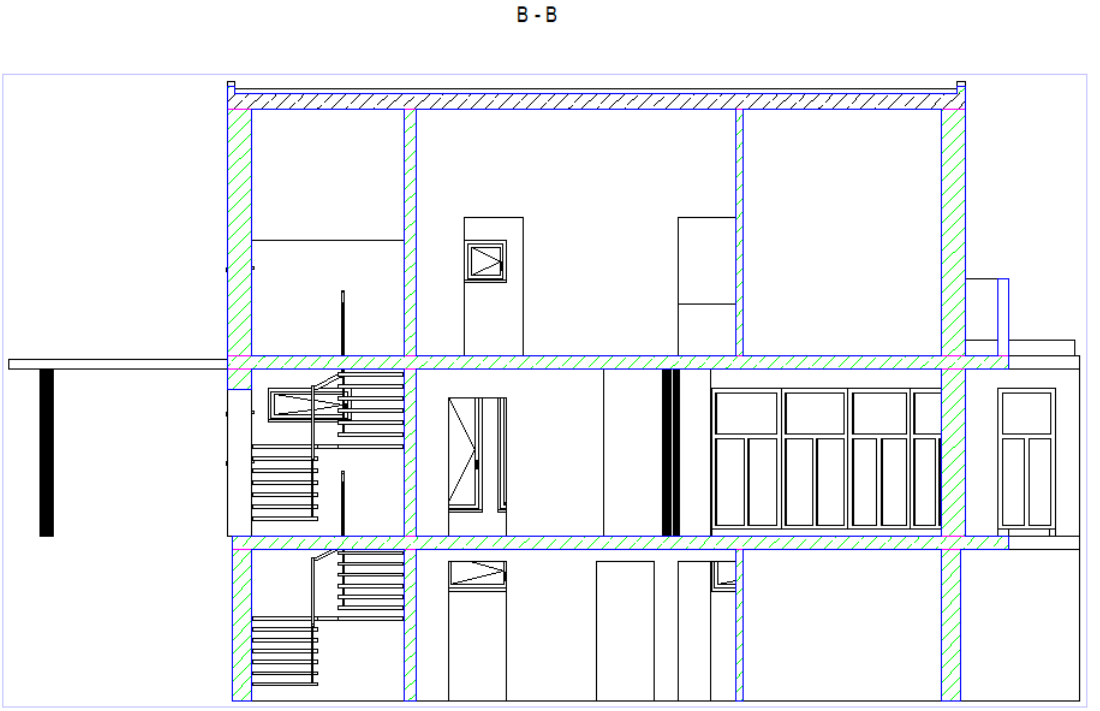
13 Clear the **Show Clipping Path** option in the **Representation** area and click **Apply** to confirm.

Note: When you create a section, the **Show clipping path** option is selected by default.



14 **Close** the **Modify Section** palette.

The result should look like this:



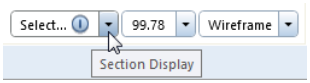
Section B–B

If you created the section with the **Update automatically** option, the program updates the section automatically to reflect any changes you make to the floor plan.

If the section is *not* **associative** (**Update automatically** not selected), you can add changes to the section as follows:
If you have changed a drawing file that is used as a source drawing file for the section, you can update the section by selecting the **Update calculation result** tool (**Open on a Project-Specific Basis** tool – shortcut menu of **Section n**). You can use the **Lock update** tool (also on the shortcut menu of **Section n**) to retain the section as it is. In other words, you can no longer update the section.

For example, if you want to use another drawing file as a source drawing file for the section, you must calculate the section again as described.

Note: Sections can also be created with the **Section Display** tool (viewport toolbar).



To place the result in a separate drawing file, select the **Hidden-Line Image, Wireframe** tool (in the **View** drop-down list on the Quick Access Toolbar) and click **Hidden-Line Image**.

Here, the program does *not* update the section automatically to reflect any changes you make to the floor plan. You must calculate the section again and update the drawing file by using **Hidden-Line Image, Wireframe** and **Update Hidden-Line Image**.

Editing sections

You can now edit the section. Use a separate drawing file, because the drawing file with the hidden-line image will be overwritten when you update it.

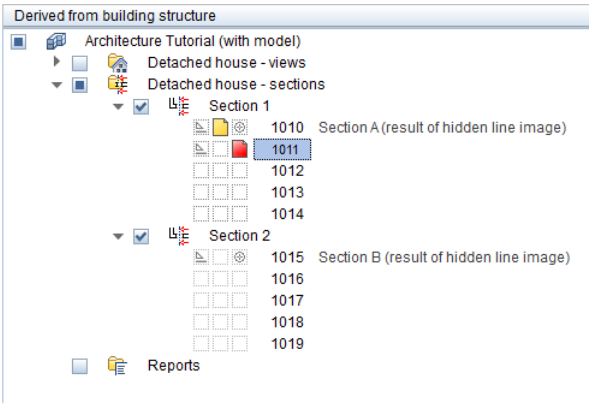
First draw the finished floor in the section.

To create elevation dimensioning

1 Click **Open on a Project-Specific Basis**.

2 Go to the **Derived from building structure** area on the right side and select **Detached house – sections – Section 1**.

3 Make drawing file **1011** current and open drawing file **1010** in edit mode.



4 Rename drawing file **1011** and close the dialog box.

5 Draw the finished floor; use a height of 11 cm.

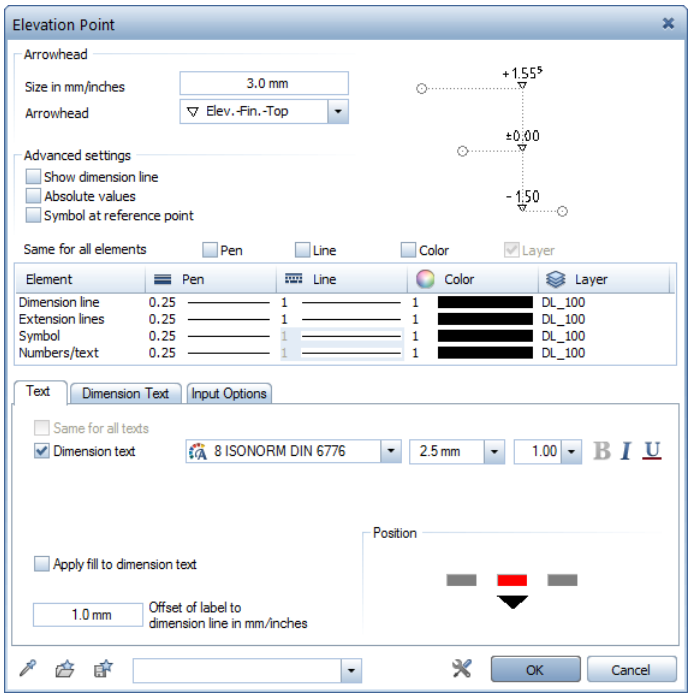
6 Go to the **Quick Access** task area of the **Actionbar** and select the **Elevation Point** tool on the flyout menu of the **Dimension Line** tool.

7 Select the **Vertically upward** type on the **Elevation Point** Context toolbar.

8 Then click **Properties**.

9 Select the **Arrowhead** (mark for finished floor) in the top part of the dialog box, define the format properties and select the **DL_100** layer (see illustration).
Open the **Text** tab and define the following settings:

- Select the **Dimension text** option.
  Font: 8 ISONORM DIN 6776
  Text height: 2.5 mm
  Aspect: 1

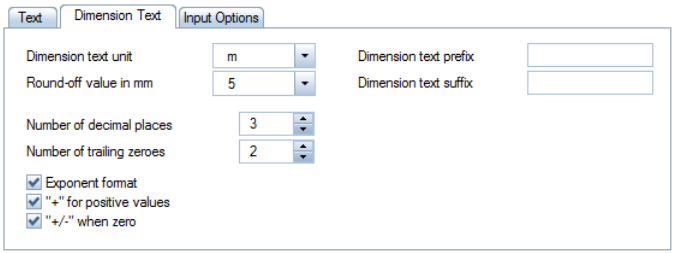


10 Define the following settings on the **Dimension text** and **Input options** tabs.

- **Dimension text** tab

  Dimension text unit: m
  Round-off value in mm: 5
  Number of decimal places: 3
  Number of trailing zeros: 2

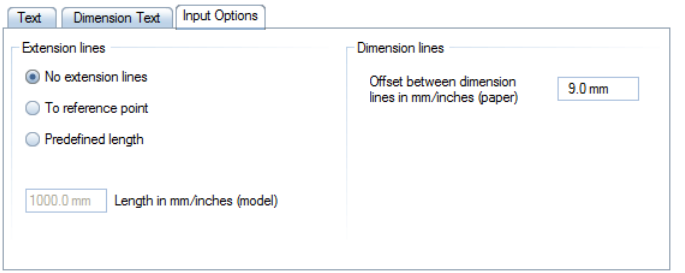
  Select all three options.



- **Input options** tab

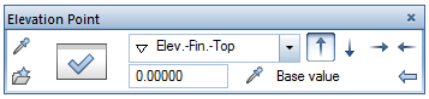
  Extension lines area: Select the **No extension lines** option.

  Dimension lines area: **Offset between dimension lines**: 9 mm



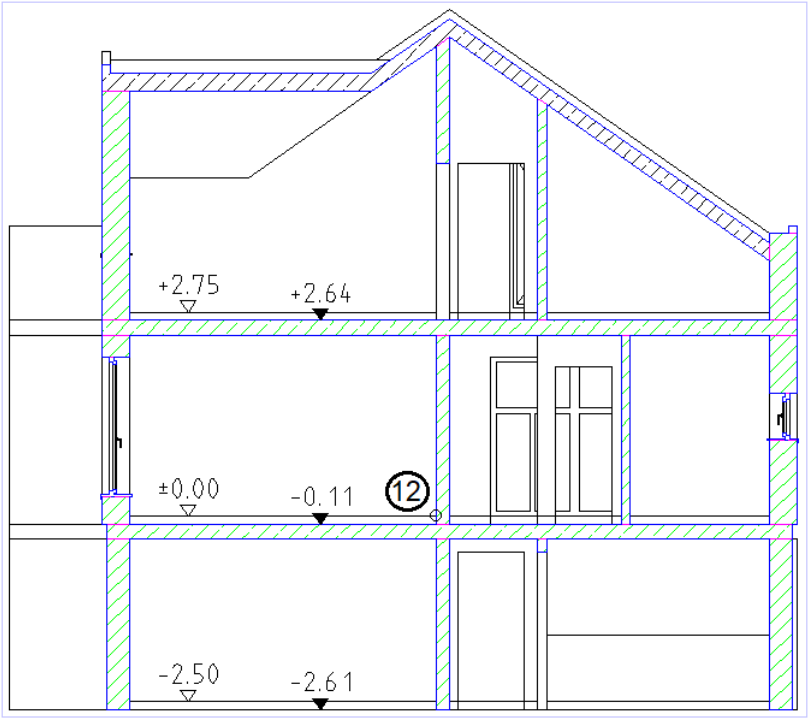
Click **OK** to confirm.

11 Place a point through which the dimension line is to pass. The **Elevation Point** Context toolbar changes.



12 *Reference point*
This is a point that is assigned a value that you know.
First enter the base value on the context toolbar: **0.00**
Then click a point of the finished floor on the ground floor.

13 Click the points to be dimensioned and
select ESC to finish.



14 Open the **Properties** or use the context toolbar to change the **Arrowhead** to Elev.-Unf.-Top.
Then dimension the unfinished floor (steps 12 to 14).

15 Select the ESC key to finish and to close the tool.

Exercise 10: views

Like sections, views can be created by means of the building structure or with a tool in the **Sections** task area on the **Actionbar**. The procedure for creating views is similar to that for creating sections.

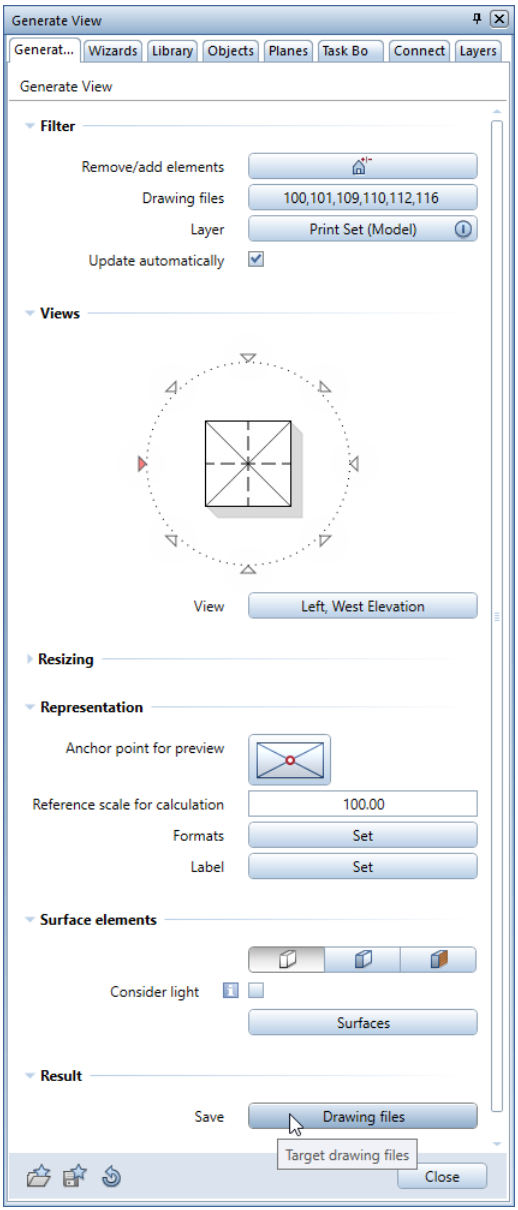
How to create views

Option 1

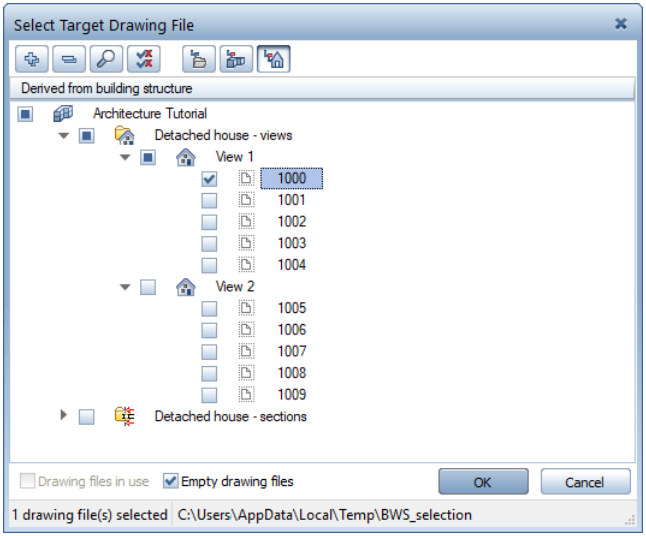
- Select the **Create View** tool (**Actionbar** – **Architecture** role – **Elements** task – **Sections** task area).
- **Generate View** palette:
  - Select the drawing files that contain the elements you want to display in the view.
  - Open the **Layer filter** dialog box, select the **Use print set** option and choose the **Model** print set.
  - Select the **Update automatically** option.
  - Switch the view to **Left, West Elevation**.

  Tip: When you select the view by clicking the button, the **3D View** palette opens. When you look at the bottom of this palette, you can find the **Match parameters** tool. You can use this tool to match the view of a viewport simply by clicking it.

- Select the **No surface elements** button.
- Use the same **Formats** as for the sections.



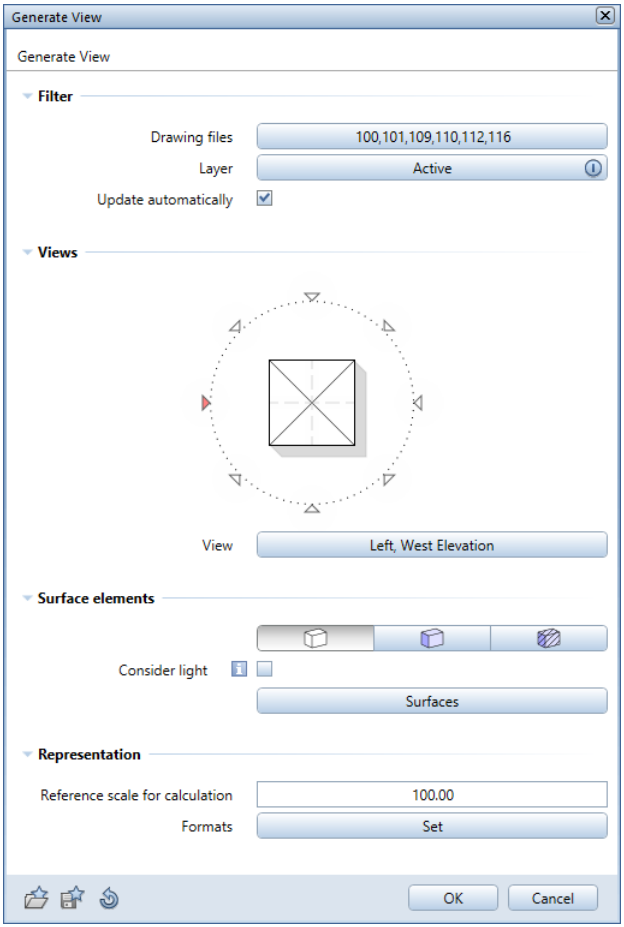
- Go to the **Result** area and click the **Drawing files** button.
- Select destination drawing file **1000** and click **OK** to confirm.



- **Close** the **Generate View** palette.

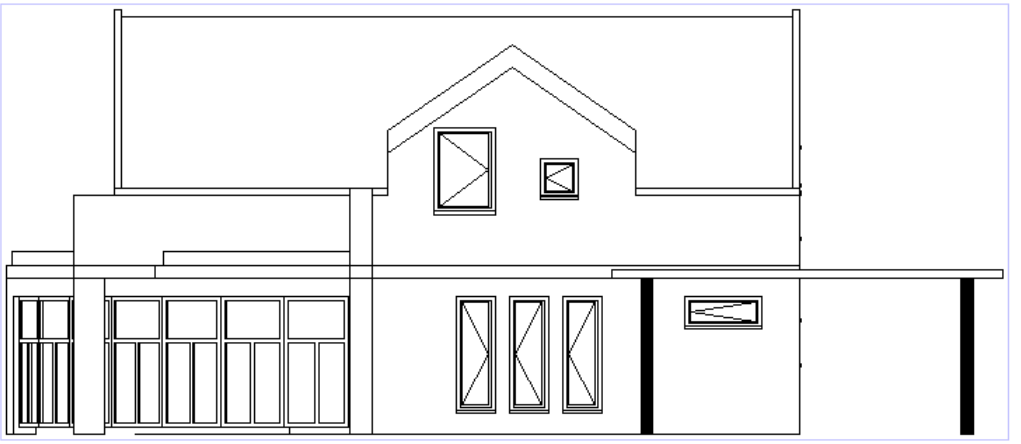
Option 2

- **Open on a Project-Specific Basis**, **Derived from building structure**, **Detached house – Views** folder, **View 1**.
- Open the shortcut menu of drawing file **1000** and select **Generate view**.
- **Generate View** palette:
  - Make the same settings as in variant 1.



- Drawing file **1000** automatically gets the name of the selected view.

West



West elevation

North

North elevation

Unit 7: Area Calculations and Quantity Takeoff

➲ The exercises in this unit also require the **Architecture** role of the **Actionbar**.

You will create the rooms on a separate layer in the drawing file with the walls. This will ensure that all the design components are included in the calculation.

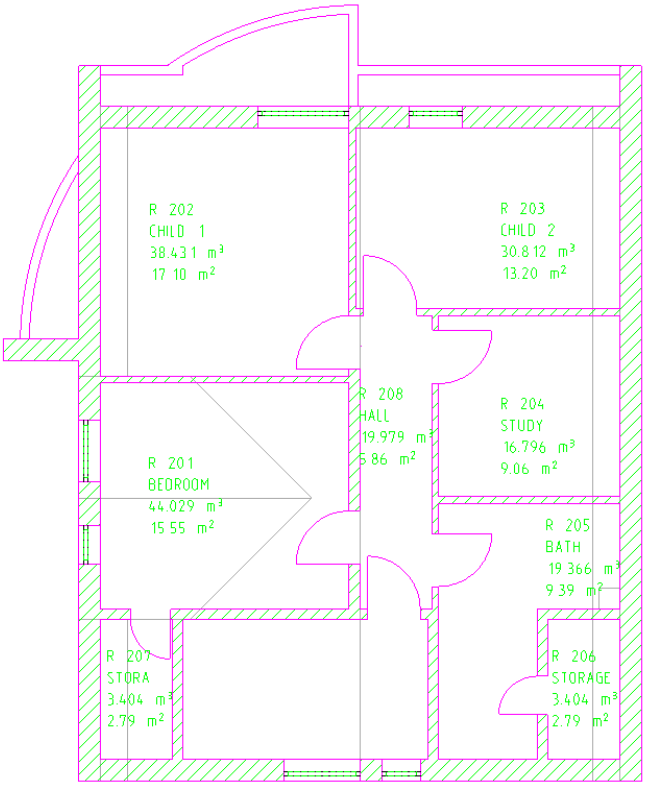
There are two ways to create rooms:

- Manually – enter polygons to define the boundary of each room separately. The rooms can be labeled immediately and assigned finish specifications.
- Automatically – the program scans the drawing file for closed wall polygons, creating rooms based on the wall polygons it detects. The rooms must be labeled and assigned finishing surfaces later.

Exercise 11: rooms, finish and floor area

Important notes on defining rooms

- In either case, you must enter the height of the room first. You enter the height as you would for any other architectural element – you can even associate the height of a room with reference planes or with other elements.
- We recommend that you work with reference planes consistently and to use a transparent plane concept for both components and rooms.
- So that you can differentiate visually between the rooms and the other elements on the screen, you should draw rooms in a different color.



You can calculate areas according to floor area regulations and output the results to reports only when you have defined rooms and entered finish specifications (for determining the finished dimensions).

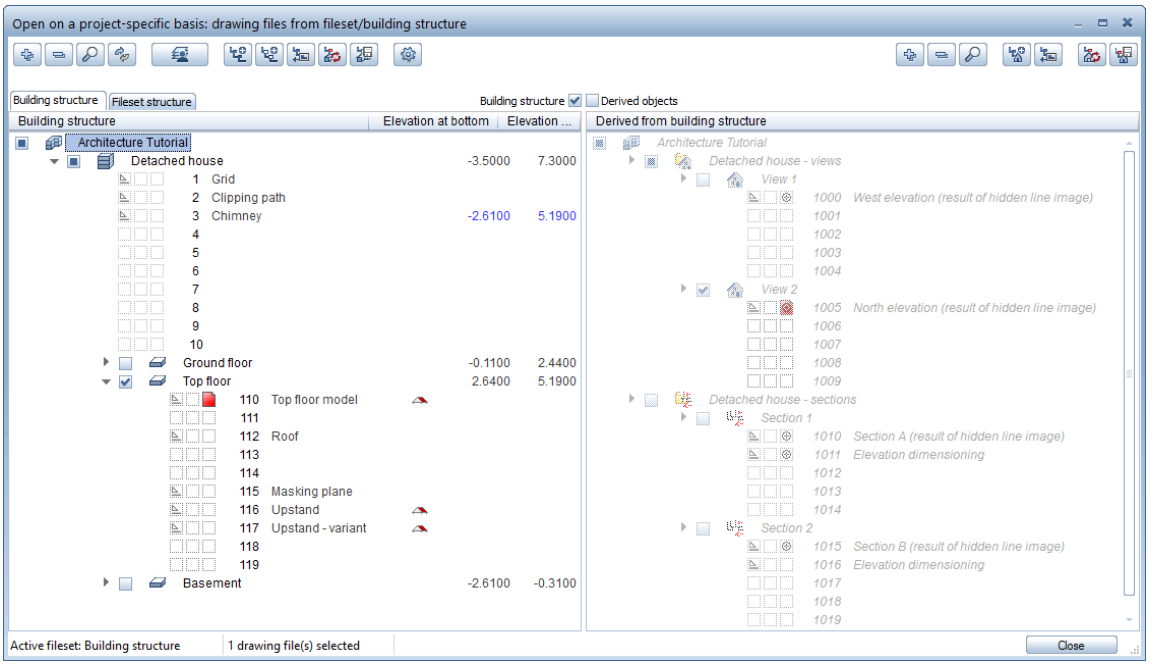
Defining rooms one by one

In the exercises that follow, you will assign a finish to different surfaces on the top floor and calculate the floor area. Here, you could use the automatic room-generation approach. However, you will also consider the manual approach so that you can decide for yourself which is the more effective.

You will start by defining single rooms and labeling their wall surfaces, floors and ceilings. Then, you will create the other rooms automatically.

To create rooms

1 Select **Open on a Project-Specific Basis** and make drawing file **110 Top floor model** current.
Select the check box beside **Building structure** and clear the check box beside **Derived objects**.



2 Open the **Layers** palette, click **Select Layer Print Set** and select the **SC Rooms** print set.

3 Switch to the **Finish** task (**Architecture** role) on the **Actionbar** and maximize the **Rooms, Surfaces, Stories** task area.

4 Click **Room** (**Rooms, Surfaces, Stories** task area) and check the **Properties** palette to see whether the **RO_ROOM** layer is selected.

5 Select pen (3) **0.50** (**Properties** palette).

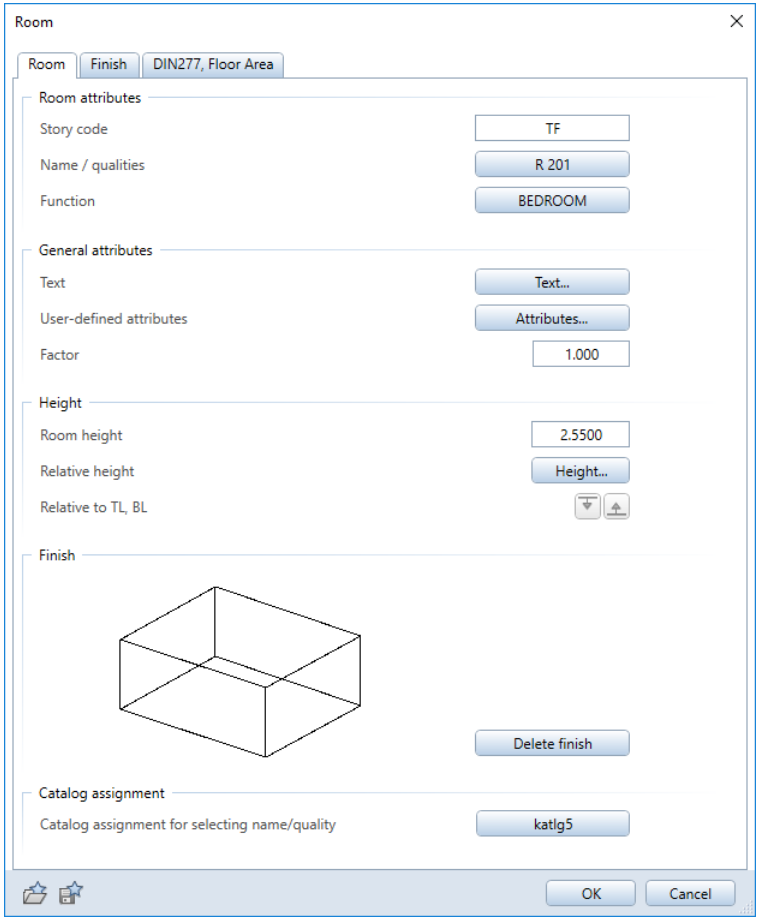
6 Click **Properties**.

Define properties for the room.

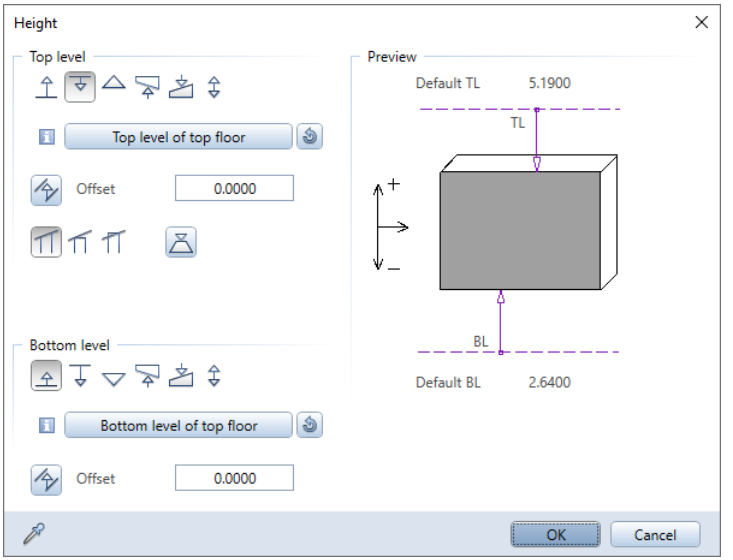
7 In the **Story code** box, enter **Top floor**. Click the **Name / qualities** box and enter the number of the room: **R 201**.

8 Click **Function** and use to add a new entry to the list: **BEDROOM**.

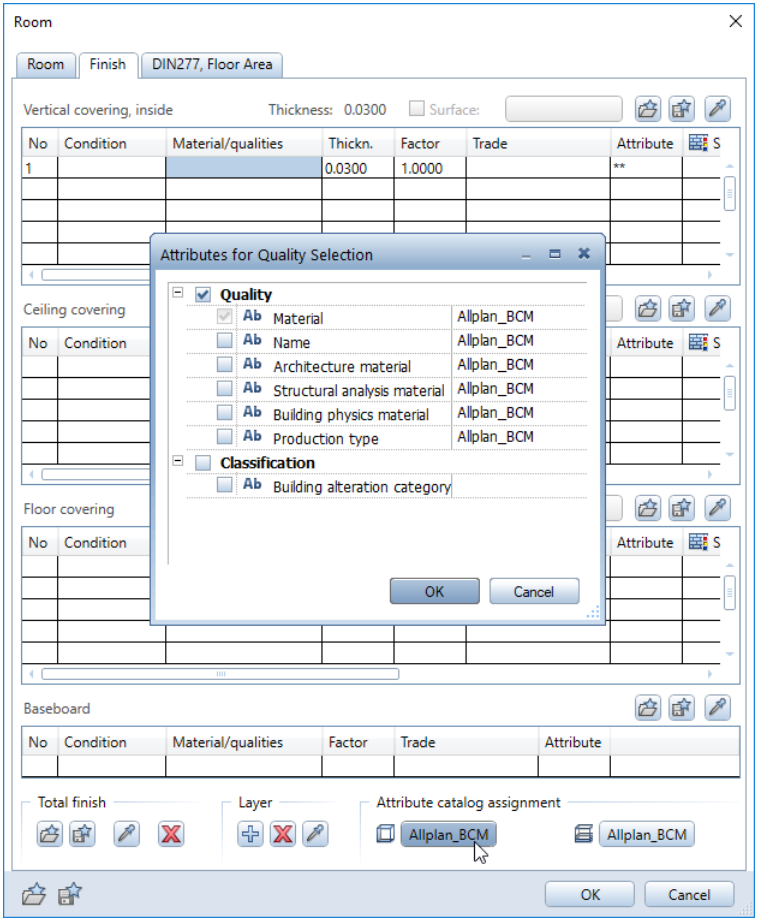
Tip: Entering a factor is useful for areas like balconies, for example, that count only partially.



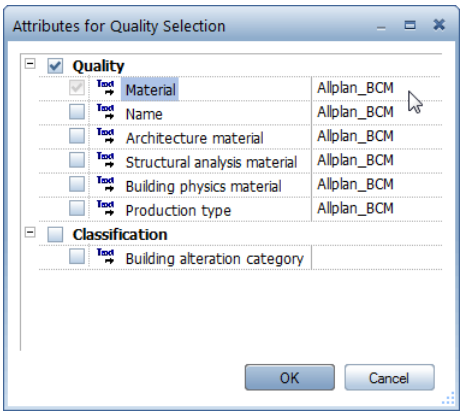
9 Click **Height** and define the top and bottom levels of the room in such a way that they match the settings defined for the walls on the top floor.



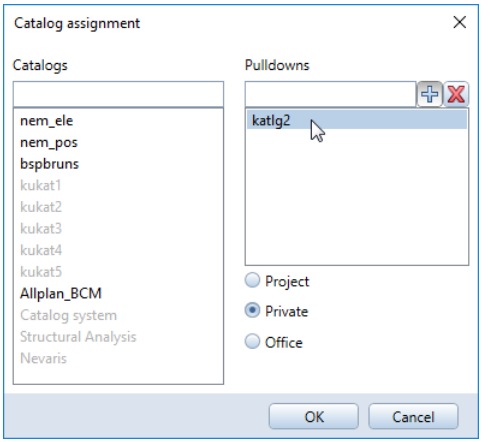
10 Switch to the **Finish** tab. Click the left button in the **Attribute catalog assignment** area at the bottom of the dialog box.



11 In the **Attributes for Quality Selection** dialog box, click the entry in the right column next to **Material**

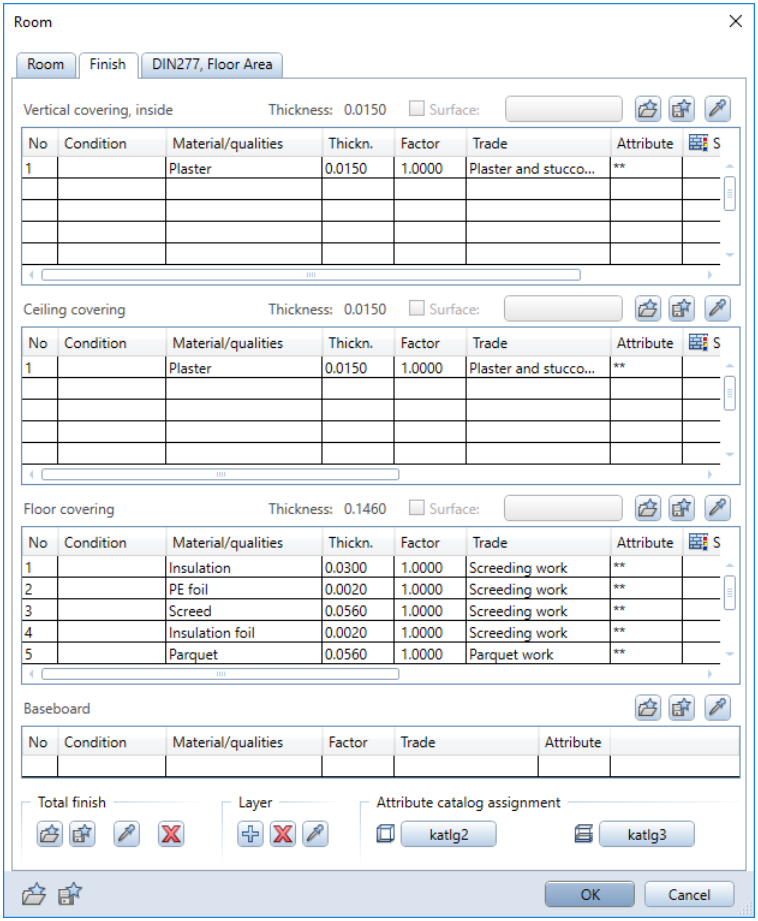


12 Assign a catalog for vertical surfaces, ceilings and floors.



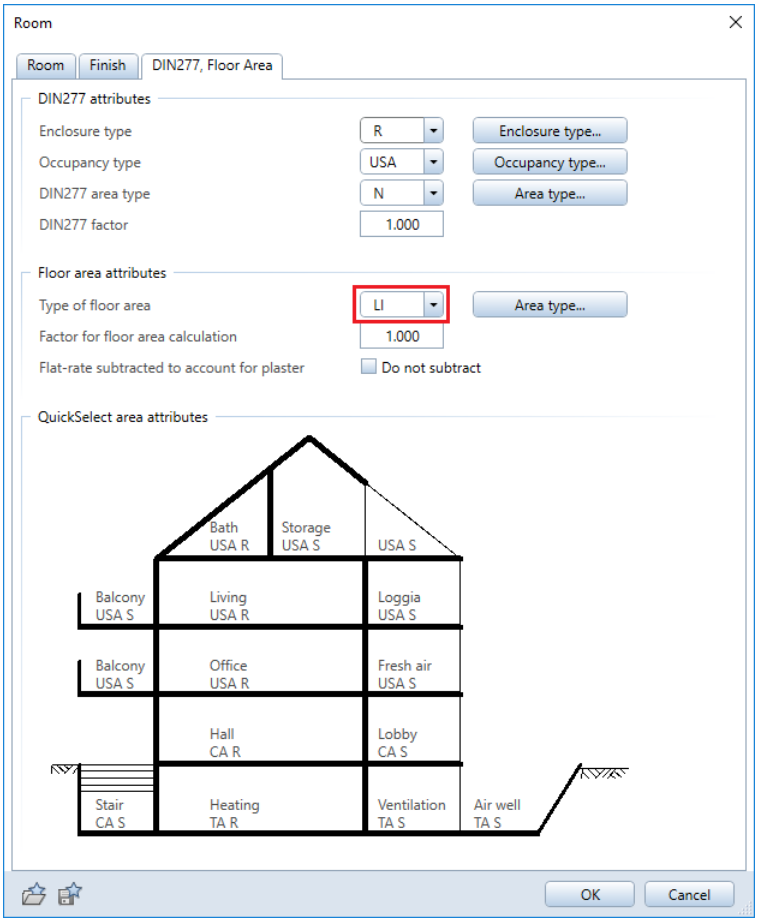
13 Assign a catalog for **Baseboard** (button on the right side).
Repeat steps 10 to 12.
Select catalog **katlg3** in the **Catalog assignment** dialog box.

14 Make settings for the coverings of ceilings, floors and vertical surfaces.



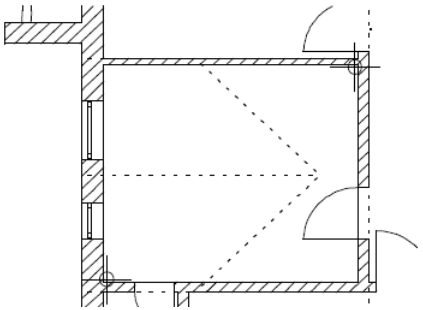
Tip: Use to save combinations of settings as favorites. The settings for entire rooms and those for individual surfaces can be saved as favorites.
With large-scale projects in particular, this saves you time and increases quality, as all those involved can access the same settings.

15 Select the **DIN277, Floor Area** tab.
In the **Floor area attributes** area, define the **Type of floor area** as **LI** (for living space).



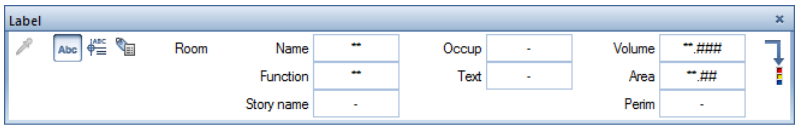
16 Click **OK** to confirm the dialog box.

17 In plan, click the diagonally opposite corners of the room under the dormer and select the ESC key.



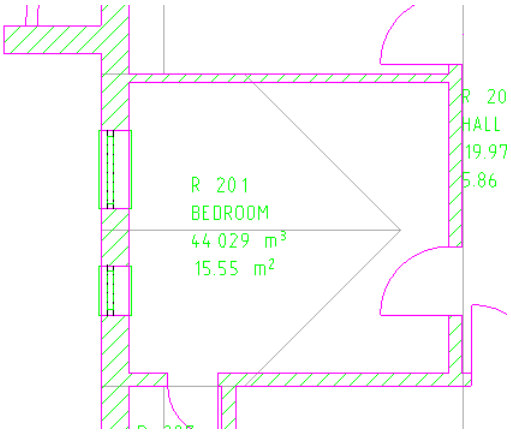
18 Make settings for the label. The label in this exercise will include information on the **name**, **function**, **volume** and **area** of the room. Click in the relevant boxes to exclude them from the label.

Tip: Click to switch to the text parameters.



19 Check the **Properties** palette to see whether the layer **AR_LABEL** is selected.

20 Click in the room to place the label (a preview of the label is attached to the crosshairs).



21 Select ESC to close the tool.

Creating rooms automatically

In the next exercise, you will create the other rooms automatically. This involves two steps:

- Define all the rooms by using **Auto-Room**.
- Label the rooms by using **Redefine Rooms, Surfaces, Stories**.
  You can define the finish immediately when creating labels or later with special tools.

To create rooms automatically

1 Click **Auto-Room** (**Actionbar** – **Finish** task – **Rooms, Surfaces, Stories** task area – flyout menu of the **Room** tool).

2 Check the **Properties** palette to see whether the layer **RO_ROOM** is selected.

3 Click **Height** in the input options and check the height setting.

4 Enclose the design in a selection rectangle. Make sure that you do not select any parts of the balconies. Allplan creates the rooms and closes the tool.

Note: **Auto-Room** will not change any rooms you have already defined.

Finish specifications

You have already defined the finish of the single room; in other words, you have assigned vertical surfaces, ceilings and floors (and baseboard).

These surfaces have properties (for example, material, building trade and thickness). Qualities and quantities are included in calculations of floor area and quantity takeoff.

The rooms you have defined automatically have not yet been assigned any finish specifications.

You have two options to define finishing surfaces in rooms:

- By defining finishing surfaces as single entities for an entire room.
  - The easiest method is to define finish specifications when you enter a room. To do this, use the **Room** tool, **Finish** tab. However, you can also do this later by using the **Finish Specifications** tool.
    When modifying rooms, you can also define or change the finish for an entire room by using **Redefine Rooms, Surfaces, Stories**, **Finish** tab.
- By defining finishing surfaces (that is, special surfaces) one by one. You can use this option to define separate surfaces within the same area, such as a tiling pattern up to a certain height.
  - You can enter special surfaces with the **Vertical Surface**, **Ceiling**, **Floor** and **Baseboard** tools.

In the exercises that follow, you will learn how to use the different methods.

Tip: You can use this approach to modify surfaces that you have created by using **Room**.

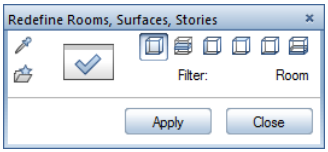
Finishing surfaces for an entire room (as a modification)

The next step is to label the rooms created automatically. You will copy the finish settings from the existing room named "BEDROOM" and assign them to the rooms while creating the labels.

To assign finishing surfaces to rooms

1 Click **Redefine Rooms, Surfaces, Stories** (**Rooms, Surfaces, Stories** task area).

2 Make sure that the **Room** filter is selected on the context toolbar.

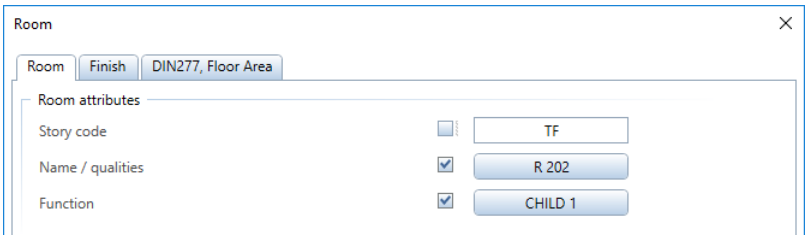


3 Click **Match Properties** and then click within the room called BEDROOM.

Allplan takes all the attributes from the "BEDROOM" (name, finish, type of area).

4 Click **Properties**.
On the **Room** tab, enter **R 202** for the name and **CHILD 1** for the function of the room. Use to permanently add entries to the list.

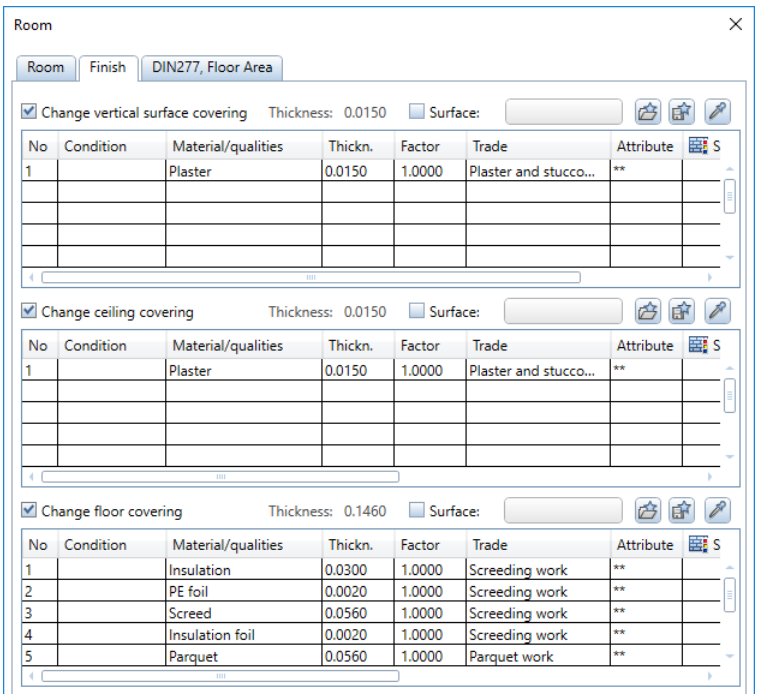
Select the check boxes beside **Name / qualities** and **Function** to transfer these attributes to the new room.



5 Switch to the **Finish** tab.

You can see the finish you defined for "BEDROOM"; changes are not necessary at the moment.

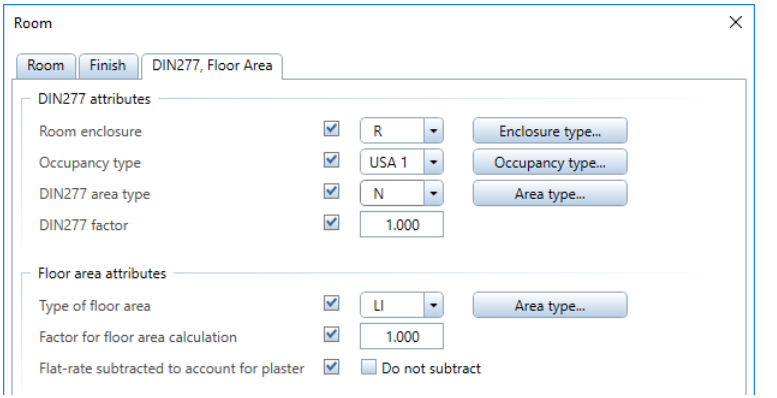
Make sure that you select the check box for each finishing surface you want to transfer to the new room.



6 Check the settings on the **DIN277, Floor Area** tab:

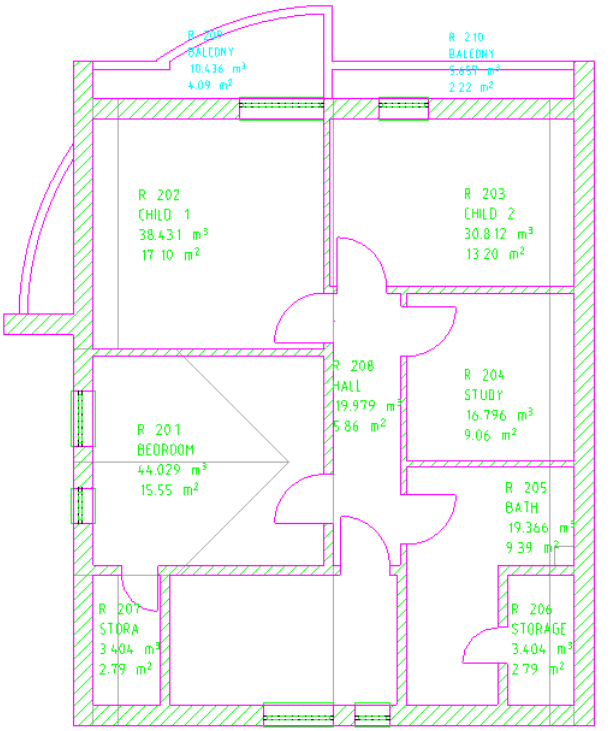
The program also took the **LI** area type from the "BEDROOM".

Here, too, make sure that the corresponding check boxes are selected.



7 Click in the upper-left room and right-click to confirm.

8 Select the layer AR_LABEL and place the label.



9 Repeat steps 4, 7 and 8 with the other rooms.
Enter the room numbers and room functions as shown in the illustration.
Make sure that you switch between the RO_ROOM (for rooms) and AR_LABEL (for room labels) layers.
The settings you defined for finish and type of area are retained until you change them. Allplan assigns them automatically to the modified room together with the label.
A value to account for plaster is not to be subtracted from the overall area of room **205 Bathroom** in subsequent floor area calculations: Select the **Do not subtract** check box in the **Floor area attributes** area on the **DIN277, Floor Area** tab.

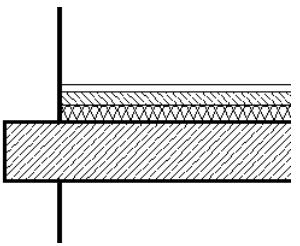
10 Select ESC to close the tool.

You will define the balcony as a separate room. Specify a function and name on the **Finish** tab and delete all the finishing surfaces by clicking **Delete total finish**. Open the **DIN 277, Floor Area** tab. Go to the **Floor area attributes** area and switch the **Factor for floor area calculation** to **0.5**. Then go to the **Din277 attributes** area and change the **Room enclosure** to **S**.

Finishing surfaces for an entire room

The ceiling and vertical surfaces of the bathroom will get the same coat of plaster as the other rooms. The floor covering, however, will be different from the parquet floor of the other rooms you have defined so far.

Tip: You can also display ceilings and floors (finishing surfaces) in sections. When you create the section via the building structure (see "Calculating sections" on page 290), you must define the settings in the **Generate Section** palette (**Representation** area – **Set Formats** – **Finish elements** tab). The same applies to the **Create Section** (see "**Calculating sections**" on page 290) tool (**Actionbar** – **Architecture** role – **Elements** task – **Sections** task area).
When you create the section by means of the **Section Display** (see "**Calculating sections**" on page 290) (viewport border) and **Hidden-Line Image, Wireframe ...** tools (**View** drop-down list on the Quick Access Toolbar), you can define the settings in **Special settings**.



In addition, you will apply a tiling pattern that is max. 2 m high to the walls of the bathroom. To create this tiling pattern, you must enter the height relative to the room.

By using the bathroom as an example, the following section shows how to create finishing surfaces and special surfaces.

To define finishing surfaces

➲ Open the **Options** – **Rooms** page – **Room finish** area and select the **Calculate vertical surfaces only at adjacent components** option. This ensures that Allplan calculates vertical finishing surfaces only in places where there are walls.

1 Click **Finishing Surfaces** (**Rooms, Surfaces, Stories** task area).

2 Define the required surfaces in the dialog box (see following tables and illustration; step 3). The entries you make apply to the entire surface or to all the sides in the room.

Assign, remove vertical surface covering area:

No.	Material, qualities	Thickness	Factor	Trade
1	Plaster	0.0150	1	Plaster and stucco work
2	Mortar bed	0.0010	1	Tiling work
3	Wall tiles	0.0300	1	Tiling work

Assign, remove ceiling covering area:

No.	Material, qualities	Thickness	Factor	Trade
1	Plaster	0.0150	1	Plaster and stucco work

Assign, remove floor covering area:

No.	Material, qualities	Thickness	Factor	Trade
1	Insulation	0.0300	1	Screeding work
2	PE foil	0.0020	1	Screeding work
3	Screed	0.0560	1	Screeding work
4	Mortar bed	0.0100	1	Tiling work
5	Tiles	0.0100	1	Tiling work

The tiling pattern is not as high as the entire wall but it is applied to all the sides in the room. You can therefore use this tool to define it as a finishing surface.

Note: Tiling patterns or other surfaces that differ in height or that are not applied to all the sides in a room are defined separately as special surfaces (see the following section).

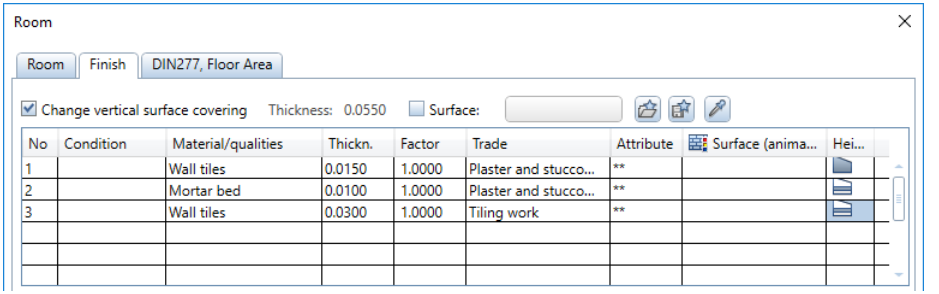
Note: Do not forget to select the relevant check boxes!

Note: When you move the horizontal sliders to the right, additional columns appear.
You can assign animation surfaces to ceilings, floors and vertical surfaces. In addition, ceilings and floors can be assigned hatching styles, patterns or fills for display in section views. You can also define the height of vertical surfaces relative to the room.

Note: Surfaces you have already defined are overwritten as soon as you select the check box for the surface in the dialog box – regardless of whether there are **assignments** in the dialog box.

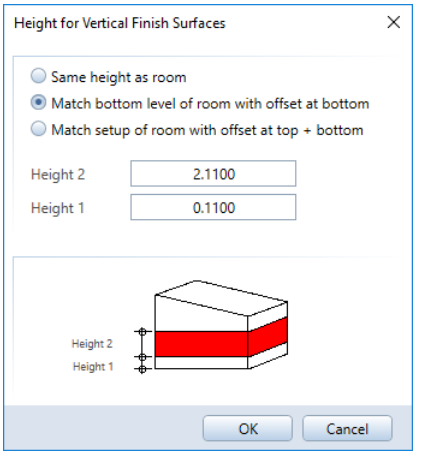
3 Enter the vertical surfaces with the tiling pattern as follows:

- The coat of plaster is applied to the full height of the room. There are no particular issues to bear in mind (default setting).
- The situation is different with the mortar and the tiles. To enter the height relative to the room, move the slider to the right and click the **Height** column.

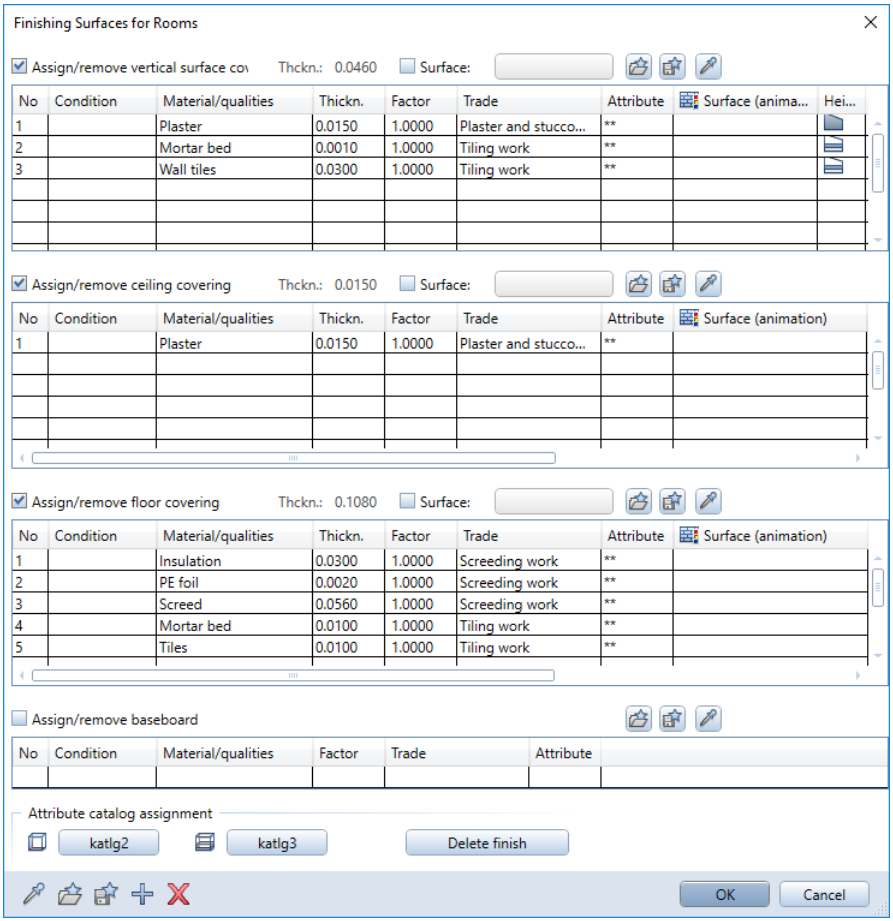


- Define the height as follows:

  Select the **Match bottom level of room with offset at bottom** option
  Height 2: **2.11**
  Height 1: **0.11**



The dialog box should now look like this:



4 Click **OK** to confirm.

5 Click in the **Bathroom**.

6 Right-click to confirm.
The finishing surfaces are assigned to the surfaces in the bathroom, even though they are invisible.

7 Select ESC to close the tool.

Tip: You can apply finish specifications to a whole series of rooms in one go. To do this, simply enclose the rooms in a selection rectangle or use the **Brackets** tool.

Alternative: special surfaces

You will apply the tiling pattern (that is max. 2 m high) only to the walls with sanitary objects. You will enter these surfaces as special vertical surfaces.

As parts of the bathroom are located under sloping walls, you will define the height by selecting the **maximum component height** option.

Special surfaces have a higher priority than finishing surfaces. Placing a special surface on top of a finishing surface makes a "hole" in the finishing surface.

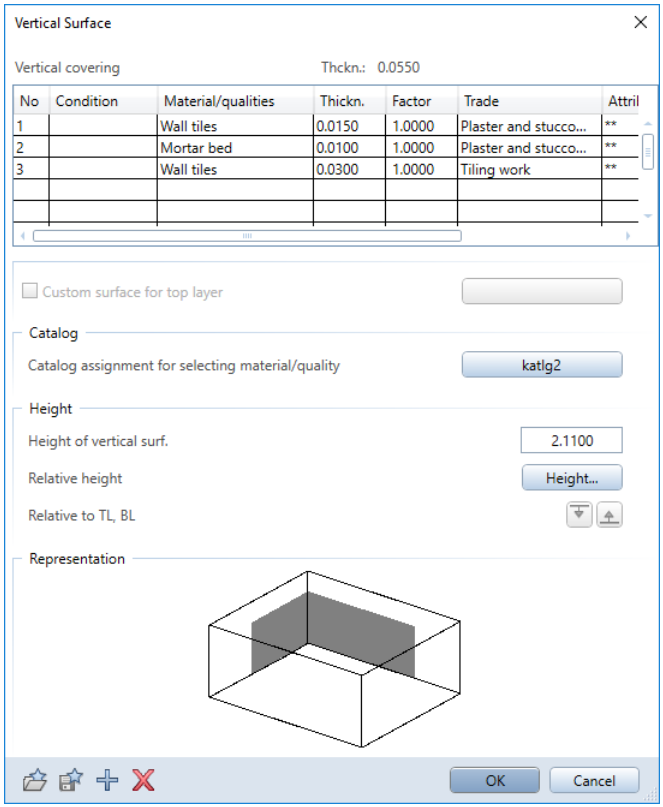
To create vertical surfaces

Tip: Select a different pen (for example, pen 8, green) for the plan view.

1 Click **Vertical Surface** (**Rooms, Surfaces, Stories** task area) and check the **Properties** palette to see whether the **RO_VERSU** layer is selected.

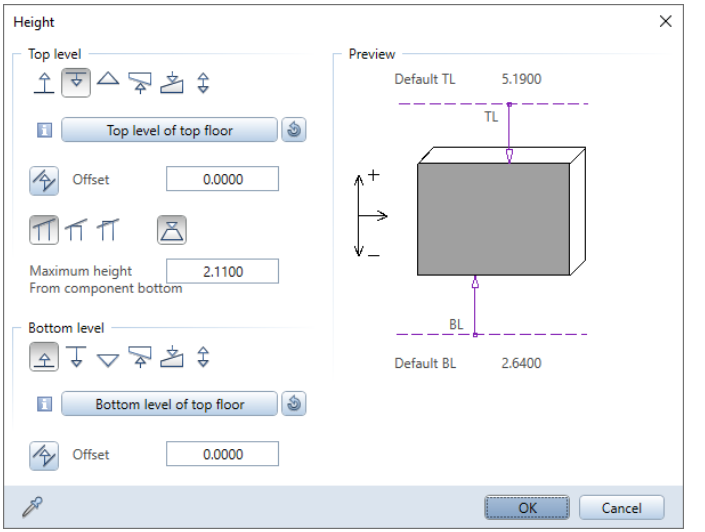
2 Click **Properties**.

3 Specify the **Material**, **Thickness** and **Trade** for each layer or coat of the surface.
The system will apply the surface to the area of the unfinished structure without taking the coat of plaster (defined earlier for calculating the area) into account. Therefore, enter the plaster as the first layer or coat in the surface properties. You can use this approach to redefine just specific parts of a surface from scratch.



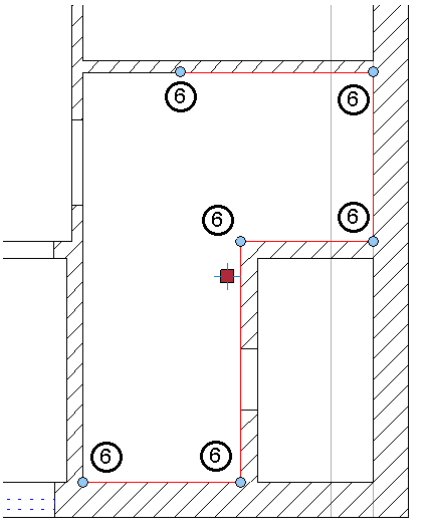
4 Click **Height** and make the following settings:

- **Top level:** **Relative to upper plane** but only up to 2 m from finished floor (= 2.11 m from unfinished floor). Therefore, click
- **Maximum component height** and enter **2.11**.



5 Click **OK** to confirm all the dialog boxes.

6 Click the points defining the outline of the surface in plan. To specify the first point, roughly click 2 m from the upper-right corner (where the bathtub ends). Select ESC to close the polyline.



7 Place the label and then select the ESC key to finish.
If you do not want to apply a label, simply select ESC.

Area calculations according to residential space ordinance

The regulations for calculating the floor area (residential space ordinance) came into effect on January 1st, 2004. As opposed to the old regulations, you must use clear dimensions in calculations. A flat-rate amount to account for plaster is no longer permitted.

By means of the finishing surfaces you defined for every room, you can quickly and easily calculate the floor area in accordance with these regulations.

Allplan 2020 offers various reports for area and floor area calculations. Each report provides the following options:

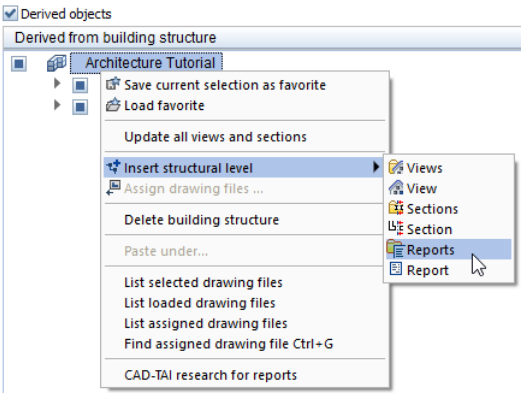
- For calculations according to the residential space ordinance, use the precise finished dimensions, which are calculated based on the finish specifications, vertical surfaces, floors and ceilings (based on finished dimensions).
- However, you can still use all the options for calculating the floor area based on the second calculation directive:
  A value subtracted to account for plaster and covering (based on unfinished dimensions less a percentage for plaster to be subtracted from the overall area)
- Area of structure (based on unfinished dimensions)

To calculate floor area

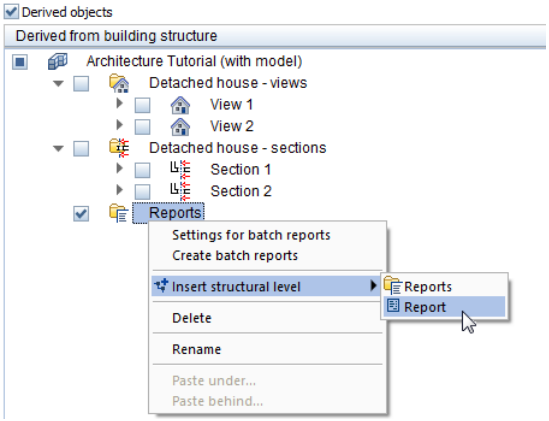
1 Click **Open on a Project-Specific Basis**.

Turn on the **Derived objects** area by selecting the **Derived objects** check box.

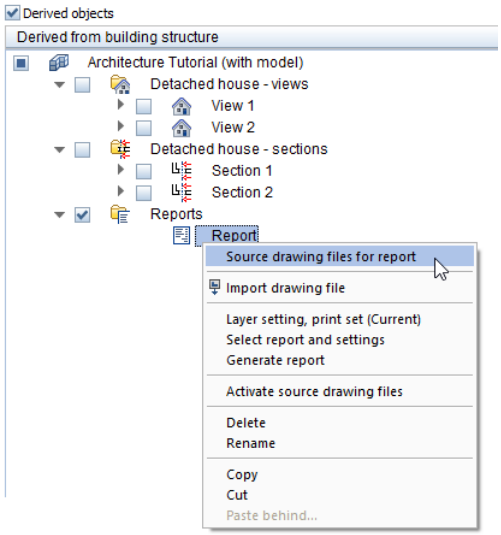
2 Check the **Derived from building structure** area on the right side of the dialog box to see whether this area already contains the **Reports** structural level.
If this is not so, open the shortcut menu of the **Architecture Tutorial** project and point to **Insert structural level – Reports**.



3 Open the shortcut menu of **Reports**, point to **Insert structural level** and click **Report**.

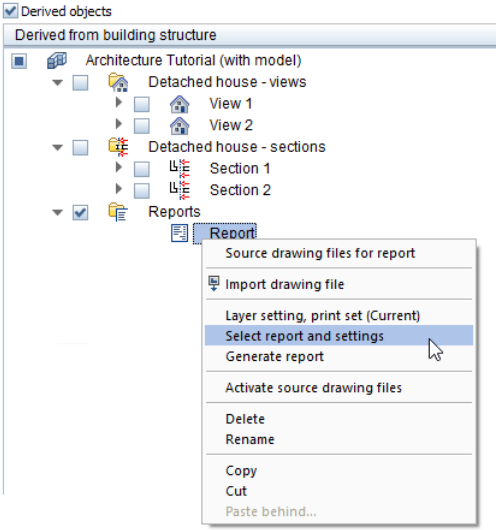


4 Open the shortcut menu of **Report** and select **Source drawing files for report**.

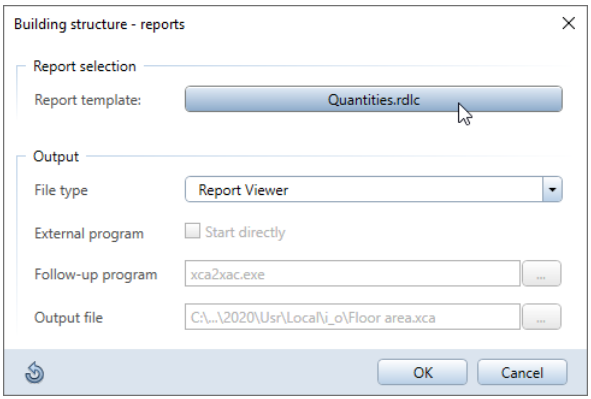


5 Select drawing file **110 Top floor model** in the **Select file** dialog box.

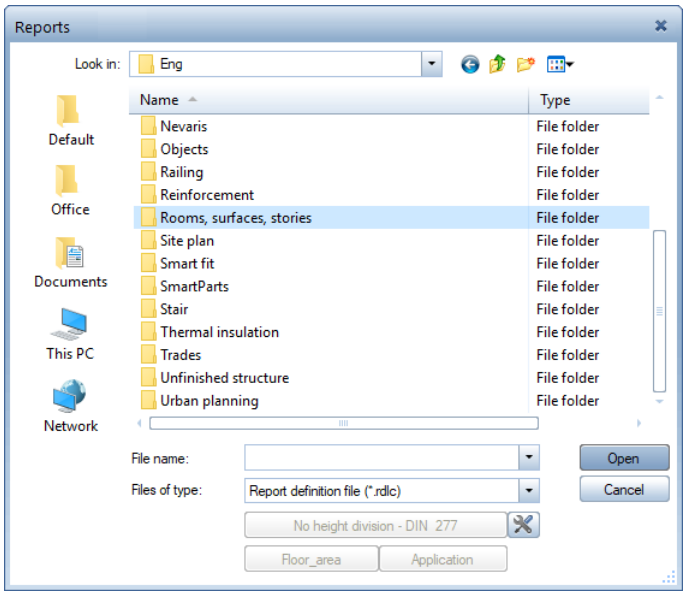
6 Open the shortcut menu of **Report** again and click **Select report and settings**.



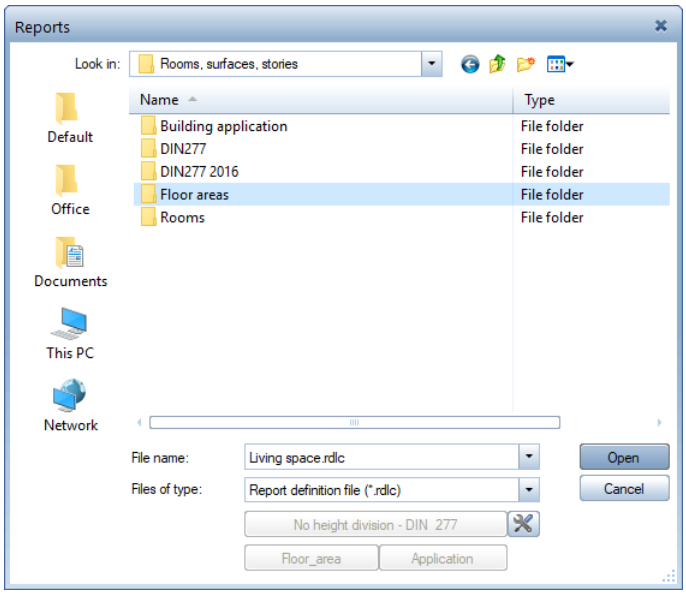
7 The **Building structure – reports** dialog box opens. Click the **Report template** button in the **Report selection** area.



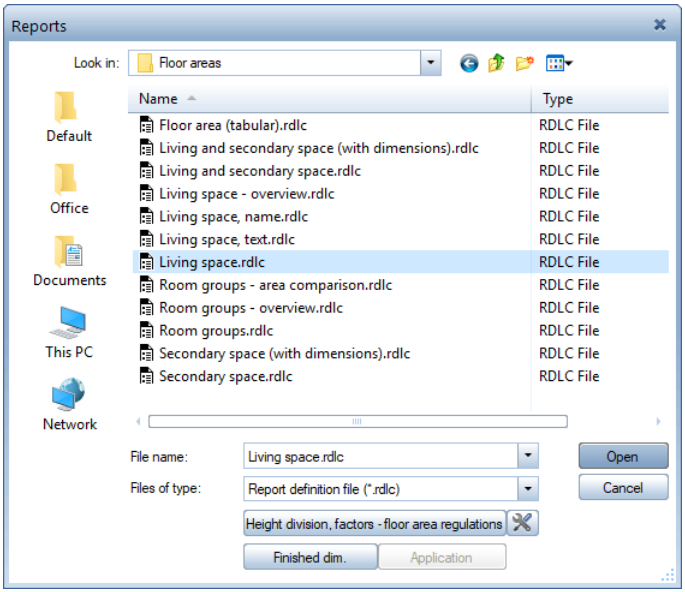
8 In the **Reports** dialog box, select the **Default** folder and then the **Rooms, surfaces, stories** folder.



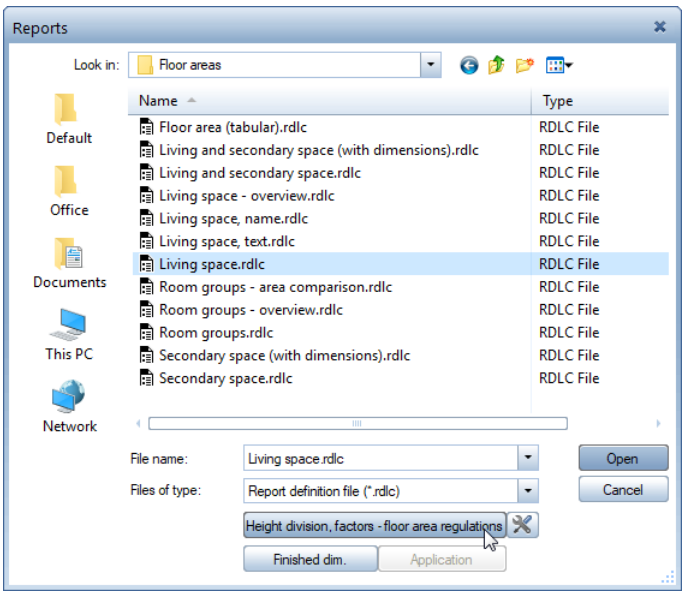
9 Select the **Living space** folder.



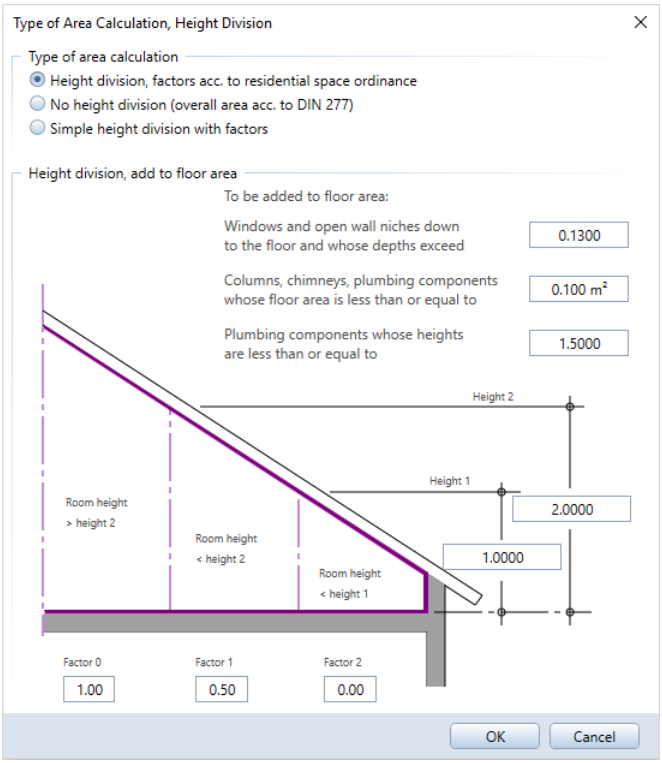
10 Select the **Living space.rdlc** file.



11 Click the following button to define how to calculate areas:

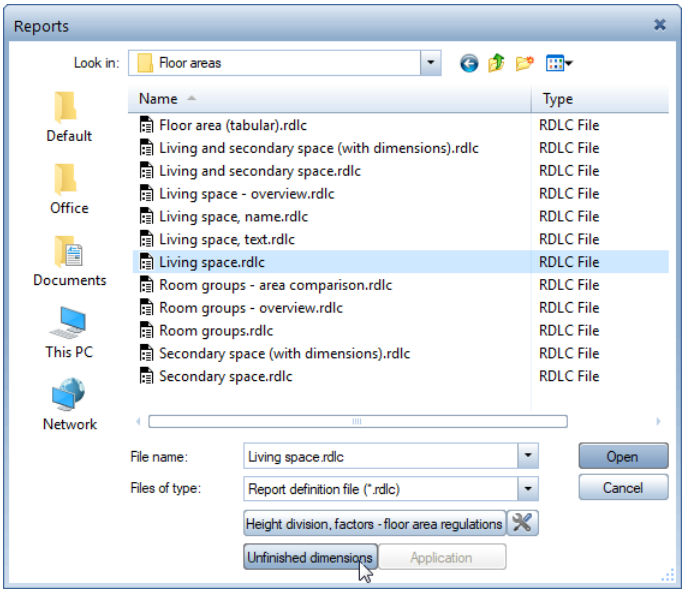


12 You can modify each factor.

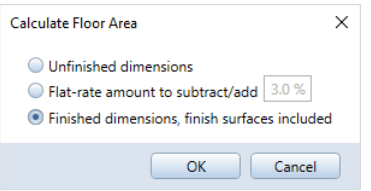


13 Click **OK** to close.

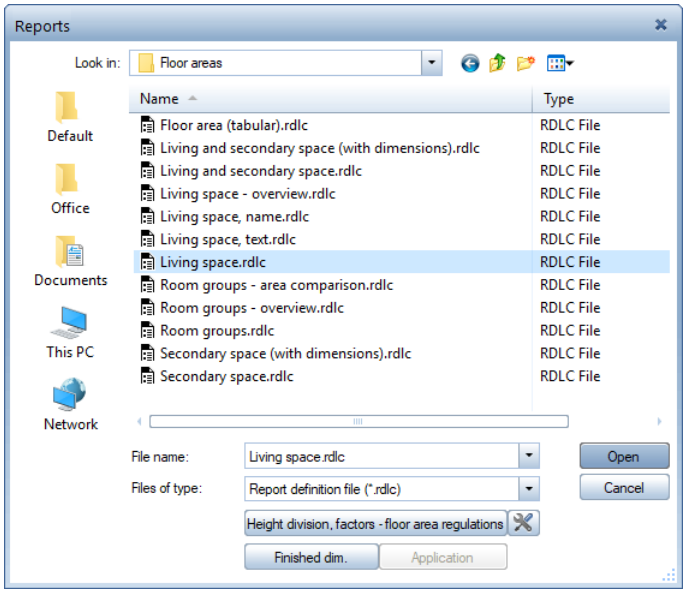
14 Click the following button in the **Reports** dialog box:



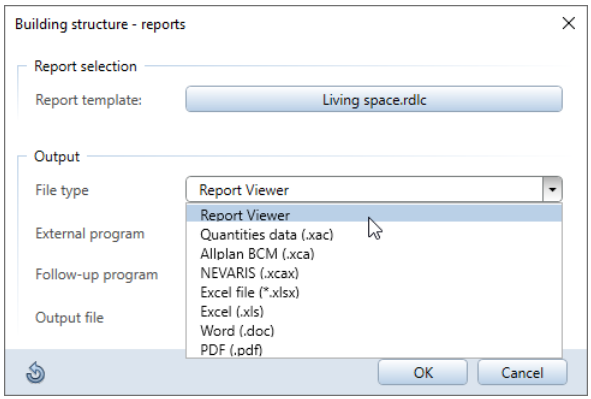
15 Go to the **Calculate Floor Area** dialog box, select the **Finished dimensions, finish specs included** option and click **OK** to close the dialog box.



16 Close the **Reports** dialog box by clicking **Open**.

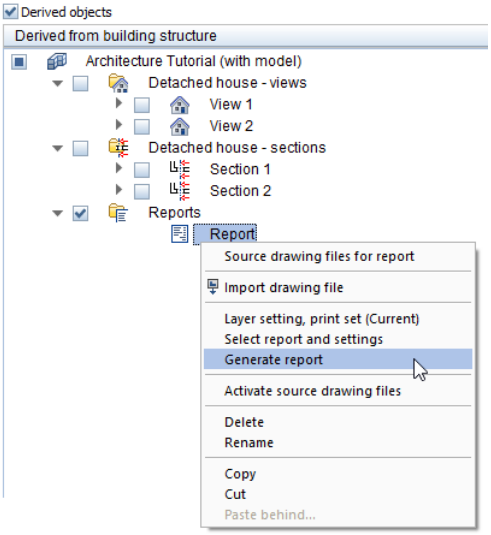


17 You are back in the **Building structure – reports** dialog box. Select the **Report Viewer** option in the **Output** area.

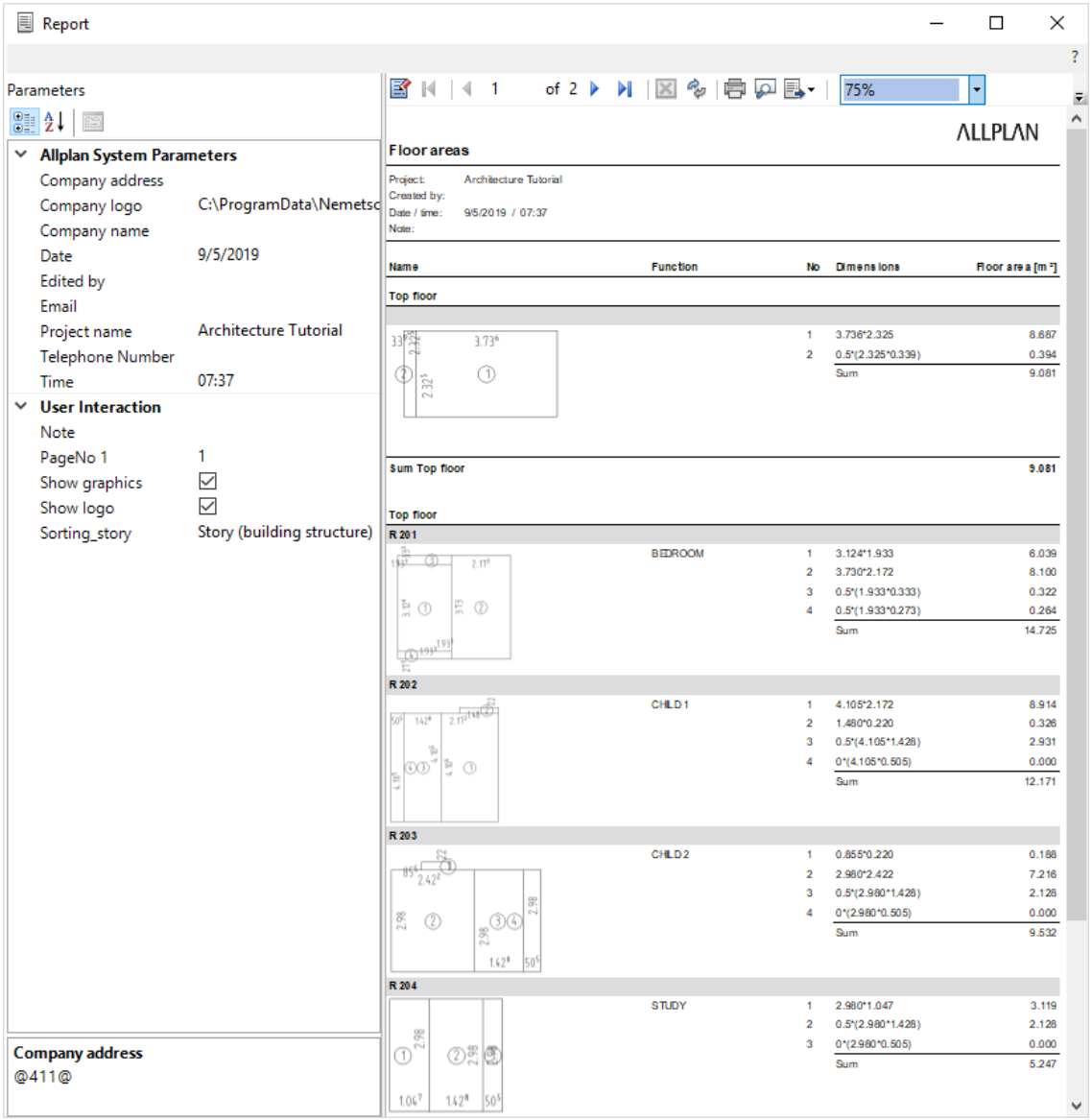


18 Click **OK** to close the **Building structure – reports** dialog box.

19 Open the shortcut menu of **Report** and select **Output report**.



A separate viewport opens, displaying the report. Use the arrows at the top to move through the pages.



The report can be printed, placed in the document, transferred to Excel or Word or saved as a PDF file.

You can use **Layout Designer** to change and save report templates. You can modify the layout and, to a certain degree, the contents of existing cells.

In the **Properties** palette, you can change the Allplan system parameters such as project name and edited by. By default, these parameters are taken from Allplan attributes. In the **User Interaction** area, you can show and hide the logo and control page numbering.
This palette only opens if the report has parameters you can change.

20 Close the **Report**.

21 The **Open on a project-specific basis: drawing files from fileset/building structure** dialog box is still open.
Enter a name for the report you just created, for example, **Floor area**.

Note: You can also use the **Area Calculation, Application** tool (**Rooms, Surfaces, Stories** task area) to create reports for floor area calculations.

Exercise 12: quantity takeoff

Reports

Allplan 2020 comes with a wide range of predefined standard reports, which are sorted by topic and arranged in folders. You can also create your own, custom reports and save them to the **Office** folder.

Tip: You can find advanced information on architectural reports in the Allplan Help. See the "**Available reports, overview**" section.

How to generate reports

- Open the drawing files with the elements you want to analyze. This will only work when the criteria you are looking for are actually met in the drawing files.
- **Reports**: Select a report. The entry you choose lays down the criteria according to which the system will scan the drawing files for elements.
- Optional: Use **Find Elements** to enter additional filter criteria.
- Define the area of the drawing files to be analyzed (entire drawing file or just parts of it).
- Print the report, display it in the drawing file or save it as an ASCII or Excel file.

The exercises that follow show how to use reports. In addition, you will learn how to enter search criteria.

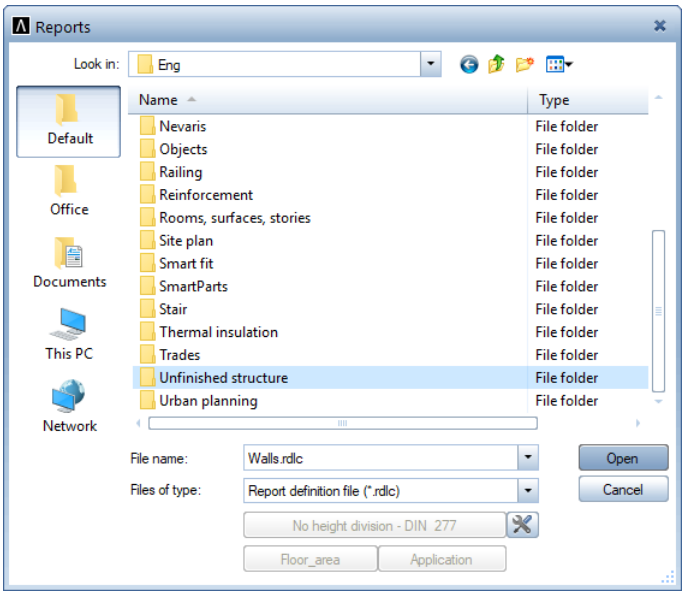
To generate a standard report

➲ Make drawing file **110 Top floor model** current and close all the others. Clear the **Derived objects** check box.

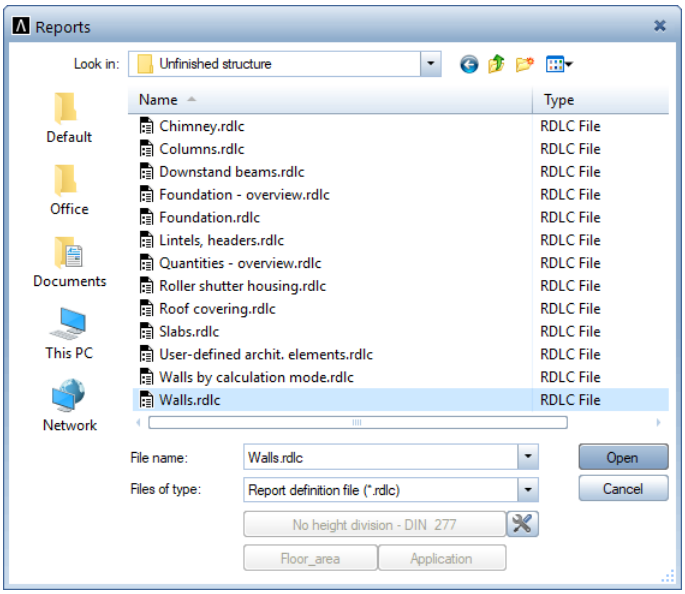
➲ Make the **AR_WALL** layer visible. Hide the other layers.

1 Click **Reports** (**Annotations** task area).

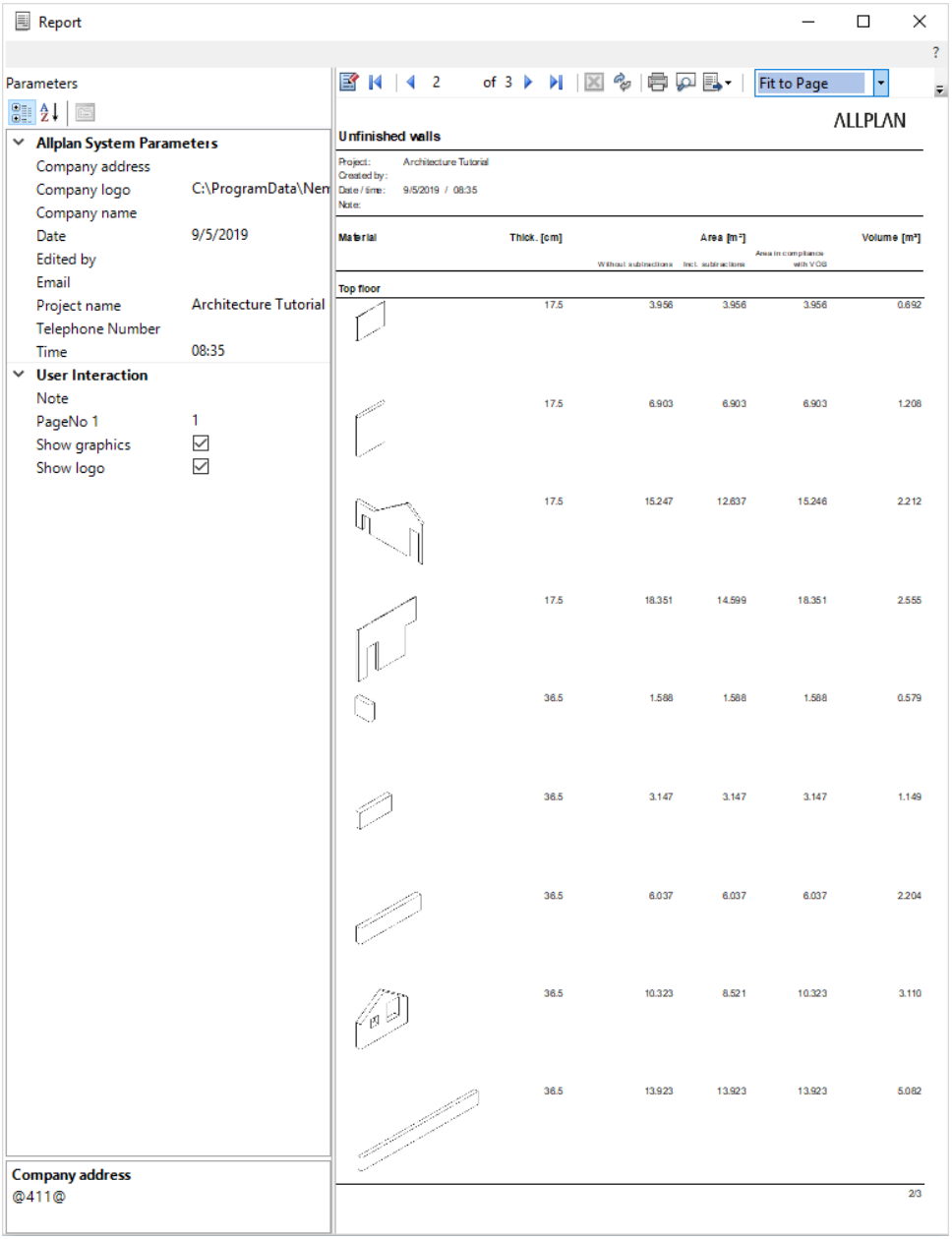
2 In the **Reports** dialog box, select the **Default** folder and then the **Unfinished structure** folder.



3 Select the **Walls.rdlc** file in the **Reports** dialog box and click **Open**.

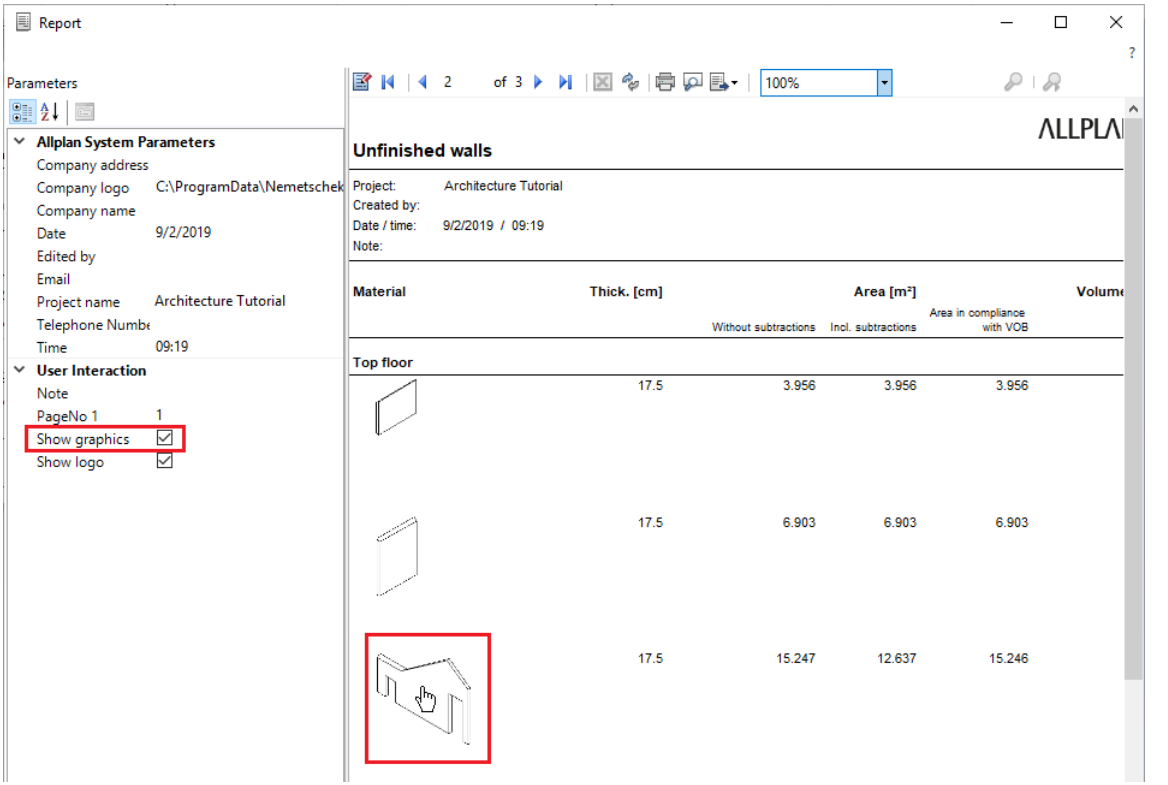


4 Click **All** in the input options or right-click in the workspace twice (do not double-click!!).

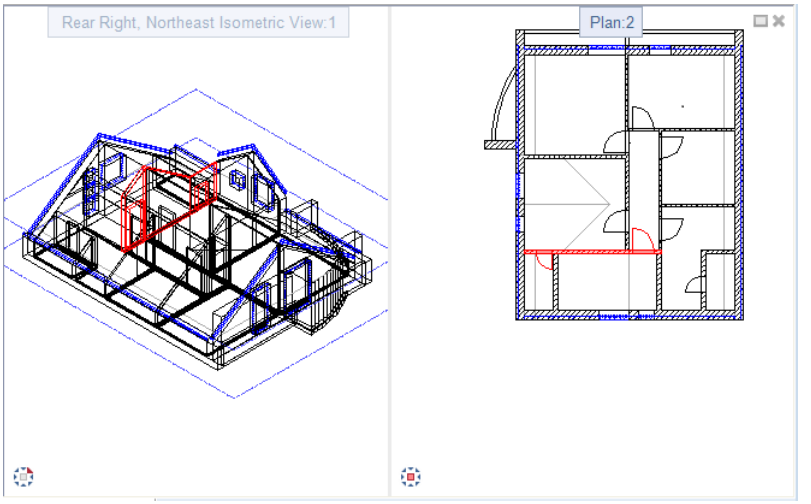


The report appears in the **Report** dialog box on the screen. The **report** options were covered in the section "Area calculation according to regulations". You can find detailed information on the **Report** dialog box in the Allplan Help. See the "Report Viewer" section.

Note: You created this report by using the **Reports** tool in the **Annotations** task area of the **Actionbar**. As you can see, the **Show graphics** option is selected in the **User Interaction** area. When you point to the graphic of a wall, the cursor changes to a



Click the graphic.
Allplan highlights the wall in plan view and isometric view, centering the wall and zooming in on it in plan view.



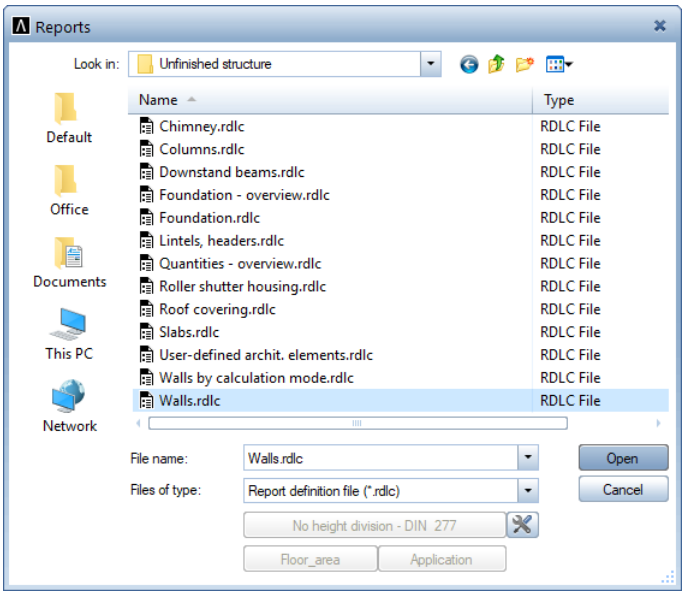
5 Click to close the **Report**.

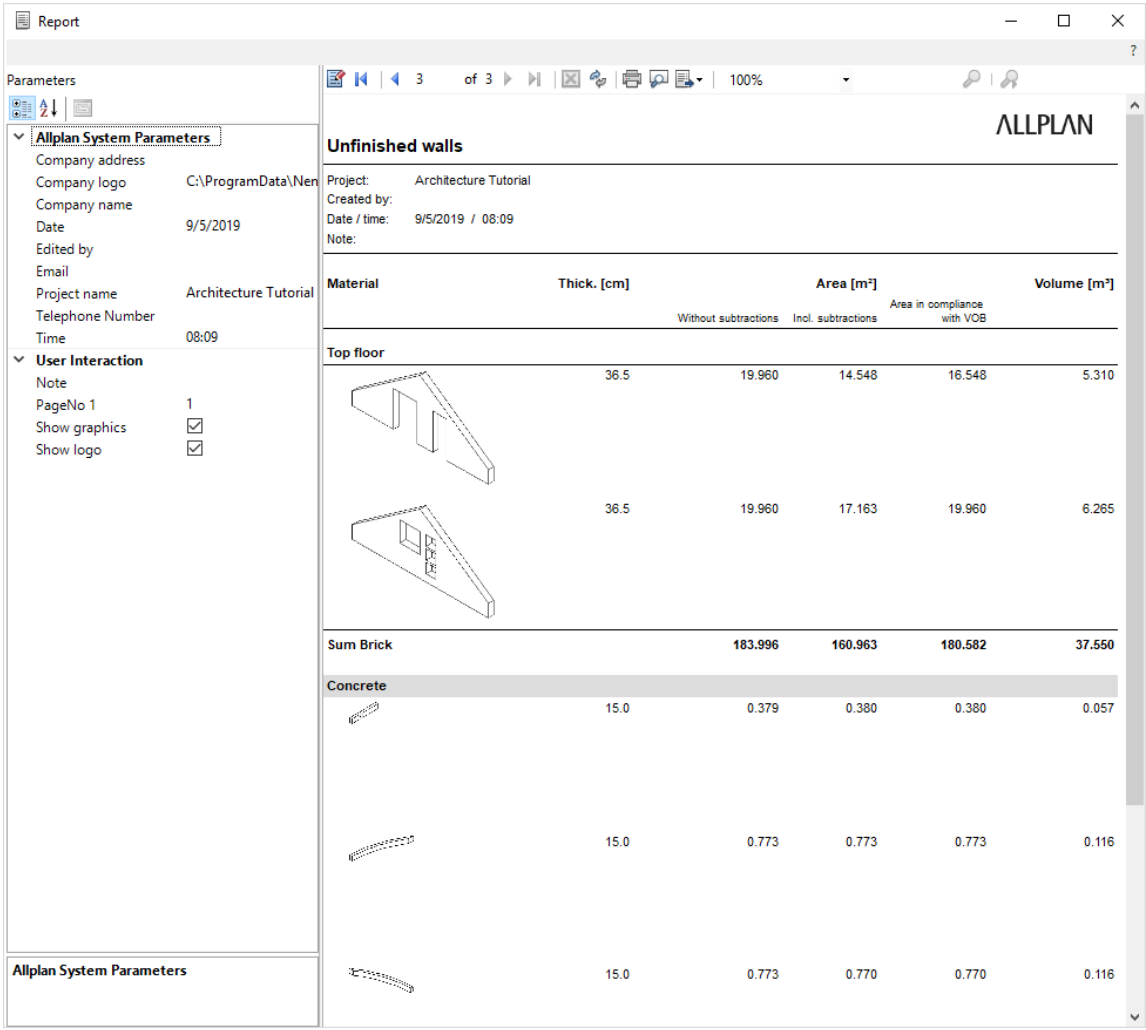
Examples of reports

Here are some examples of reports to illustrate possible applications. These reports were created for the top floor of the tutorial building. Additional search criteria were not specified.

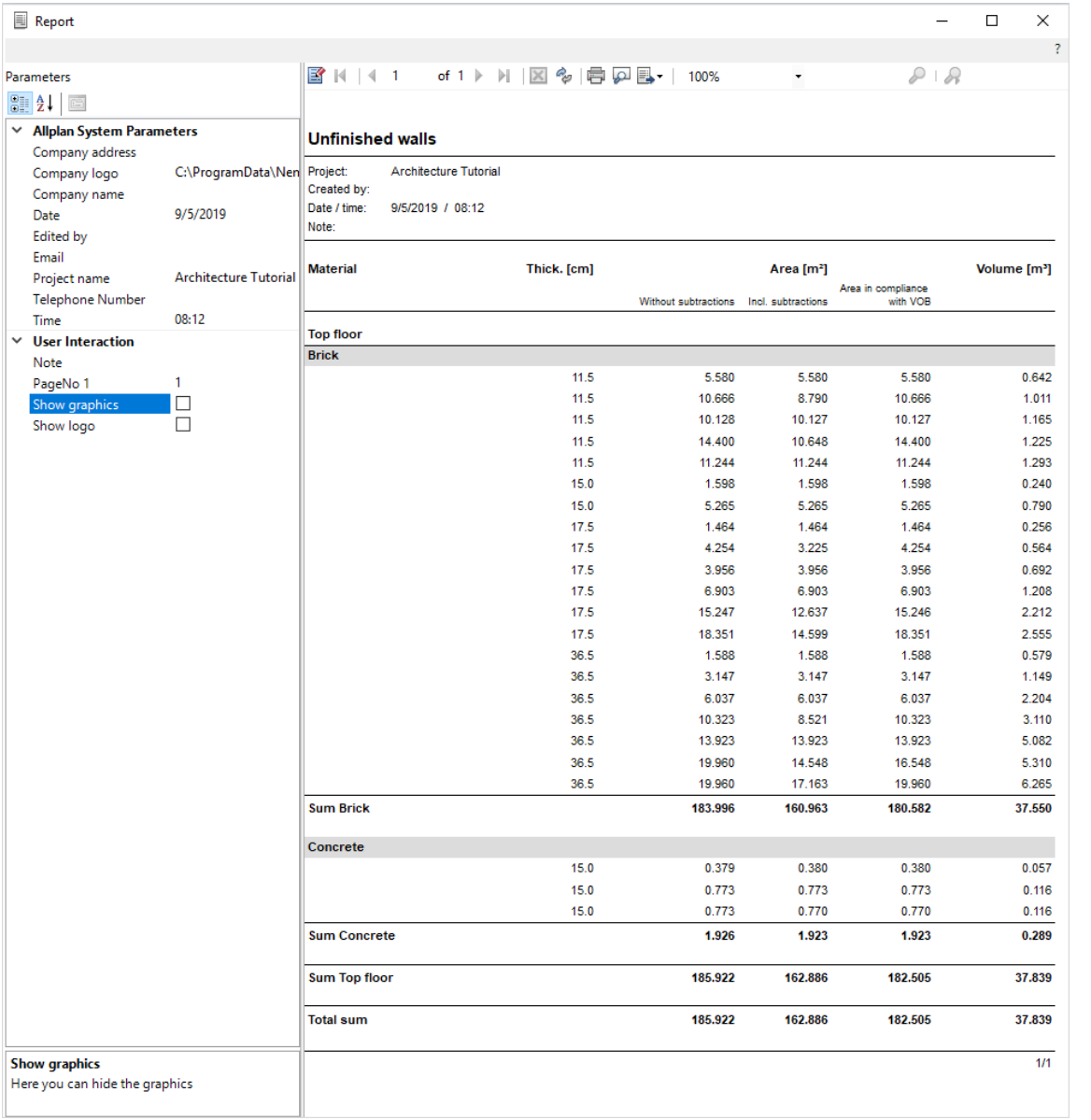
Tip: For quantity takeoff, you can transfer the quantities to a program for tendering, awarding and invoicing.
When assigning materials, you can use material catalogs with item numbers.

The unfinished structure reports also analyze area and volume to be subtracted in compliance with building regulations. In the **User Interaction** area, you can define how the report looks. For example, you can show and hide the logo or the graphics of the components.




Report
Parameters
Allplan System Parameters
Company address
Company logo
C:\ProgramData\Nen
Company name
Date
9/5/2019
Edited by
Email
Project name
Architecture Tutorial
Telephone Number
Time
08:09
User Interaction
Note
PageNo 1
1
Show graphics
Show logo
Allplan System Parameters
3 of 3
100%
ALLPLAN
Unfinished walls
Project: Architecture Tutorial
Created by:
Date / time: 9/5/2019 / 08:09
Note:
Material
Thick. [cm]
Area [m²]
Without subtractions
Incl. subtractions
Area in compliance with VOB
Volume [m³]
Top floor
36.5 19.960 14.548 16.548 5.310
36.5 19.960 17.163 19.960 6.265
Sum Brick 183.996 160.963 180.582 37.550
Concrete
15.0 0.379 0.380 0.380 0.057
15.0 0.773 0.773 0.773 0.116
15.0 0.773 0.770 0.770 0.116

Here is the same report without the logo and the graphics:



Unfinished walls

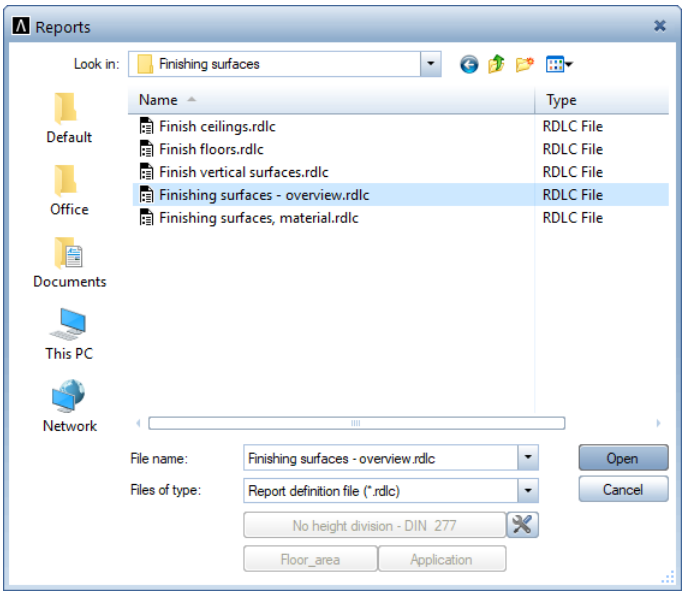
Project: Architecture Tutorial
Created by:
Date / time: 9/5/2019 / 08:12
Note:

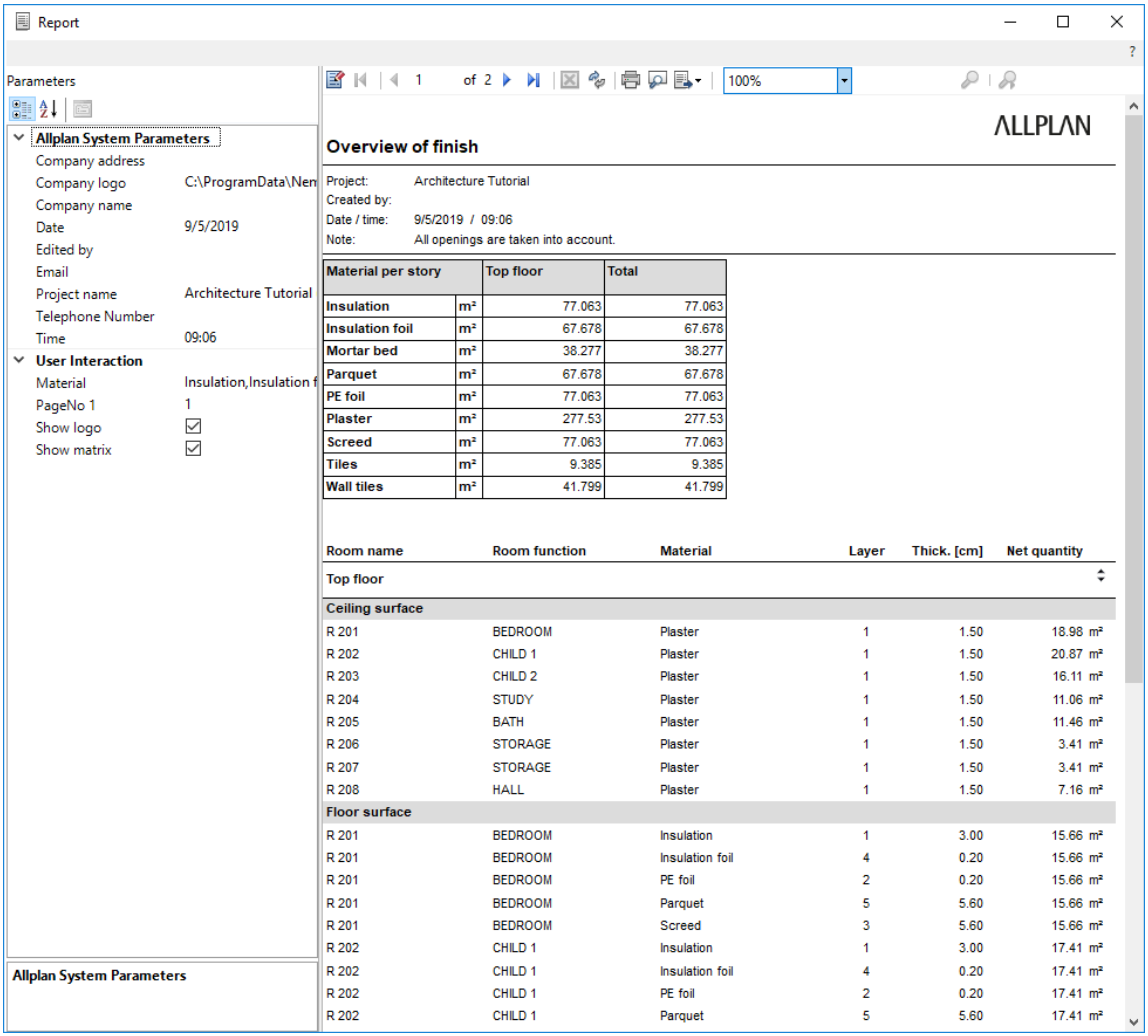
Material	Thick. [cm]	Area [m²]			Volume [m³]
		Without subtractions	Incl. subtractions	Area in compliance with VOB	
Top floor					
Brick					
	11.5	5.580	5.580	5.580	0.642
	11.5	10.666	8.790	10.666	1.011
	11.5	10.128	10.127	10.127	1.165
	11.5	14.400	10.648	14.400	1.225
	11.5	11.244	11.244	11.244	1.293
	15.0	1.598	1.598	1.598	0.240
	15.0	5.265	5.265	5.265	0.790
	17.5	1.464	1.464	1.464	0.256
	17.5	4.254	3.225	4.254	0.564
	17.5	3.956	3.956	3.956	0.692
	17.5	6.903	6.903	6.903	1.208
	17.5	15.247	12.637	15.246	2.212
	17.5	18.351	14.599	18.351	2.555
	36.5	1.588	1.588	1.588	0.579
	36.5	3.147	3.147	3.147	1.149
	36.5	6.037	6.037	6.037	2.204
	36.5	10.323	8.521	10.323	3.110
	36.5	13.923	13.923	13.923	5.082
	36.5	19.960	14.548	16.548	5.310
	36.5	19.960	17.163	19.960	6.265
Sum Brick		**183.996**	**160.963**	**180.582**	**37.550**
Concrete					
	15.0	0.379	0.380	0.380	0.057
	15.0	0.773	0.773	0.773	0.116
	15.0	0.773	0.770	0.770	0.116
Sum Concrete		**1.926**	**1.923**	**1.923**	**0.289**
Sum Top floor		**185.922**	**162.886**	**182.505**	**37.839**
Total sum		**185.922**	**162.886**	**182.505**	**37.839**

1/1

You can use the finish reports to analyze finish specifications in different ways. Try it out for yourself and generate a report for the finish in the bathroom. In this case, you do not need to open and select everything – just select the bathroom (enclose it in a selection rectangle or click the room). The following illustration shows the **Finishing surfaces, overview.rdlc** report (**Default** folder – **Finish** folder – **Finishing surfaces** subfolder). The layer you assigned to the rooms must be visible and modifiable.

Tip: Area calculations consider reveals. The only requirement is that you defined the reveal when you entered the window openings.





By using the same approach, you can generate reports based on the building trade assigned to the various elements in your model. Here, too, this will only work if the elements have a trade.

Entering search criteria

With search criteria, you can analyze the building in many different ways. To analyze the entire building, you must select all the relevant drawing files.

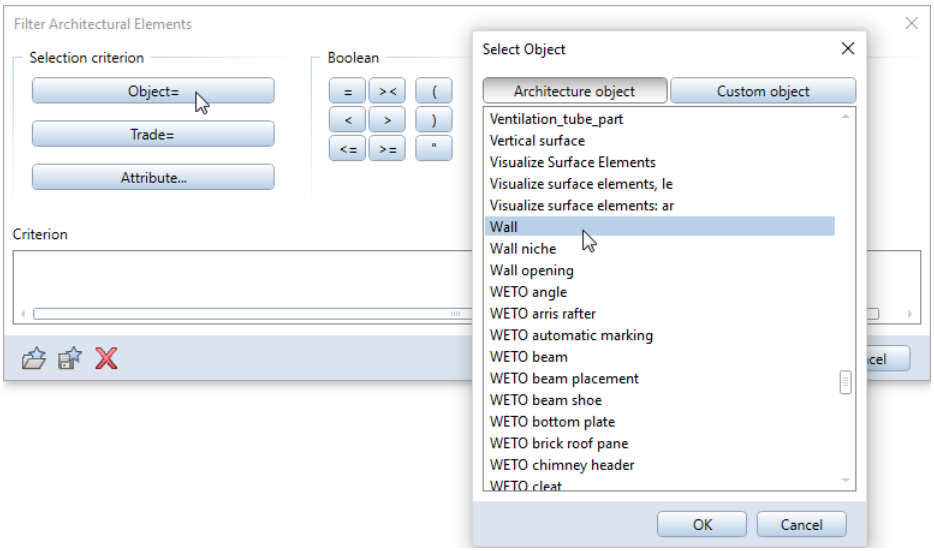
You will use the **Unfinished structure - Walls** report to define a search criterion that lists only walls that are 11.5 cm thick.

To enter search criteria

1 Click **Reports** (**Rooms, Surfaces, Stories** task area), select the **Walls.rdlc** report (**Default** folder - **Unfinished structure** folder) and click **Open** to confirm.

2 Click **Find Elements** in the input options.

3 Click **Object**. A dialog box opens. Select the object you want to find: **Wall**. Click **OK** to confirm.

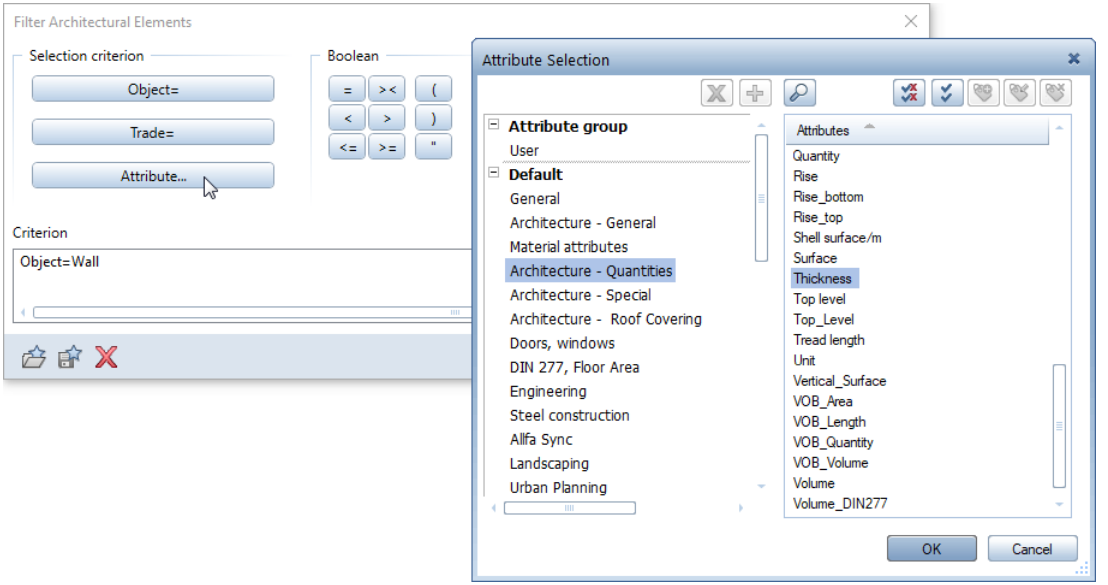


You can use Boolean operators to link your search criteria.

4 Click **& "and"** (logical AND).

The second criterion is an attribute of the **wall** object - its **thickness**.

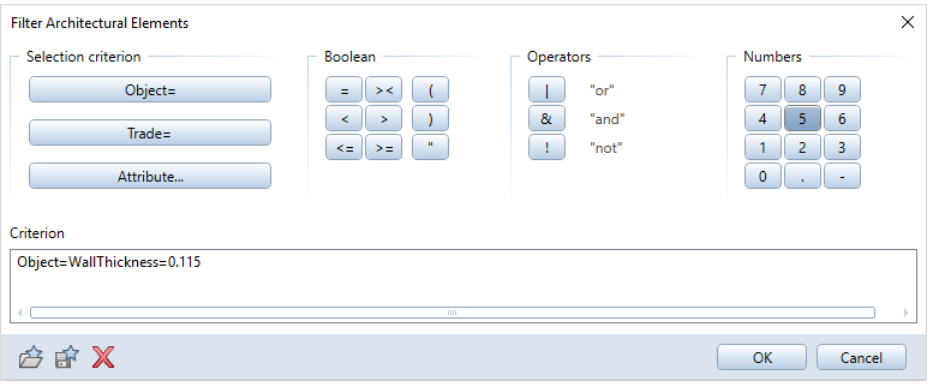
5 Click **Attribute...**, go to the **Architecture – Quantities** area and select the **Thickness** attribute. Click **OK** to confirm.



6 Select the comparison criterion **=**.

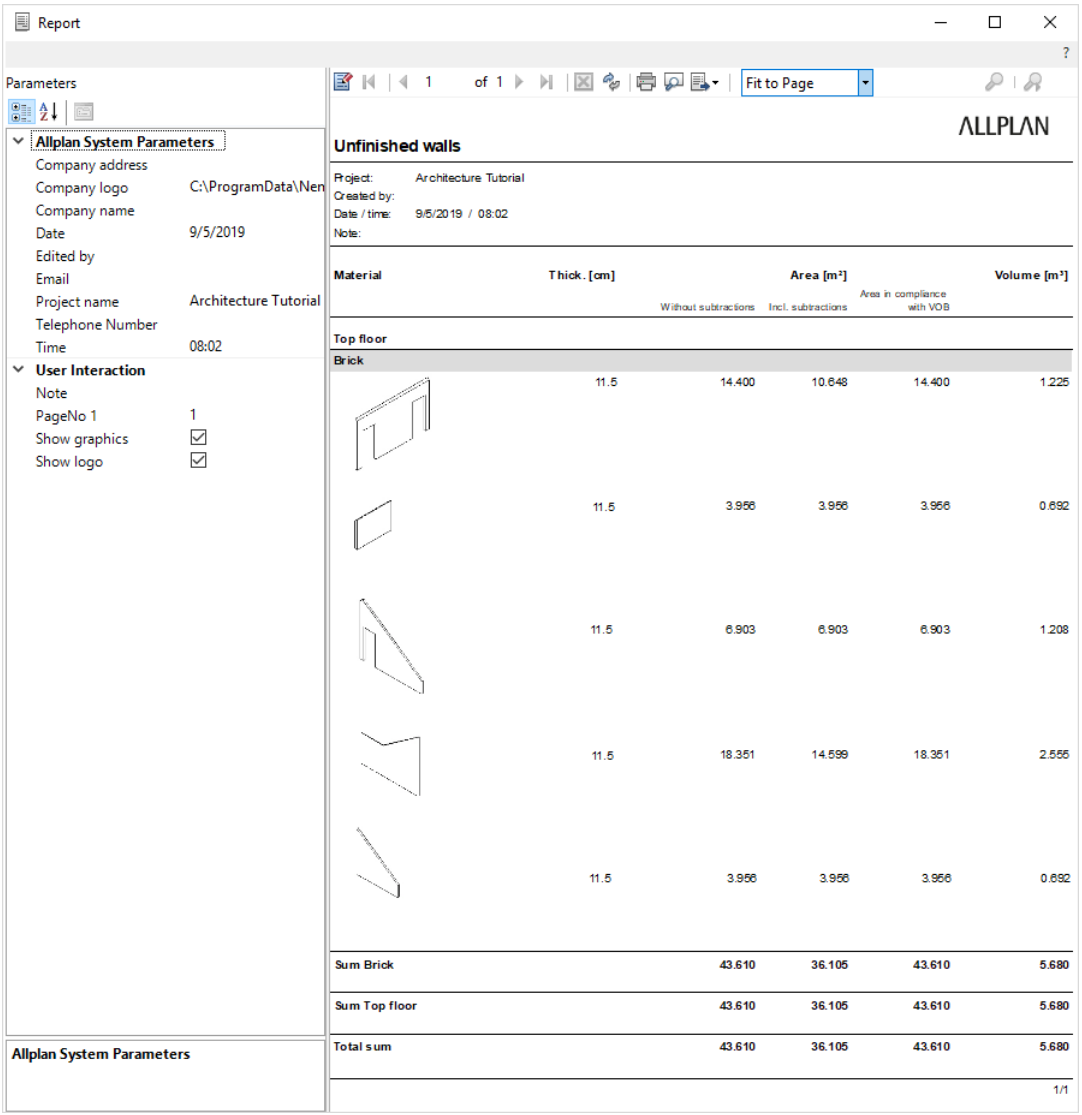
Tip: You can use to undo the entries in the **Criterion** line one by one.

7 Go to the **Numbers** area and enter the thickness: **0.115**. Just click the numbers you need.
The search criterion now looks like this:



8 Click **OK** to confirm.

9 Click **All** in the input options or right-click in the workspace twice (do not double-click!!). The report now lists only those walls that match the criterion.



10 Click to close the **Report**.

Building lists

You can use building lists to analyze data in reports. To create building lists, you can use the **Building Lists...** tool (drop-down list of the Allplan icon) or the **Derived from building structure** area in the **Building structure**.

Regardless of the option you choose, the steps for creating the report are very similar. You select the drawing files in a tree structure and assemble the data for the building list. Next, define the components of the building list you want to analyze and start the operation.

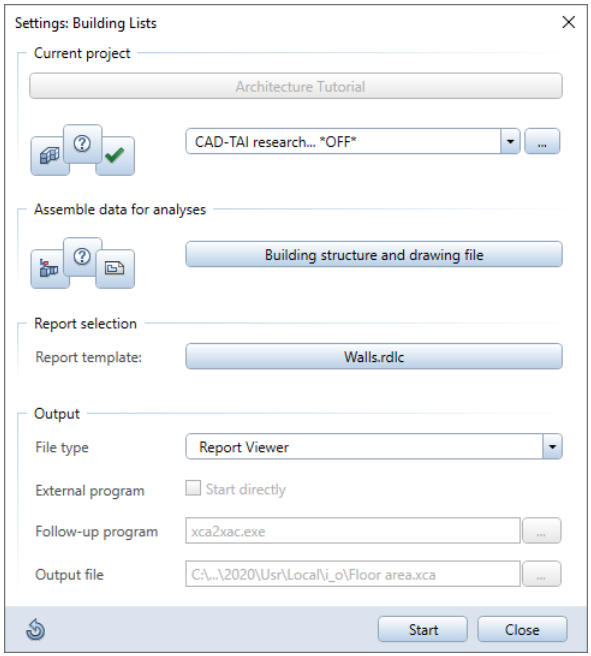
Building lists always select the entire contents of drawing files. However, only the visible layers are analyzed by building lists. It is therefore necessary to select the layers to be analyzed beforehand. You cannot define search criteria here.

The sections that follow describe the two options.

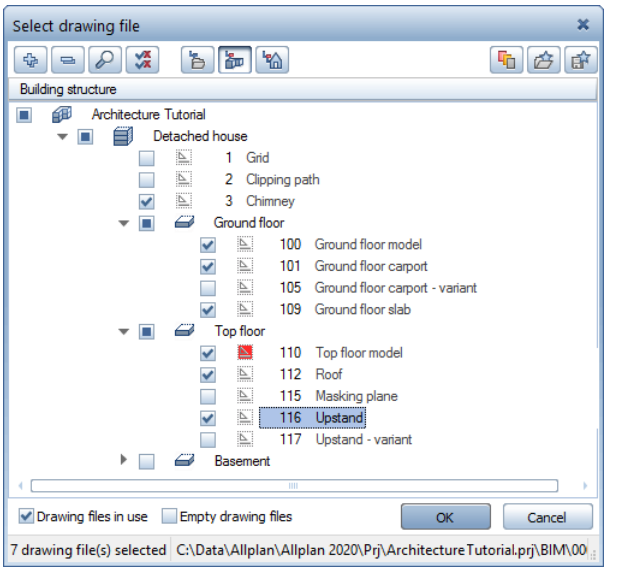
How to use the Building Lists tool

You can create building lists by means of the Building Lists tool.

1 Click **Building Lists...** in the drop-down list box of the Allplan icon.



2 Go to the **Assemble data for analyses** area and click the **Building structure and drawing file** button.



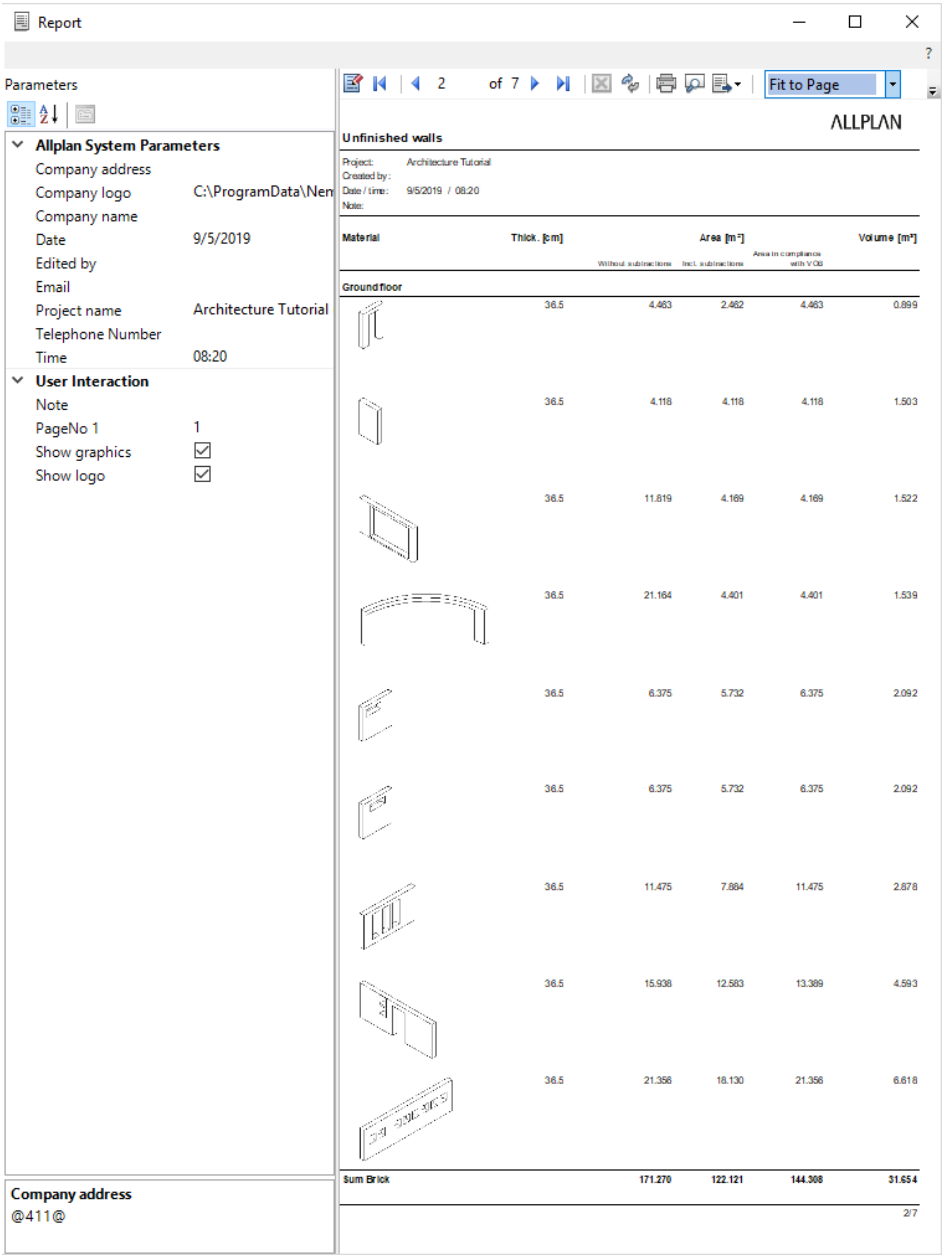
3 Select the following drawing files: **3 Chimney; 100 Ground floor model; 101 Ground floor carport; 109 Ground floor slab; 110 Top floor model; 112 Roof; 116 Upstand**

4 Click **OK** to confirm.

5 To select the **Report template**, click the button in the **Report selection** area.

6 Select the **Default** folder, the **Unfinished structure** folder and the **Walls.rdlc** file. Then click **OK** to confirm.

7 Go to the **Output** area, select the **Report Viewer** file type and click **Start**.



8 Click to close the **Report**.

Building lists derived from the building structure

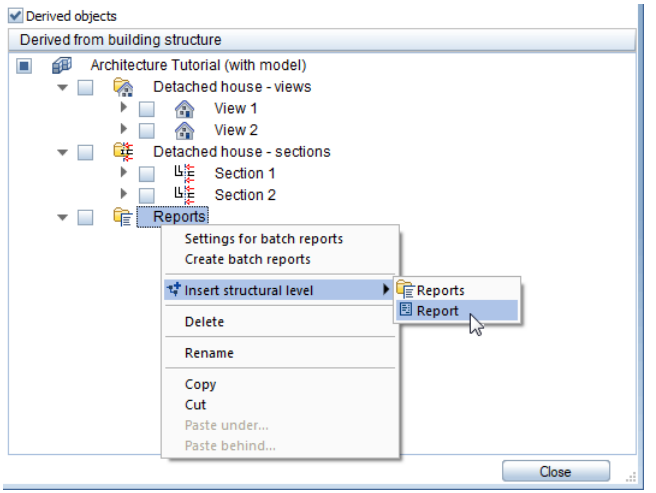
To create a building list which is derived from the building structure

1 Click **Open on a Project-Specific Basis**.

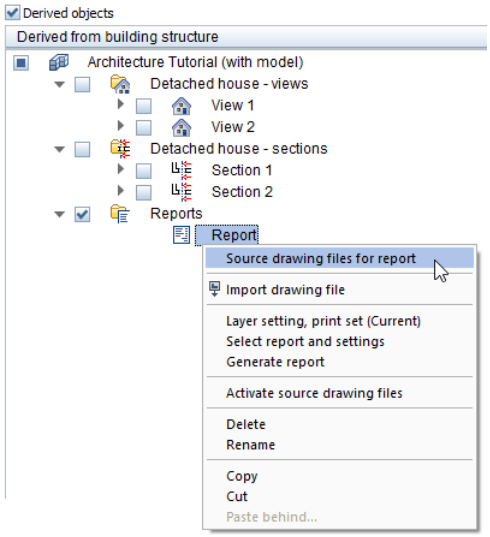
2 Turn on the **Derived objects** area by selecting the **Derived objects** check box.

3 Go to the **Derived from building structure** area on the right side and open the shortcut menu of **Reports**.

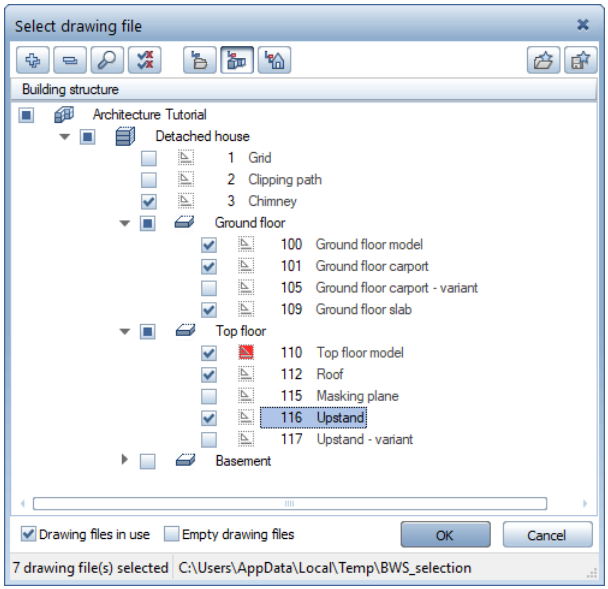
4 Point to **Insert structural level** and select **Report**.



5 Open the shortcut menu of **Report** and select **Source drawing files for report**.

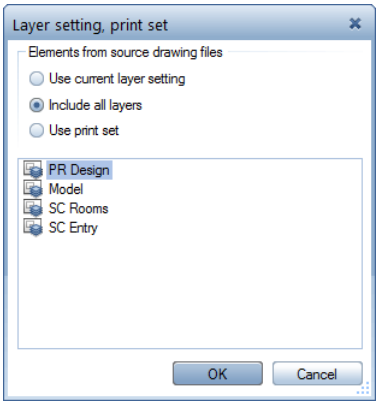


6 Select the following drawing files: **3 Chimney; 100 Ground floor model; 101 Ground floor carport; 109 Ground floor slab; 110 Top floor model; 112 Roof; 116 Upstand**

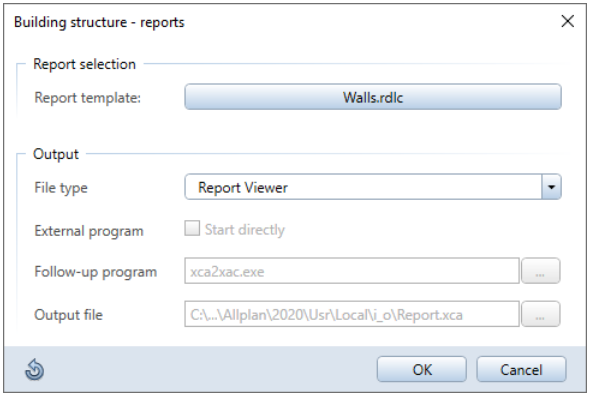


7 Click **OK** to confirm.

8 Open the shortcut menu of **Report** again and select **Layer setting, print set**.
Select the **Include all layers** option.



9 Open the shortcut menu of **Report** again and click **Select report and settings**.



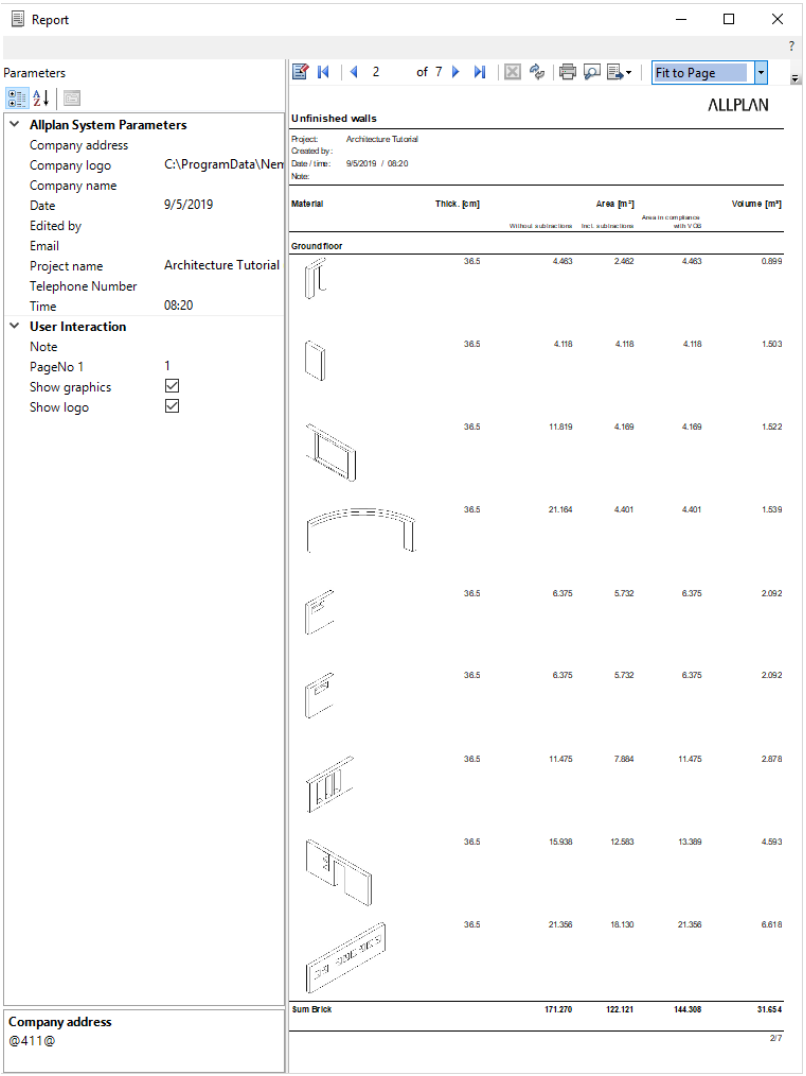
10 Go to the **Report selection** area and click the button to the right of **Report template**.

11 Select the **Default** folder, the **Unfinished structure** folder and the **Walls.rdlc** file. Then click **OK** to confirm.

12 Go to the **Output** area and switch the file type to **Report Viewer**.

13 Click **OK** to confirm the dialog box.

14 Open the shortcut menu of **Report** again and select **Output report**.



15 Click to close the **Report**.

16 The **Open on a project-specific basis: drawing files from fileset/building structure** dialog box is still open.
Enter a name for the report you just created, for example, **Walls**.

Unit 8: Layouts

Before you start, you must configure the printer.

With Allplan 2020, you can print the contents of the screen directly to a printer.

To bring the final drawing to paper, you will arrange all the drawing files in a layout.

Requirement for printing

Before you print, you need to configure the output device correctly. If you work on a network, you can use any device connected to a remote machine (assuming it is configured correctly).

To do this, you must connect the output device.

For further information, consult the user guides of your printer and operating system.

Printing the screen contents

Often, you want to have the current edit status on paper without having to assemble a layout first.
You can do this by printing the screen contents.

To print the screen contents

➲ Drawing file **110 Top floor model** is current.
Make the layers **AR_WALL** and **DL_100** visible and hide all the other layers.

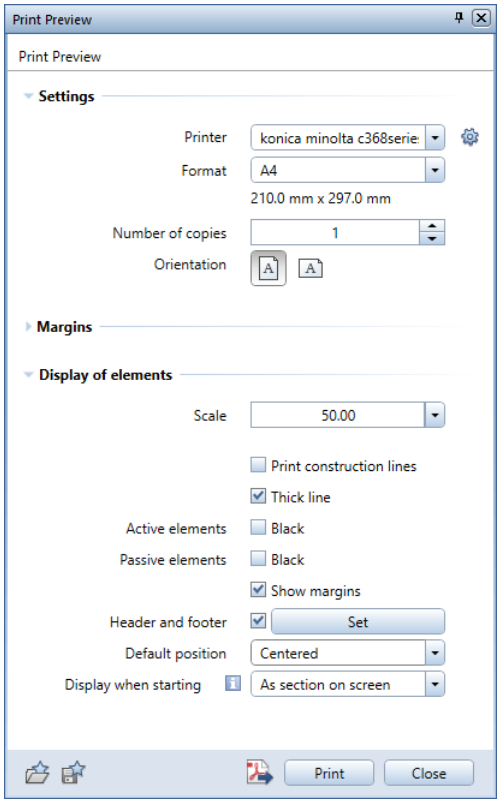
1 Click **Print Preview** (Quick Access Toolbar).

2 Make the following settings in the **Print Preview** palette:

- Select the printer in the **Settings** area.
- Go to the **Display of elements** area and select the **Thick line** option.
  This not only makes the different line thicknesses visible on the screen but also ensures that they are printed as such.

Tip: To create more printouts, click **Quick Print** in the drop-down list of the Allplan icon.

Without prompting you again, Allplan prints the screen contents with the most recent settings.



3 Click **Zoom All** on the viewport toolbar.

4 Click **Print**.

5 Select ESC to close print preview.

Exercise 13: custom title block

Allplan 2020 provides a wide range of "intelligent" title blocks based on label styles. Label styles contain design entities, texts and attributes.

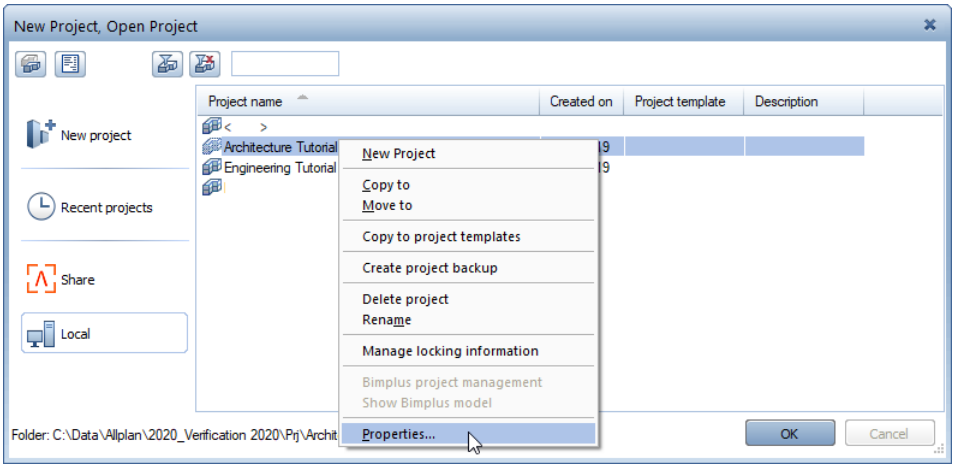
The advantage of a title block with attributes is that the program updates the text whenever you open the layout.
You can define your own, custom label styles.

Note: You draw a title block in exercise 5 of the Basics Tutorial and save this title block as a symbol with the name **Original** in the **Title blocks** folder. You can find this folder in the library (**Office – Symbols**). You will use this title block for the exercise that follows. If this symbol is not available to you, you can find the title block in drawing file 7 in the project template for the training project. Look in the appendix (Project templates on the internet (on page 493)) for information on how to download the project template from the internet.

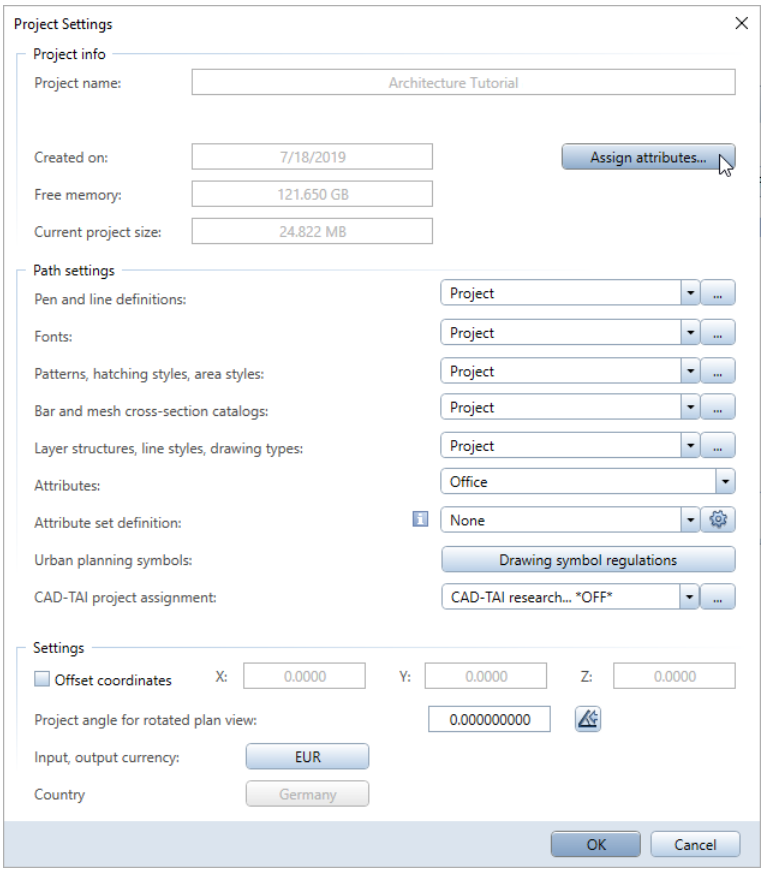
To assign attributes

1 Click **New Project, Open Project...** on the **Quick Access Toolbar**.

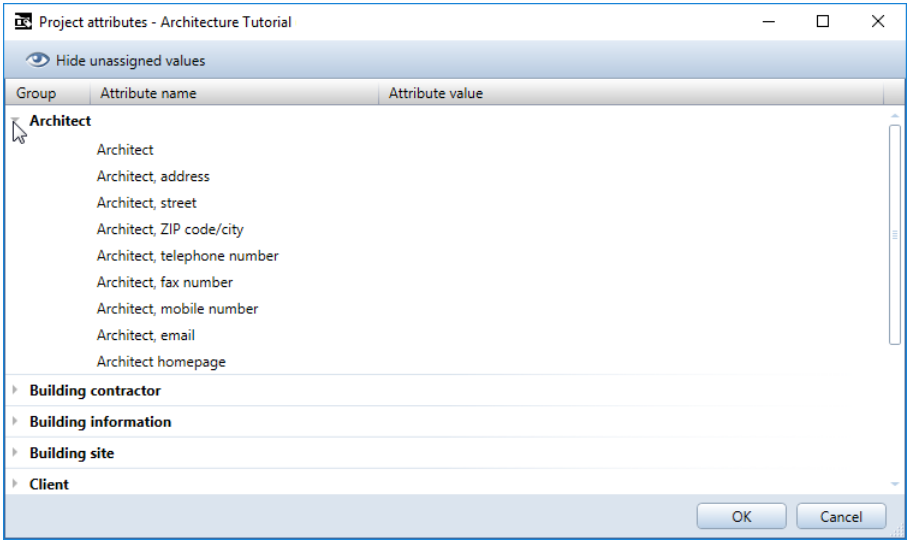
2 Open the shortcut menu of the **Architecture Tutorial** project and click **Properties...**.



3 The **Project Settings** dialog box opens. Click the **Assign attributes...** button.



4 The **Project Attributes** dialog box opens. Expand the **Architect** node.



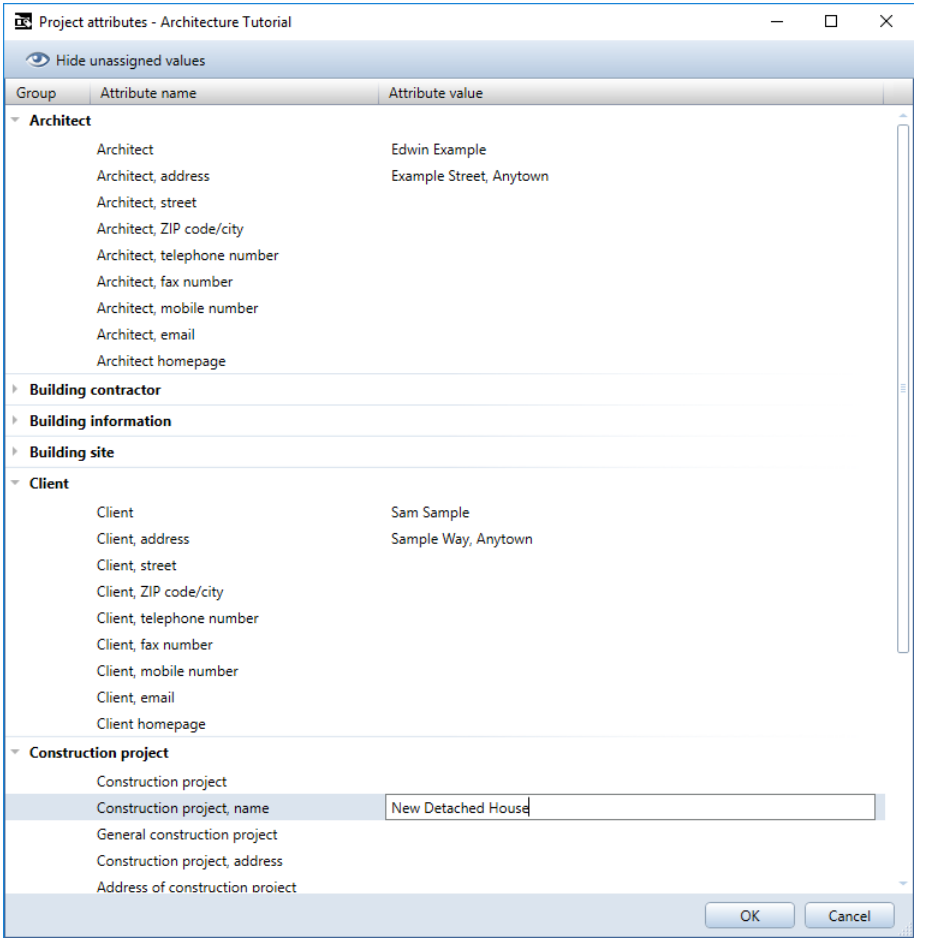
5 Click the **Architect** attribute.

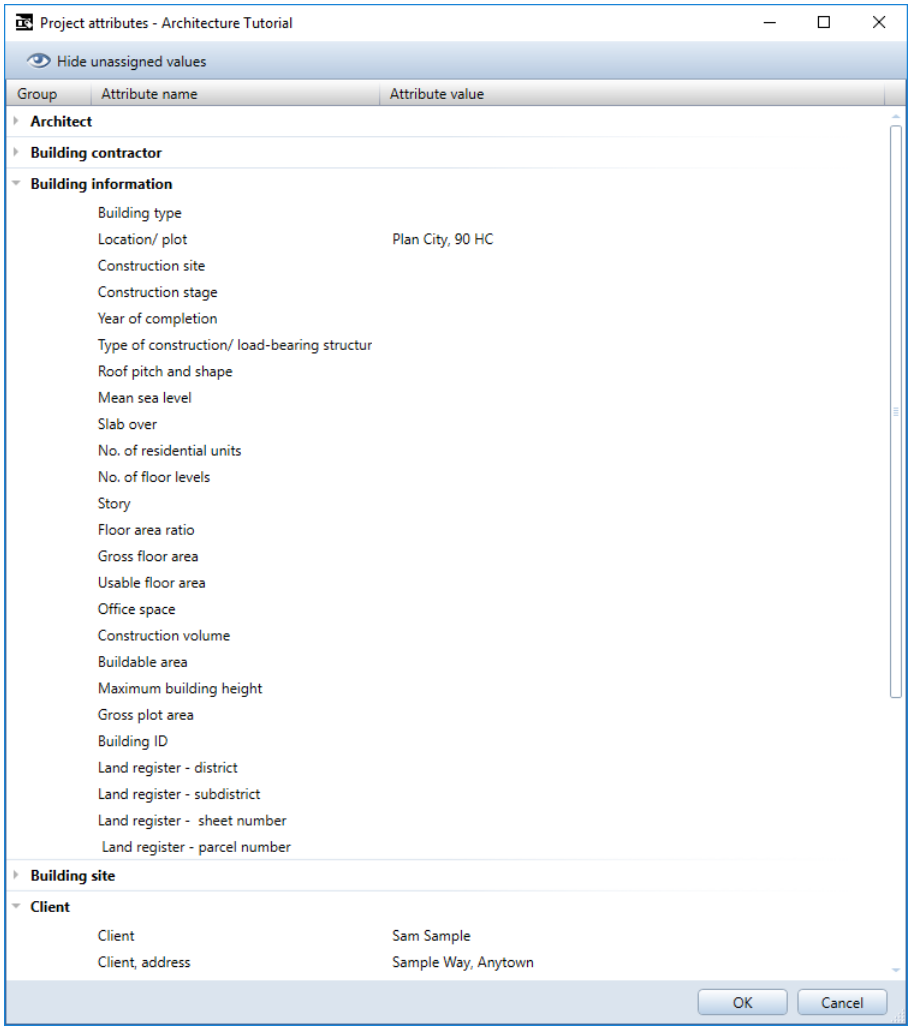
6 Type in the following:

Sam Sample

7 Select the ENTER key to confirm.

8 Define the **Client**, **Client address**, **Construction project name**, **Location/plot** and **Structural analysis** attributes as shown:





9 Click **OK** to confirm the **Project Attributes**, **Project Settings** and **New Project, Open Project** dialog boxes.

Creating the title block as a label style

The attributes you just assigned will now be used in the label style for the title block.

This exercise assumes that you can access the title block you create in exercise 5 of the Basics Tutorial. You have already drawn this title block and saved it as a symbol with the name **Original** in the **Title blocks** library file.

Note: If you have downloaded the project template for the training project from the internet, you will find the title block in drawing file 7 of the project template. Copy the contents of this drawing file to an empty drawing file (for example, 10) of the Tutorial Project. Select the drawing file with the title block (for example, 10) and start with step 7.
Look in the appendix (Project templates on the internet (on page 493)) for information on how to download the project template from the internet.

To create the title block as a label style

➲ You can access the **Original** title block you created in the Basics Tutorial.

➲ Open an **empty drawing file** and close all the others.

➲ Switch the scale to **1:1**.

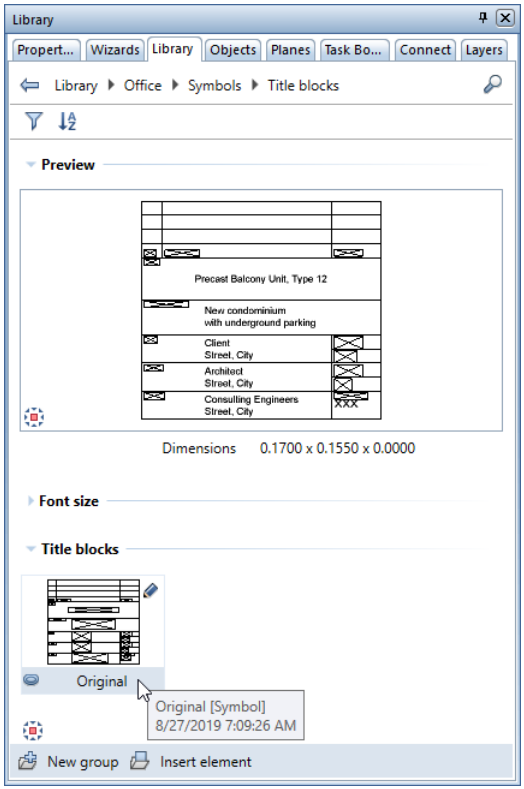
1 Click the **Office** folder in the **Library** palette.

2 Open the **Symbols** folder.

3 Open the **Title blocks** folder.

Tip: To position the label styles quickly and accurately, you can place **Point Symbols** as **construction lines** to mark where the original texts start. You can then delete these texts (**Architecture** role – **Elements** task – **Quick Access** task area).

4 Double-click the **Original** symbol.



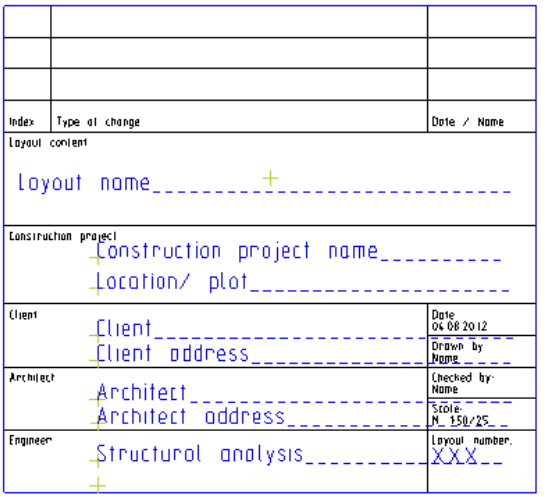
The symbol's base point is attached to the crosshairs.

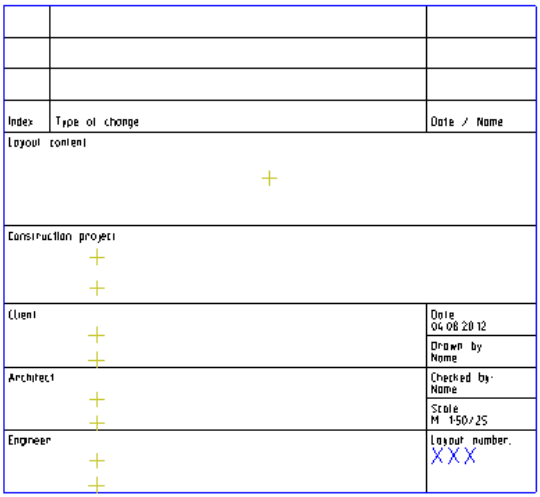
5 To place the symbol, click in the workspace.

6 If the title block appears too small, click **Zoom All** on the viewport toolbar.

Tip: You can use the **input options** to change the position of the symbol's base point and define a cursor snap angle.
The tools on the shortcut menu help you define the symbol's drop-in point precisely.

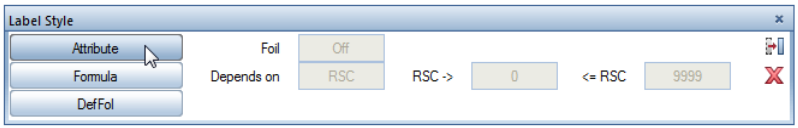
7 Delete the text that is to be replaced by attributes (project-specific information).



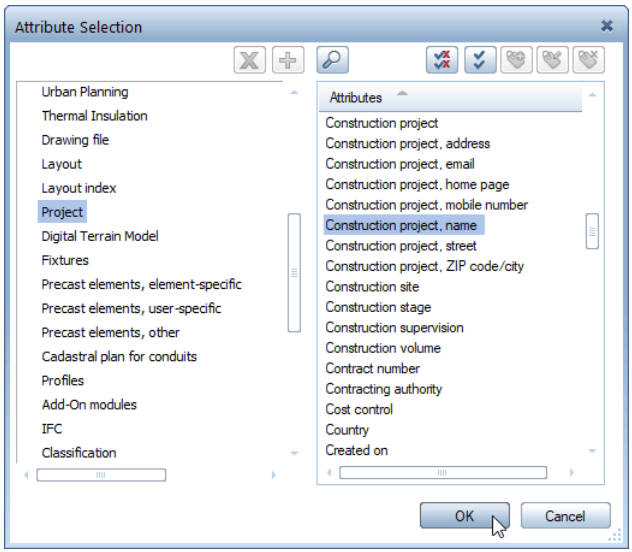


8 Click **Label Style** (**Architecture** role – **User-Defined Objects** task – **Label Styles** task area).

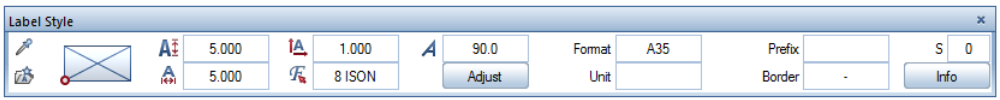
9 Click **Attribute** on the context toolbar.



10 Select the **Project** area, choose the **Construction project name** attribute and click **OK** to confirm.



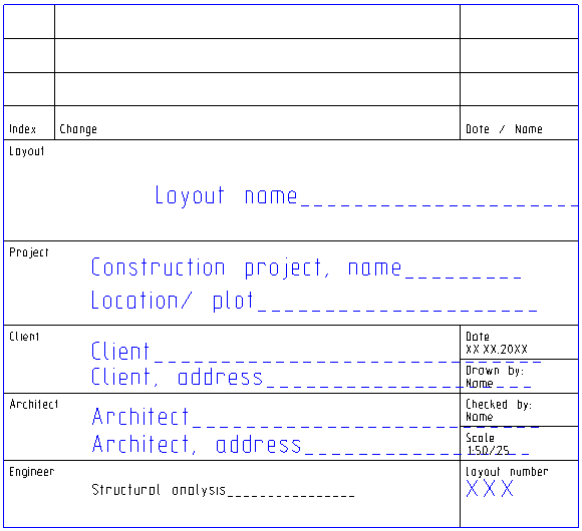
11 Define the text parameters as shown in the illustration and change the format to **A35**.
This defines the attribute as a text item with 35 characters maximum.



12 Place the attribute so that it is left-aligned in the box for the construction project details.

13 Repeat steps 9 to 12 and place the following attributes:

Group	Attribute	Format
Project	Construction project, name	A35
	Location/plot	A35
	Client	A35
	Client, address	A35
	Architect	A35
	Architect, address	A35
	Structural Analysis	A35
Layout	Layout name	A50



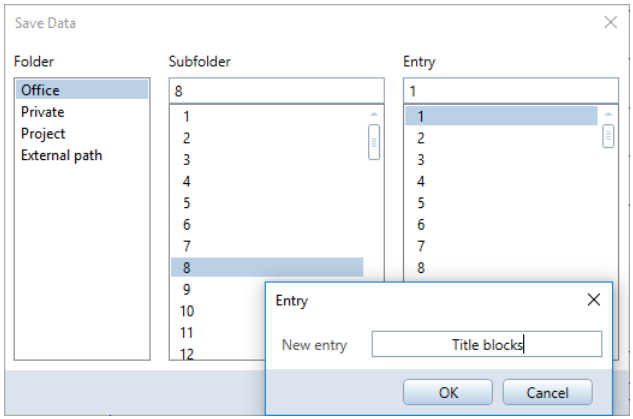
14 Click **DefFol** (Define Foil).

15 Enclose the entire title block in a selection rectangle.

16 Click the lower-right point, which will serve as the reference point.

Title blocks must always be saved to subfolders 7 and 8, as these subfolders are linked with the **Label** tool in **Layout Editor**.

17 Click subfolder number **8** and enter **Title blocks**.



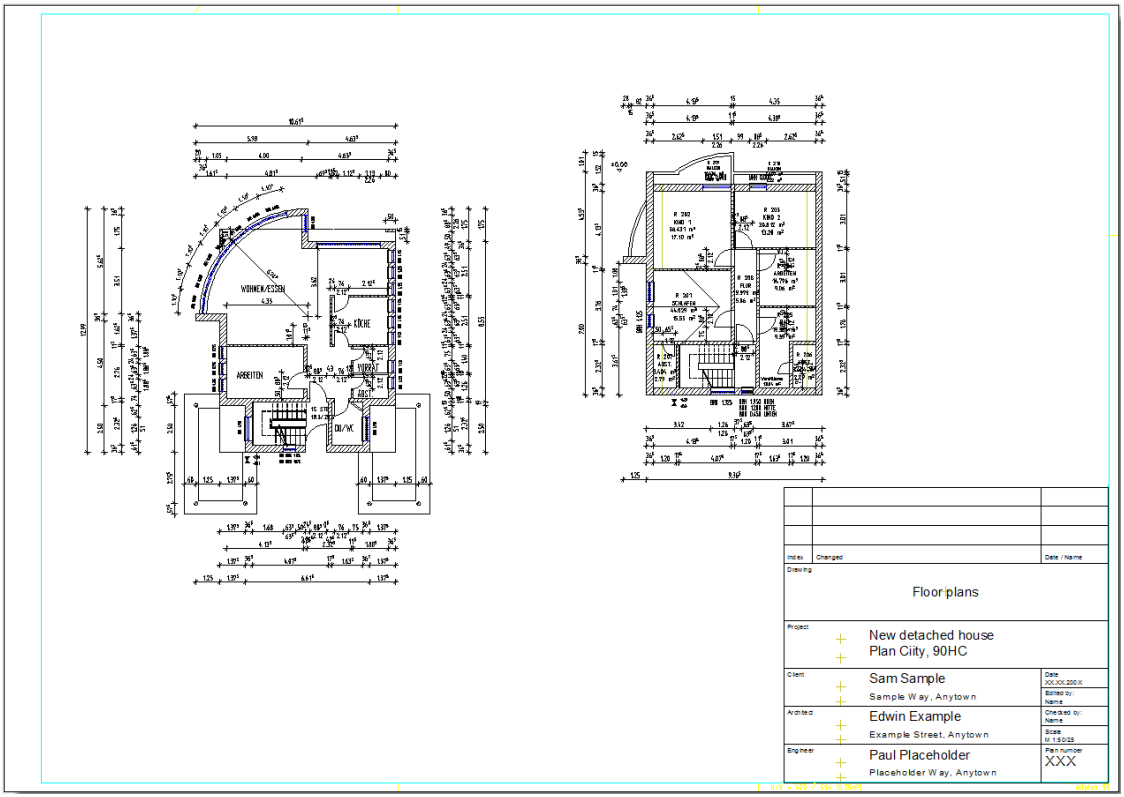
18 Click entry **1** and enter **Unfinished structure**.

19 Select ESC to close the tool.
You have now saved the title block as a label style.

You can also find the **Label Style** tool on the **Actionbar** - **Engineering** role - **User-Defined Objects** task - **Label Styles** task area.

Printing layouts

Printing finished layouts is a critical step. In Allplan 2020 a layout is the unit you send to the printer. As opposed to designing on a conventional drafting board, you do not need to define the scope of the layout in advance.
Generally, you leave the layout (which involves arranging drawing files) until you're finished with the design. This is also the stage where you define the paper size, scale, border, angle, and so on.
Each project can contain up to 9999 layouts.



Layout editor

In the following exercises you will set up a layout with the floor plans of the ground and upper floors of the sample building.
This involves two steps:

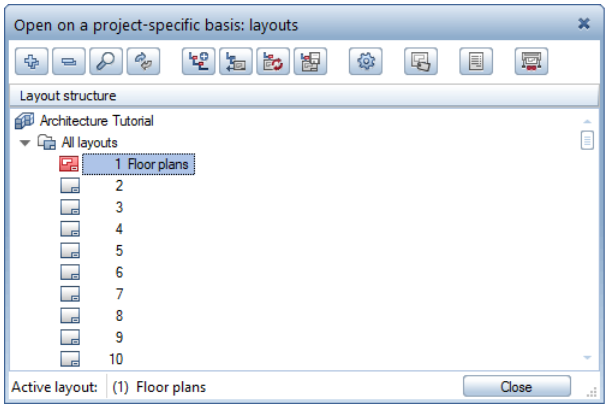
- Define the layout, that is, the sheet size, border and label (title block).
- The second step is to select the layout elements, that is, the drawing files.

To define a layout

1 Switch to the **Layout Editor** task (**Architecture** role) on the **Actionbar**.

2 Click **Open on a Project-Specific Basis** to select the layout in the **Open on a project-specific basis: layouts** dialog box.

Tip: The name you enter here will appear as the **Plan name** attribute in the title block!



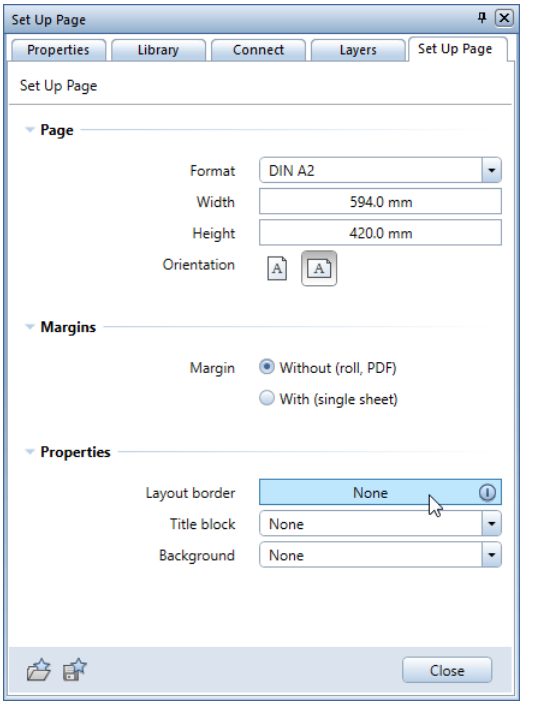
3 Click in row **1**, enter **Floor plans** and close the dialog box.

4 Click **Set Up Page** (**Layout Editor** task area).

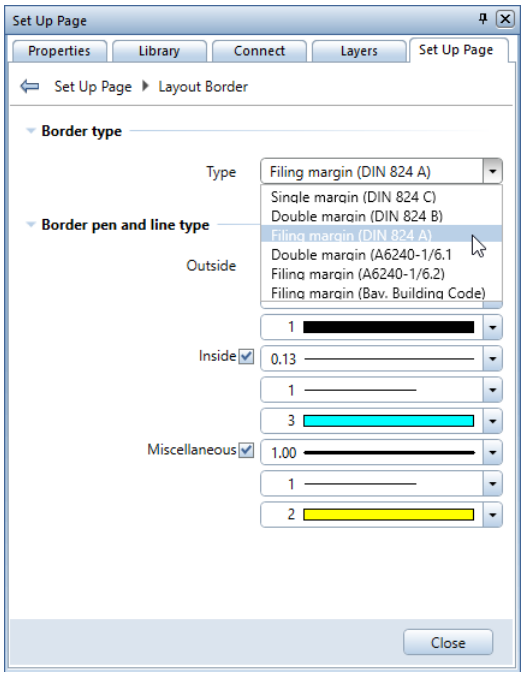
With this setting for the margins, Allplan always places the page so that its lower-left corner coincides with the lower-left corner of the printable area of the printer selected in the **Print Layouts** tool. With this setting, you can exclude elements that extend into the margins from printouts.

5 Go to the **Page** area, change the **Format** to **DIN A2** and select **Landscape**. Go to the **Margins** area and select the **Without (role, PDF)** option.

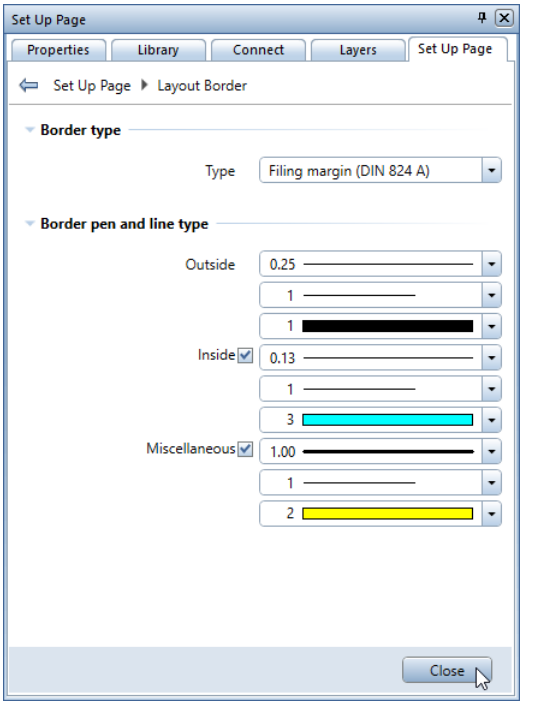
6 Go to the **Properties** area and click the button beside **Layout border**.



7 Go to the **Border type** area and select **Filing margin (DIN 824 A)** for the border type.

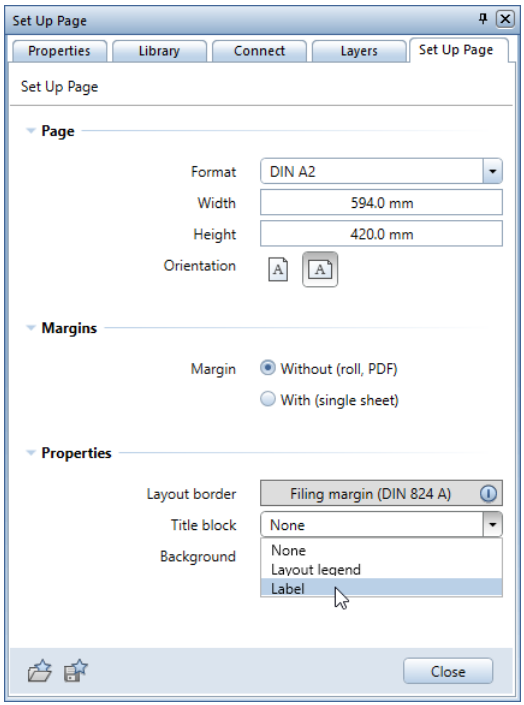


8 Click **Close** at the bottom of the palette.

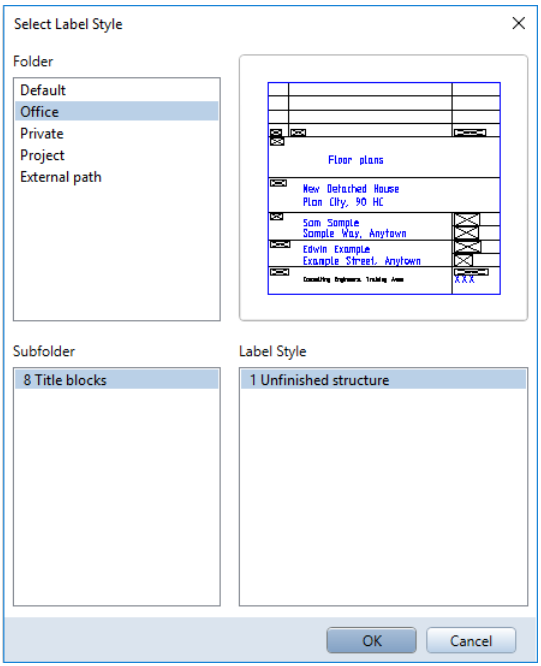


9 Go to the **Properties** area, click the button beside **Title block** and choose **Label**.

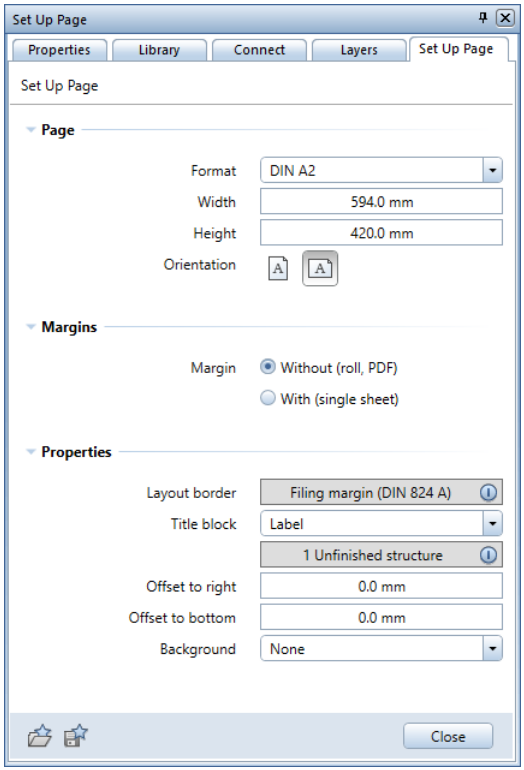
Tip: To change the layout label, you can use the standard text tools in the **Quick Access** task area.



10 Open the **Office** folder, select the label style called **Structure** and click **OK** to confirm.



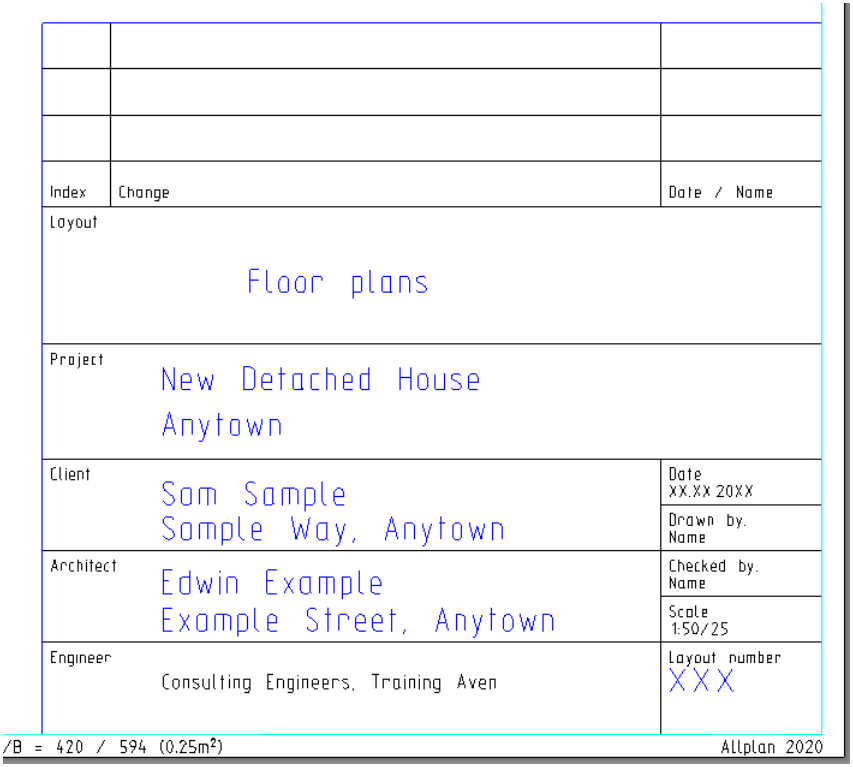
11 If you want to place the title block in the lower-right corner of the layout border, enter **0** for **Offset to the right** and **Offset to the bottom**.



12 Close the **Set Up Page** tool by clicking **Close** at the bottom of the palette.

Now you have placed the layout border and the title block.

As you can see, the title block now displays the values assigned instead of the attributes.

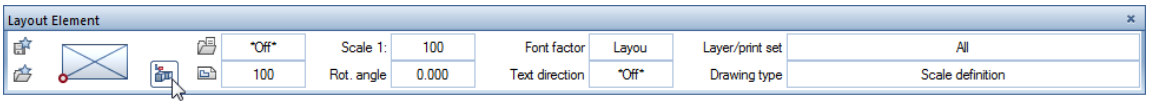


Selecting layout elements

Layout elements are mainly drawing files that you place in the layout. You can define the layers you want to include in the printout by selecting a print set.

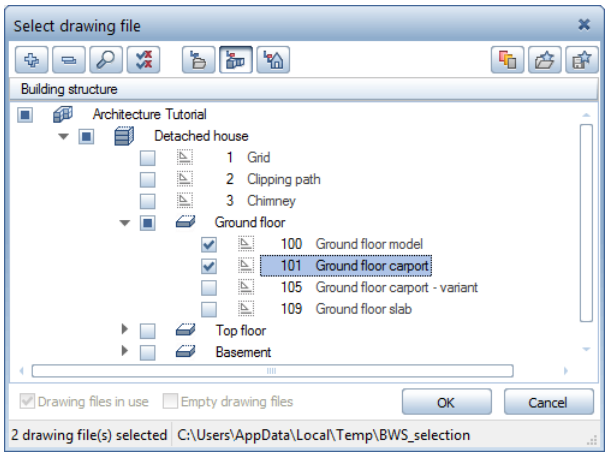
To select layout elements

1 Click **Layout Element** (**Layout Editor** task area).

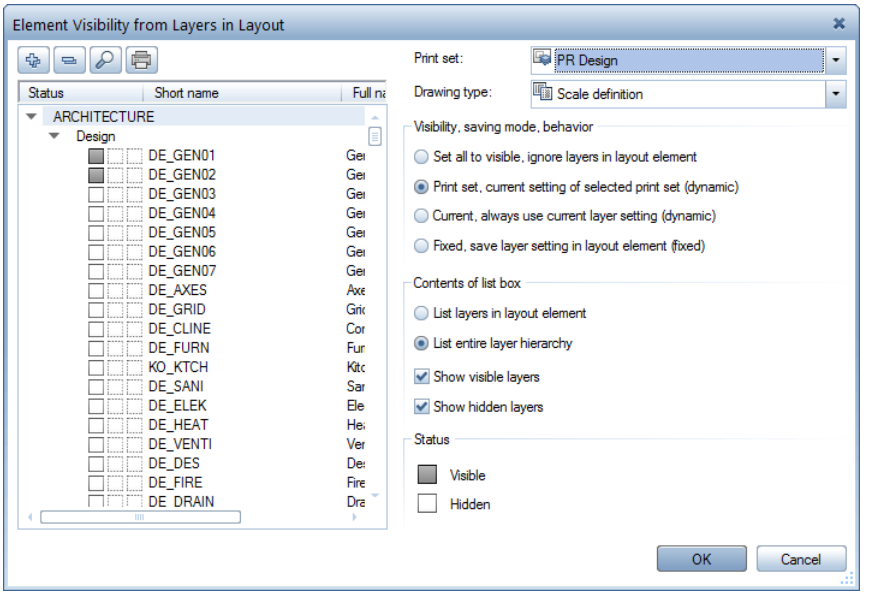


2 Click **Building structure** on the context toolbar.

3 Select drawing files **100 Ground floor model** and **101 Ground floor carport** and click **OK** to close the dialog box.



4 In the **Layout Element** dialog box, click **Layer/print set**, select the **Print set, current setting of selected print set (dynamic)** option and select the **PR Design** print set.



5 Place the drawing files in the layout.

Drawing file **105** is now attached to the crosshairs. As you do not need this drawing file, click **Building structure** and select drawing file **110 Top floor model**. The **PR Design** print set is still selected.

6 Place the drawing file in the layout.

7 Select ESC to finish selecting layout elements.

Allplan saves the finished layouts. You can print them now or later.

Printing the layout

You can now print the finished layout.

Make sure the printer is installed and configured correctly.

To print the layout

1 Click **Print Layouts** (**Layout Editor** task area).

2 Select the **Printer** tab.
In the **Selection** area, layout **1** is selected.
Click the **Set** button to select the elements you want to print.
You can limit the output to certain types of design elements only.
Furthermore, you can place the surface elements of each document in the background.
Leave the settings as they are.

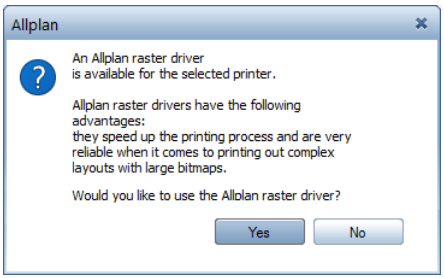
3 In the **Settings** area, you can choose the output device (printer, large-format printer) and the paper size (for example, **Super C/A2**). So that the layout is printed in its entirety, the printable area (printable area minus device margins) must be larger than the page.

Note: If you have configured output channels in the **Services** application, you can select them via the **Allplan vector drivers** option.

4 Depending on the selected output device, you can use Allplan raster drivers. These printer drivers are especially suitable for printing large-format layouts. Raster drivers speed up printing, enhance the quality of printouts and are very reliable.
If you want to use raster drivers, select the **Allplan raster driver** option and open the list box to select a raster driver that can be used with the selected printer.

Note: You can define the properties of the Allplan raster driver by clicking beside the selected printer.

Note: The following prompt appears the first time you select an output device that can be used with Allplan raster drivers:

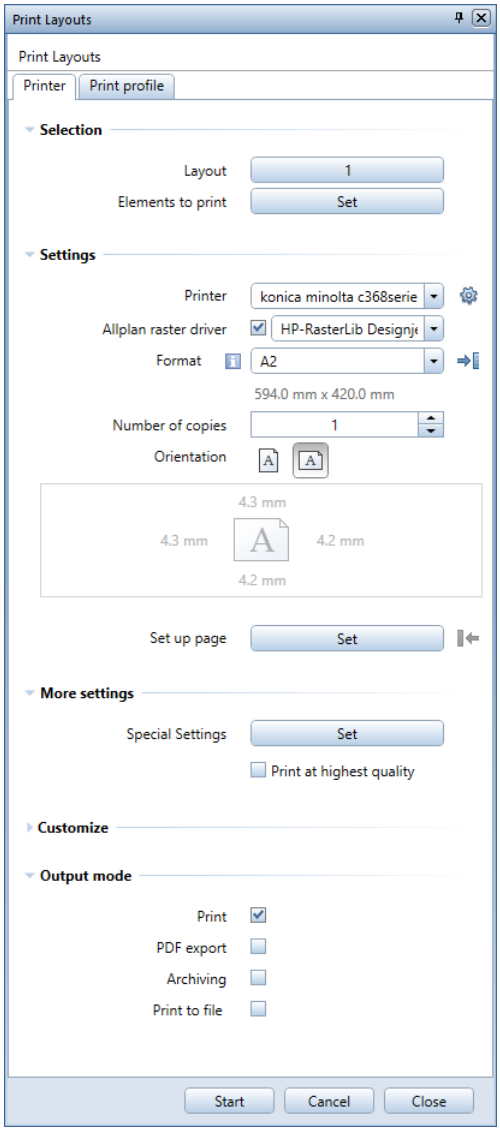


Click **Yes** if you want to use Allplan raster drivers. The **Allplan raster driver** option and an appropriate raster driver are selected.

Note: If the **When setting up page – adjust paper format (printer)** option is selected (**Options**, **Layouts** page) and you **set up the page**, Allplan automatically adjusts the paper format of the device to the format and orientation of the page. In doing so, Allplan tries to select as identical a paper format as possible. If you have not defined margins for the page, the program tries to select a format without margins. If formats without margins are not available, Allplan selects the next largest paper format. If Allplan cannot find a suitable format, it selects the largest format available for the output device.
If this option is not selected, click **Select paper format (printer) based on page format** to manually match the format and orientation of the page.

5 Select the **Landscape** format and do not change the number of copies: **1**.

You can also set up the page here.



6 Define settings in the **Output mode** area.
If you want to bring the layout to paper, select the **Print** option.

7 To start printing, click **Start**.

The program sends the data to the printer.

Note: You can find more information on the tabs of the **Print Layouts** tool in the Allplan Help.

Layout windows

You can use layout windows to position just portions of drawings in your layout. Thus, you can display elements that are far from one another in the building model beside each other in the layout. In the following exercise, you will create layout windows and display sections of individual drawing files.

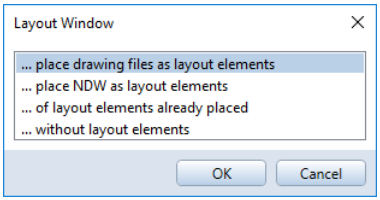
To create layout windows

1 Use **Open on a Project-Specific Basis** to open an empty layout. Then select **Set Up Page** and define the format, orientation and margins of the page.

2 Click **Layout Window** (**Layout Editor** task area).

You will create the window so that you can immediately select the drawing file you want to display.

3 Click **.. place drawing files as layout elements**.



4 On the context toolbar, click **Building structure**, select drawing file **100 Ground floor model** (drawing file number) and place it in the layout.

5 Select ESC, as you do not want to select more drawing files for this layout window.

Tip: By using the polyline entry tools, you can also define freeform layout windows or create layout windows composed of several polygons.

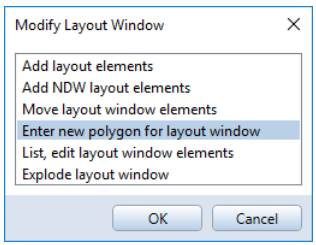
Check that **Area detection** is turned off in the input options.

6 Define the size of the layout window by clicking two diagonally opposite points (lower-left and upper-right points). Then select ESC twice (see illustration).

7 Repeat steps 2 through 6 to create a layout window for drawing file **110 Top floor model**.

If available, you can also use the drawing files with the **West elevation** and **North elevation**.

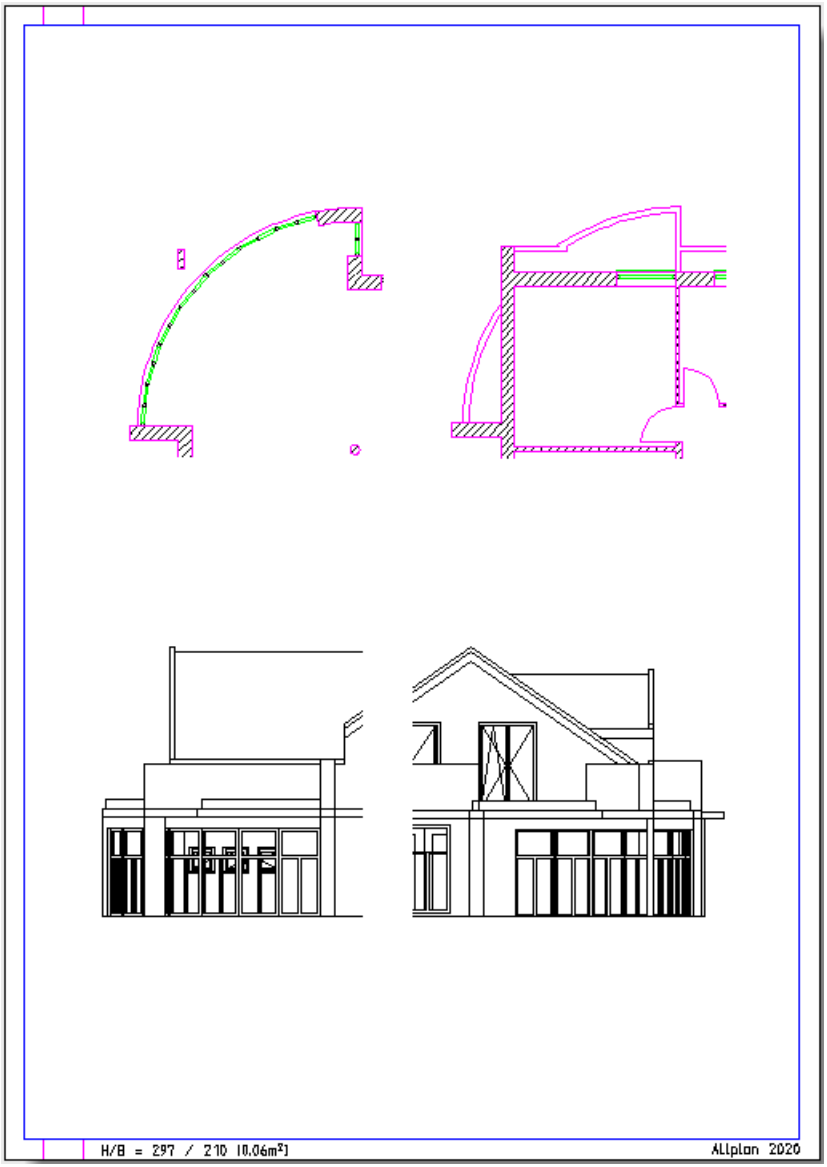
8 Click **Modify Layout Window** (**Layout Editor** task area) and select **Enter new polygon for layout window** to change the size of the window.



Tip: By using **Show/Hide** (**View** drop-down list on the Quick Access Toolbar), you can hide the **Layout element/window border**.

9 To rearrange the layout windows, you can use **Move** (**Edit** task area).

The result might look like this:



Unit 9: Visualization

➲ The exercises in this unit require the **Architecture** role on the **Actionbar**.

The ability to make presentation drawings – be it for clients or for competitions – is important.

Allplan thus comes with powerful presentation tools. These include tools for simple hidden-line images to real-time walk-throughs.

You can create a realistic, three-dimensional image of your design at any time during design – with colored surfaces, lighting and shadows. This unit shows you how.

The visualization task

Allplan 2020 provides comfortable and powerful tools for presenting and visualizing building models and interiors. You can find these tools in the **Visualization** task. In this tutorial, you will work with tools you can find in the task areas of the **Visualization** task.

The task areas

The **Visualization** task contains three variable task areas:

- **Surfaces, Light**
- **Camera**
- **Shadow**

These task areas provide two types of tools:

- Tools for creating vector data
- Tools for creating pixel data

With tools of the first type, you automatically generate full-surface, color representations of 3D models including shadows cast by two light sources (**Photo Settings** and **Photo** in the **Shadow** task area). You can also take natural daylight into account by specifying a latitude, date and time. Thus, you can study the effects of light and shadow on a building over the course of a day.
Furthermore, you can create photorealistic images of building models. The program calculates these photos based on the selected perspective view (**Photo for Sun Study** in the **Shadow** task area). You can also study the effect of sunlight on a building over a period of time.
All elements you create in this way are saved in vector format, which means that you can move, mirror, resize, ... the elements without loss of quality.

The following tools create pixel data.
Choosing from up to 16 million colors, you can shade walls, windows, solids, 3D lines, ... you created with the tools in the **Elements** and **Modeling** tasks. Use **Set Project Light** (in the **Surfaces, Light** task area) to select any number of colored light sources of varying intensity. Thus, you can create realistic scenes. Use **Set Surface** (in the **Surfaces, Light** task area) to assign surface properties to architectural elements and 3D elements. You can use textures, such as wood, marble, stone, sand, supplied with the program or bitmap images such as scans of tile structures for material simulations.
To view the object in its real surroundings or to achieve other visual effects, you can place a bitmap image (for example, a scanned photograph) as a texture in the background. You can then display this background bitmap as a 2D plane or a 3D sphere.

Use **Render** (in the **Surfaces, Light** task area) to render images based on global illumination (with or without QMC). Thus, you can produce photorealistic images for presentations.
Use **Set Camera Path** (in the **Camera** task area) to match camera positions intuitively from the viewport. You can also define a camera path in plan view or enter the coordinates of the cameras.
Use **Record Movie** (in the **Camera** task area) to record the camera path as an AVI movie, which you can then play back on any Windows computer. You can save the resulting bitmap images and use them for presentations. Predefined camera paths, such as **Rotate camera by 360 degrees**, **Orbit camera by 360 degrees** and **Sun study** produce meaningful results in no time at all.
When recording movies, you can choose between **Animation** (fast; using the flat-shading, Gouraud or Phong method) and **Render** (realistic; using the global illumination method).
So you can quickly and easily check each design stage or construction stage and create convincing presentations. If you do not want to display the entire 3D model in animation, you can select individual components by using **Element Selection**. You can even display only a single design entity in animation.

Until now you have used design tools to create your building model. These tools and the tools briefly described in the last section create and process two completely different types of data, vectors and pixels.

Exercise 14: displaying the entire model in animation

Real-time animation is only *real*time if you have a computer that is powerful enough to calculate the complex data.

To demonstrate the effects more clearly and to shorten processing time, you will use just the walls on the ground floor in the following exercises. If you want, you can follow this procedure with the entire building model.

How to create animations

The following shows how to create a movie model in just five steps. You will learn about the basic concepts of animation.

Bear in mind that making complex animations with sophisticated effects requires practice and experimentation. Consider the following as an introduction and try to spend some time exploring the different possibilities.

Procedure:

- Define the animation parameters and define the first scene
- Define the lighting (sun)
- Define materials and surface properties
- Choose a rendering method and render the image
- Assemble the movie model: position cameras

Animation window

You can see lights, surfaces and shadows in a viewport of the **Animation** view type.

To open an animation window and to define parameters

➲ Open the **Visualization** task (**Architecture** role) on the **Actionbar**.

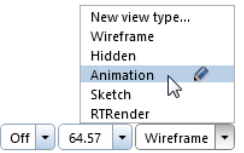
➲ Make drawing file **100 Ground floor model** current and open **101 Ground floor carport** in edit mode.

➲ Make the layers **AR_WALL**, **AR_COL**, **AR_WIND**, and **AR_WSILL** visible and hide all the other layers.

1 You have various options to display the design in animation:

- The quickest way is to select the F4 key.
  Allplan opens an additional viewport of the **Animation** view type. You can see the building in the middle of the animation viewport. The view is from the front and top. In addition, Allplan selects the **Perspective view** option in **3D View** and switches to **Navigation Mode** (viewport toolbar).
- You can use the Quick Access Toolbar: Click **Window** to open the drop-down list and select **Animation Window**. Here, too, Allplan opens an additional viewport of the **Animation** view type. You can see the building in the middle of the animation viewport. The view is from the front and top. In addition, Allplan selects the **Perspective view** option in **3D View** and switches to **Navigation Mode** (viewport toolbar).

- You can use the viewport toolbar: Click **View Type** on the viewport toolbar and select **Animation**.
  Allplan changes the view type of the active viewport to **Animation**. Here, Allplan *neither* selects the **Perspective view** option in **3D View nor** switches to **Navigation Mode** (viewport toolbar).

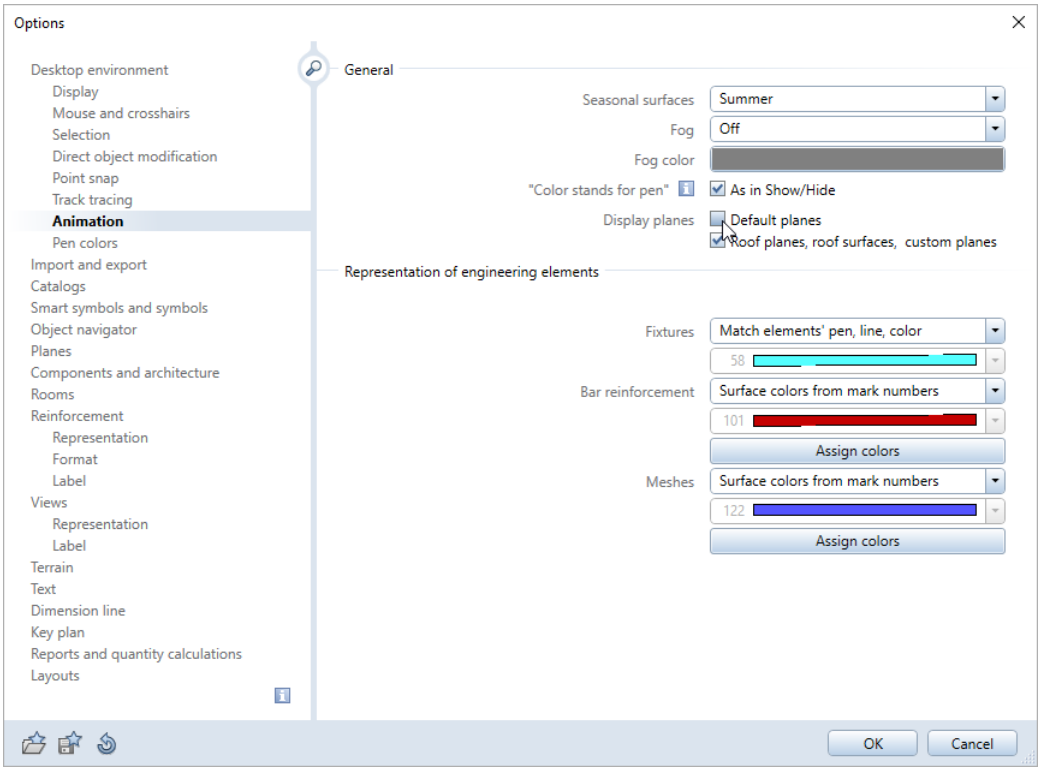


Note: If the cursor looks like this , **Navigation Mode** is active.

2 You have opened an animation viewport by selecting F4, for example.
The default planes and a virtual ground plane are visible in animation. You will hide the default planes, as you do not need them for the following exercises.

Open the **Default Settings** drop-down list on the Quick Access Toolbar and click **Options**.

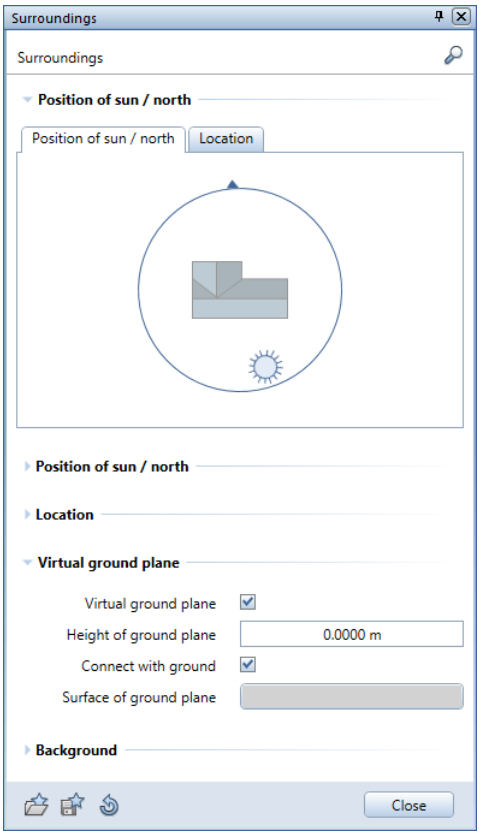
3 Open the **Animation** page and go to the **General** area. Turn off the **Display planes – Default planes** option and click **OK** to confirm.



4 To define how the virtual ground plane looks, you can use the **Surroundings** tool. You can find this tool in the **Surfaces, Light** task area or on the shortcut menu of a viewport (if **Navigation Mode** is selected).

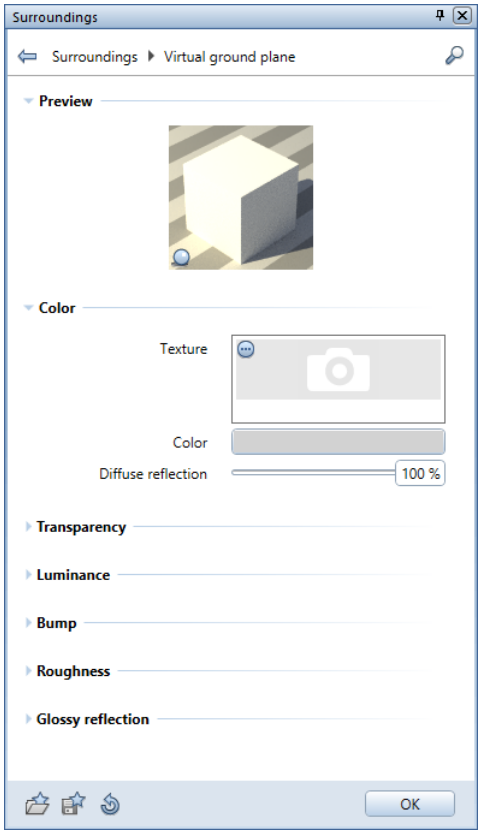
Select this tool.

5 As you can see, the **Virtual ground plane** option is selected in the corresponding area in the **Surroundings** palette.



The **Connect with ground** option is also selected by default. In this case, the virtual ground plane will automatically adjust to the bottom of the elements. For example, if you open drawing file **3 Chimney** in addition to the other drawing files, Allplan will move the virtual ground plane below the bottom level of the chimney.

6 If you want, you can customize the surface of the virtual ground plane to your needs. Click the relevant button and define settings in the **Virtual ground plane** palette.



7 Click **OK** to close the palette.

8 Close the **Surroundings** tool.

If **Navigation Mode** is active (cursor looks like this), you can use the mouse to walk around and through the building in animation.

Animation with the mouse

Tip: Selecting and holding the Shift key accelerates the movement of the mouse.

1 Move by selecting one of the following mouse buttons and gently moving the mouse:

- Left: Turns the camera about an object on the surface of an imaginary sphere.
- Middle: Moves the camera to the left or right and up or down on a linear path.
- Right: Zooms in or out; moves the camera forward or backward.

2 Close animation by closing the viewport or selecting the **Wireframe** view type on the viewport toolbar.

Mouse movement in sphere mode and camera mode

The default setting is sphere mode. In this mode, the eye point pivots about the target point and its movement is constrained to an imaginary sphere. You have already encountered the movement of the mouse in sphere mode. This topic was dealt with in "Unit 2: Building Design":

Mouse navigation in sphere mode

Select and hold the left mouse button:
Turns the camera about the object on the surface of an imaginary sphere.

Select and hold the middle mouse button:
Moves the camera laterally, up, down.

Select and hold the right mouse button:
Moves the camera toward or away from the object (zooming)

If you select the Ctrl key while you are in animation mode, you switch to **Camera Mode**. This mode can be visualized as the view through a camera with the observer at the center, 'looking' around.

Mouse navigation in camera mode

Ctrl+left mouse button:
Rotates the camera about the viewer ("camera pan").

Select and hold middle mouse button:
Moves the camera laterally, up, down.

Ctrl+right mouse button:
Moves the camera toward or away from the object (zooming)

Exercise 15: lights and surfaces

Light

Appropriate lighting is an important factor if a presentation is to be a success. The program provides a wide range of lighting options:

- **Sunlight**: Use the **Surroundings** tool to make settings for sunlight by defining the position, time and angle of the north arrow in plan view. You can also add a **fill-in light** for interiors.
- **Individual lights** (particularly important for lighting interiors): Use **Set Project Light** to create these lights. For each light, you can define a color, the type of light source and the exact location of the light source and its target point.
  - **Point light** is diffused evenly in all directions from a single light.
  - **Spotlight** is conical light; the intensity of this light drops the further away from the point it is.
  - **Conical light** is similar to spotlight except that the intensity of the light pool cast is uniform.
  - **Area** is a light source that diffuses light evenly in one direction.

You can use the **Sun Study** tool to generate sun path studies quickly and easily,

In the following exercise, you will define the sunlight.

To set up lights: sunlight

Tip: Click (bottom border of the palette) to return to the default values.

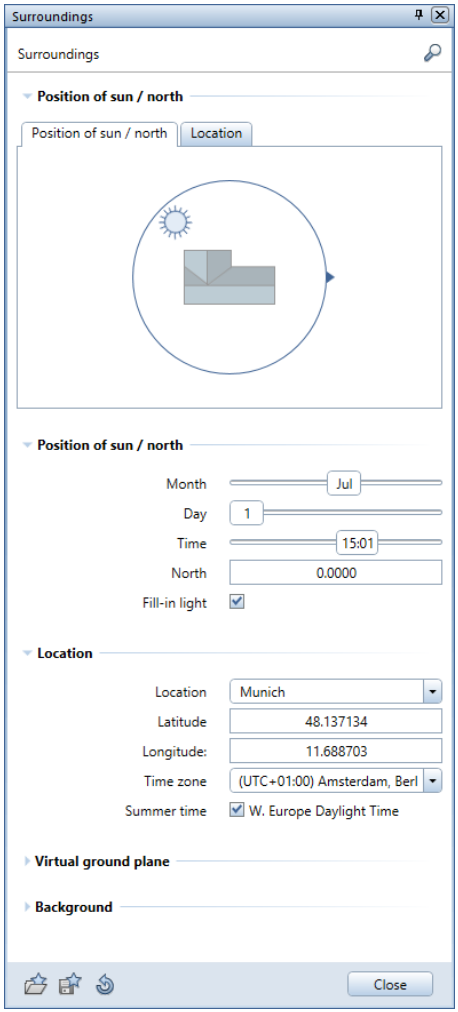
1 Click **Surroundings** (**Surfaces, Light** task area). You can also right-click in the animation viewport and select **Surroundings** on the shortcut menu.

2 In the **Surroundings** palette, make the following settings in the **Position of sun / north** area:

- Month: **July**
- Day: **1**
- Time: **15:00**
- North: **0** (the side where the kitchen is located).

3 In the **Location** area, select a city in the list.
You can add cities to the list: first enter the latitude and longitude. Then enter a name for the location.

4 Select the **Summertime** check box.



5 Select ESC to close the **Surroundings** palette.

6 You can immediately see the effects of these settings in the animation viewport (if it is not open, select **Animation** on the viewport toolbar).
The shadows cast by the lights are not visible due to the rendering method used here. The direction of lighting, however, is evident from the illumination of the surfaces.

Note: Due to various factors (for example, local time, time zone), the calculated position of the sun might not exactly match the actual position in reality, even if you have defined the location and time parameters correctly. For further information and possible solutions, see the "Sun and longitude, notes" section in the Allplan 2020 Help.

Surfaces

Each line color can be assigned a surface color and a value for transparency, luster, refraction and a texture.

Defining colors

In Allplan, you have three options to define and mix colors. You can also combine these options.

- Click the color in the color circle and define its brightness with the slider.
- Mix the color in the following color spaces by entering values in the boxes:
  - **RGB**: red-green-blue color space
  - **LAB**: LAB color space
  - **HSL**: HSL color space (hue, saturation, lightness)
  - **CMY**: subtractive cyan-magenta-yellow color model
  - **Hexadecimal**: hexadecimal color definition; hexadecimal numbers represent the RGB color value in the sequence RRGGBB.
- Select a color system, a color file and then a color name in the file. You can also define your own custom palettes.

Note: The **Color stands for pen** option, which can be turned on and off in **Show/Hide**, has no effect on the colors in animation; surface properties are always assigned based on 256 element colors.

You will now assign the walls a different color.

To define a surface for a wall

Tip: You can also define surfaces by using **Set Surface** (**Surfaces, Light** task area).

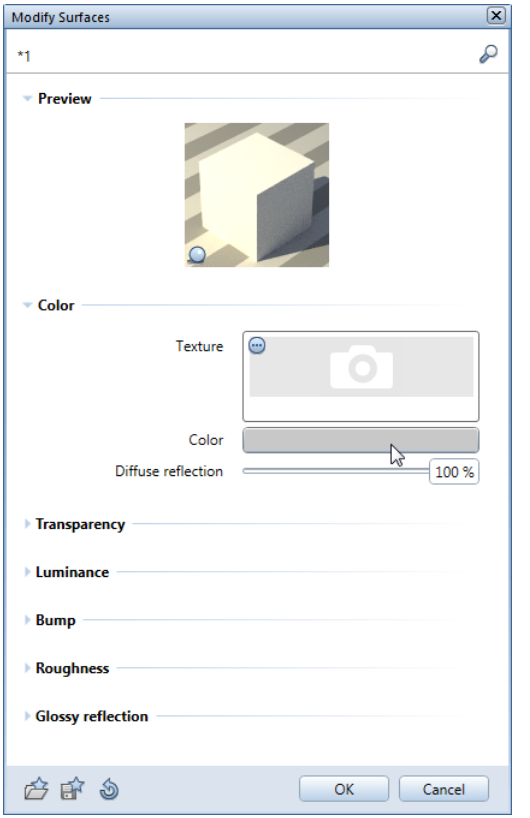
➲ The animation viewport is still open.
If it isn't, select the F4 key.
The walls are in color 1.
Color stands for pen is not selected in **Show/Hide** (**View** drop-down list on the Quick Access Toolbar).

1 Go to the animation viewport, right-click one of walls and select **Set Surface** on the shortcut menu.

Note: You can find the **Set Surface** tool on the shortcut menu of the animation viewport only if **Navigation Mode** (viewport toolbar) is selected.

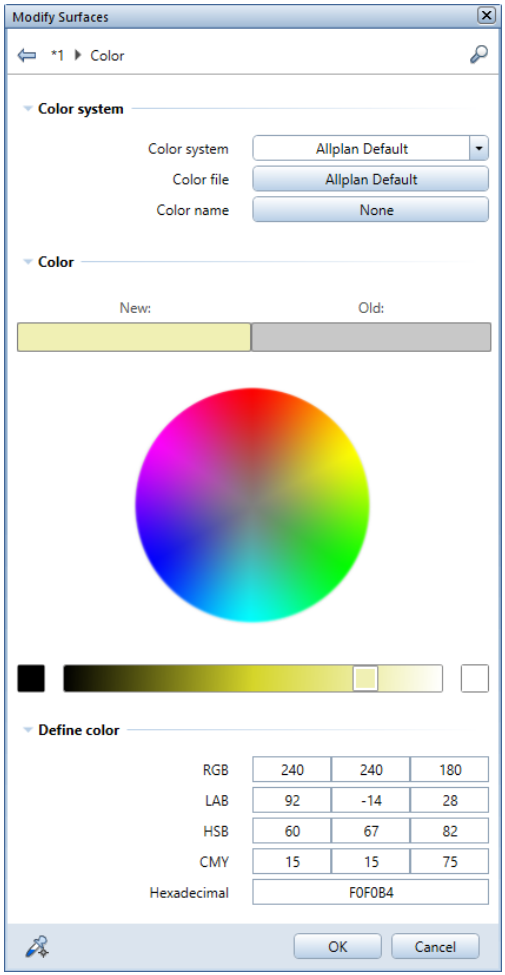
The **Modify Surfaces** palette opens.

2 Click the **Color** button in the **Color** area.



Tip: You can save your own colors under a name of your choice. You can also save entire color palettes in color files.

3 Define a color in the RGB color space:
Red: **240**
Green: **240**
Blue: **180**



4 Click **OK** twice to confirm all settings.

You can immediately see the effects of these settings in the animation viewport.

Changing the surface has an effect on all visible elements with the same color!

As an alternative to **Set Surface**, you can also use **Assign Custom Surfaces to 3D, Archit. Elements** on the shortcut menu of the animation viewport to assign animation surfaces to 3D elements, regardless of the element color.

Exercise 16: rendering

Allplan will render your model including all the settings you have made for the view, lights and surfaces. The effects you can achieve vary depending on the rendering method selected.

When rendering, Allplan always uses the most recent view in the animation viewport. Therefore, never render straight from the viewport in which you design. Rather, select a suitable view in the animation viewport before you start rendering.

The following applies, whichever method you use: The more sophisticated the rendering method and the larger the rendering window, the longer the whole process will take.

The following exercise uses the **global illumination** method.

To render an image

➲ Select the view you want to render in the animation viewport.

1 Select the F2 key.

Or:

Click **Render** (**Surfaces, Light** task area).

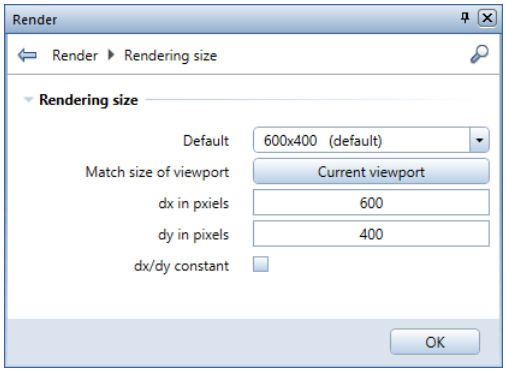
Or:

Right-click in the animation viewport and select **Render** on the shortcut menu.

2 Define the size of the rendered image. In the **Render** palette, go to the **Image resolution** area and click the **Resolution** button.

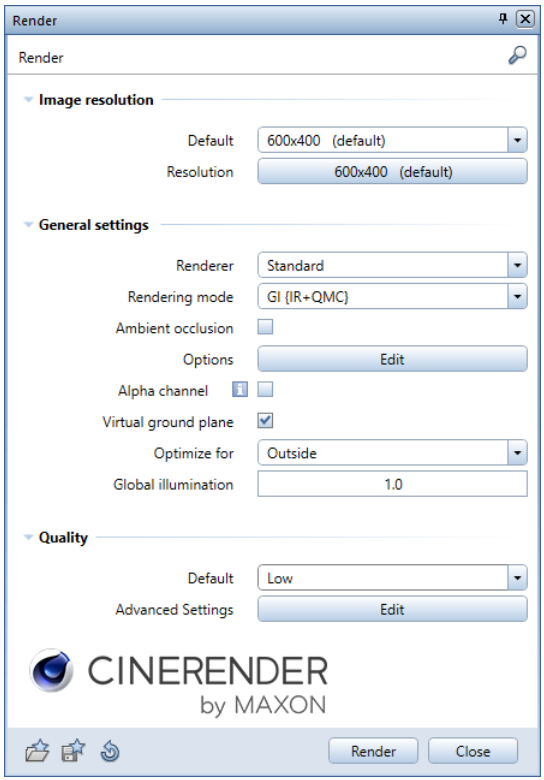
3 Open the list box and choose 600x400 (pixels). This will be sufficient for a first impression.

4 Click **OK** to confirm.



5 Go to the **General settings** area and select the **Global Illumination (GI (IR+QMC))** render mode.

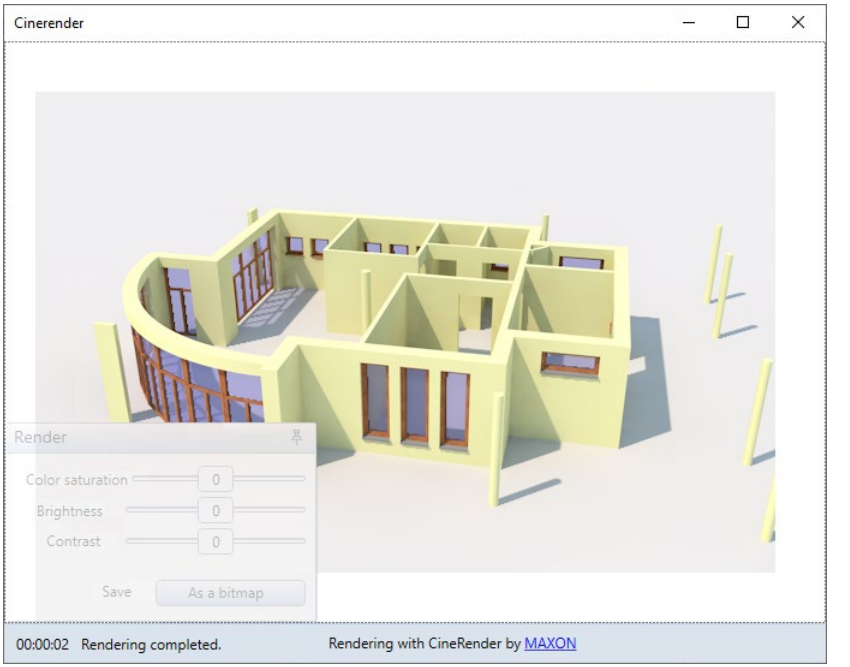
6 Go to the **Quality** area and switch the **Default** to **Low**. Remember: The better the quality, the longer the whole process will take.



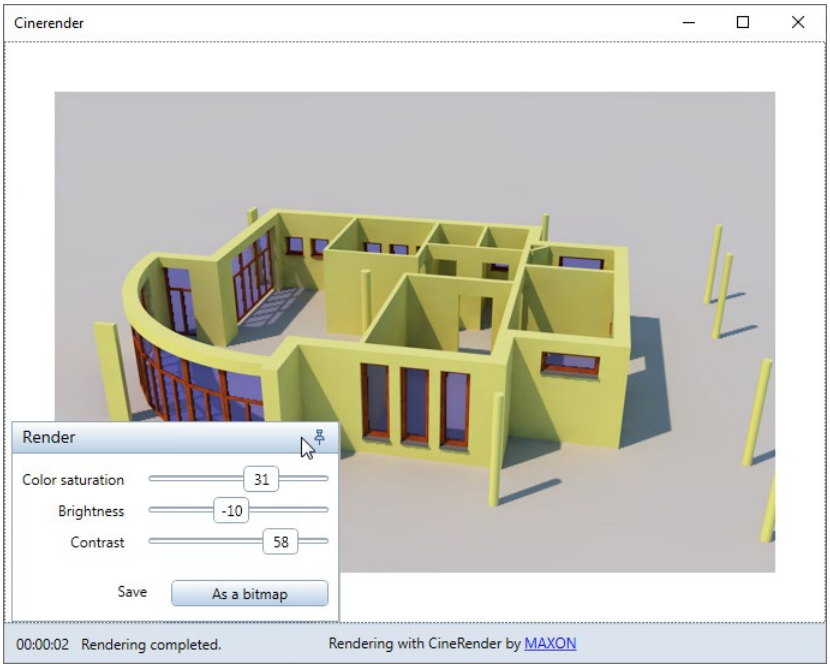
Tip: Once the program has finished rendering, you can save the image as a bitmap. You can also edit the image by using the menus at the top. The options are the same as those in the **Edit Bitmap** tool. (For more information, select **F1** to open the Help.)

7 Start rendering by clicking the **Render** button.

Allplan displays the result:

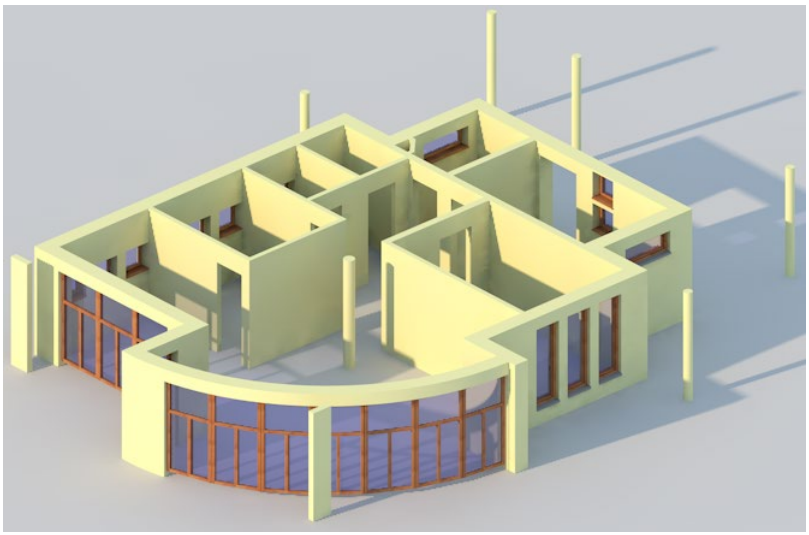


8 You can optimize the result by means of the settings in the **Render** dialog box.



If you want, you can save the image as a bitmap to any folder.

9 Close the window with the result.



Exercise 17: camera path, AVI movie

You will simulate a fly-by around the ground floor.

To do this, you will start by defining a camera path by placing camera positions and defining the viewing angle of the building model. By using interpolation, Allplan will automatically calculate the actual camera path between the camera positions you defined.

You will then create and record a movie by moving a camera along the camera path you defined.

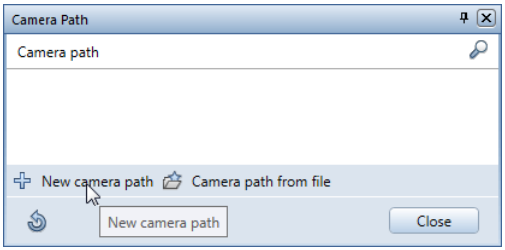
To define the camera path and to create the movie

➲ Divide the workspace into a number of viewports. For instance, you might have three viewports, each showing a different view of the design. Select **2+1 Animation Window** (**Window** drop-down list on the Quick Access Toolbar).

1 Click **Set Camera Path** (**Camera** task area).

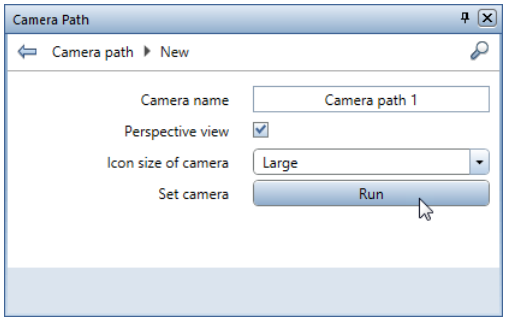
Note: You can also select this tool by opening the shortcut menu in a viewport where navigation mode is active.

2 Click **New camera path** at the bottom of the **Camera path** palette.



3 Change the icon size to **Large** so that the positions of the cameras are clearly visible in plan view and in animation.

4 Click the **Run** button beside **Set camera**.



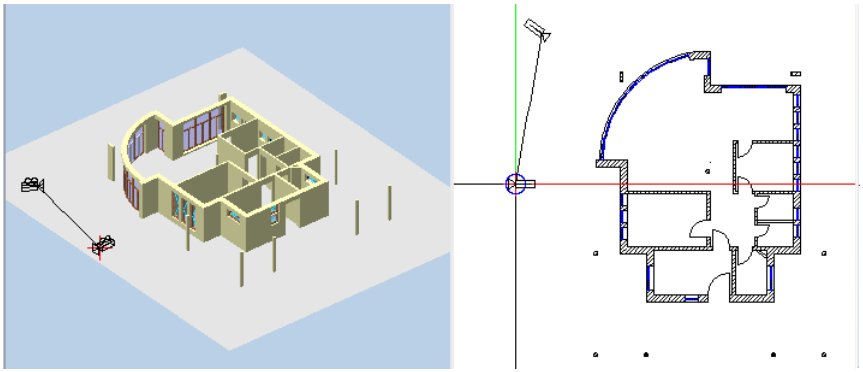
The first camera is attached to the crosshairs.

5 Place the camera in plan view.

You can rotate the camera freely.

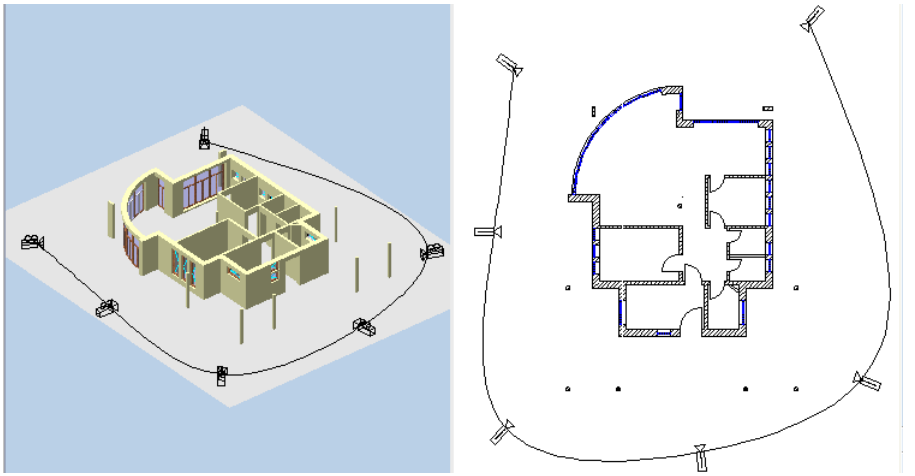
6 Click to turn the camera in the required direction (defines the target point).

Now the camera points in the direction selected.



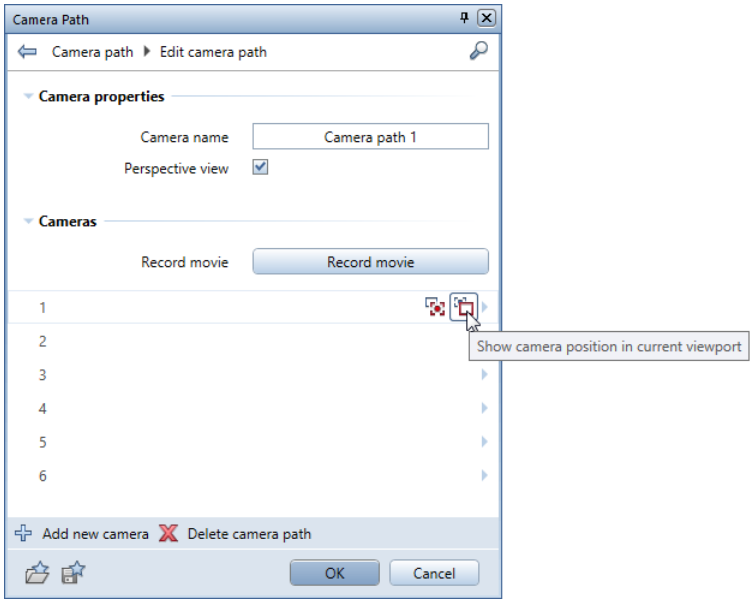
7 Position the next camera in the same way.

8 Place other cameras (see illustration) and select ESC to finish defining the camera path.



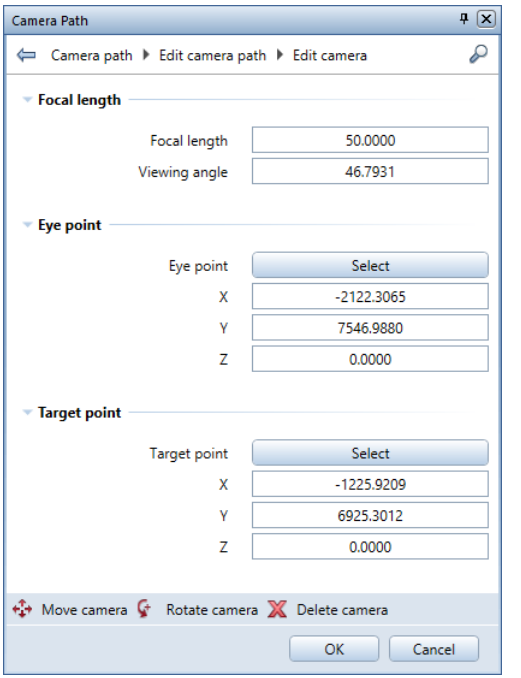
The **Camera path** palette displays the camera path again.
The **Cameras** area shows the cameras 1 to 6 you have just placed in plan.

9 To check and correct the camera positions, you can display them in the active viewport.
Select the camera you want to check and click the corresponding tool.



10 If you want to change the position of the camera, click the small arrow at the end of the line.

The palette now shows the parameters of the camera. You can change the focal length and the coordinates of the eye point and the target point.
You can find more modification options at the bottom of the palette:
Move camera, **Rotate camera** and **Delete camera**.

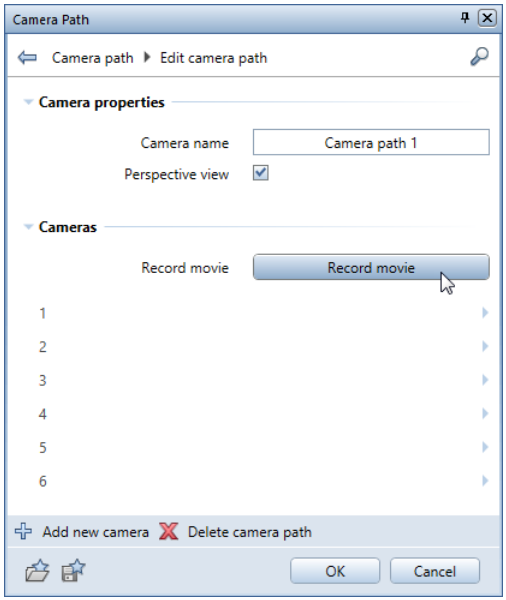


11 Click **OK** to confirm your changes.

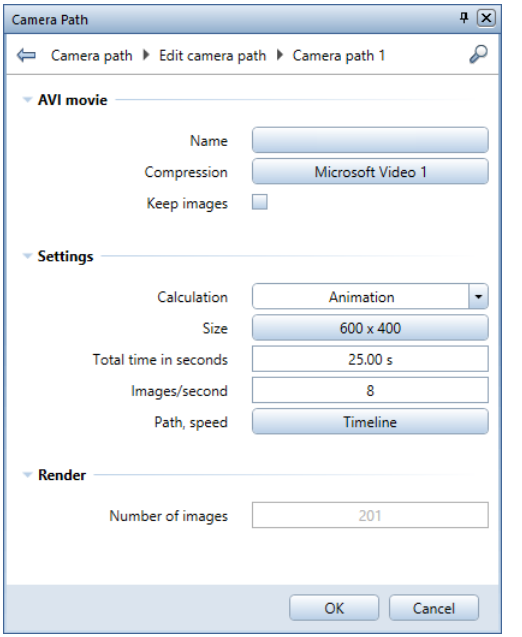
The palette displays the camera path again.
You can use the tools at the bottom of the palette to add cameras or delete the camera path.

Tip: As you entered the camera positions in plan, the z-coordinates of the eye points and target points of all cameras are zero, that is, the cameras "lie" on the virtual ground plane. So that the observer can view the model realistically, enter a sensible height for the z-coordinates of the eye points and target points. For example, enter 1.65 m.

12 Click the **Record movie** button.



13 To get a first impression, you do not need to work with large volumes of data.
Make the following settings in the palette:



Note: If you do not enter a **Name** for the AVI movie, Allplan will run the movie without saving the AVI file. So, you can still change the movie before you save the final version.

14 Click **OK** to confirm the dialog box.

The movie runs in the current viewpoint. The **Set Camera Path** tool closes automatically when the movie is over.

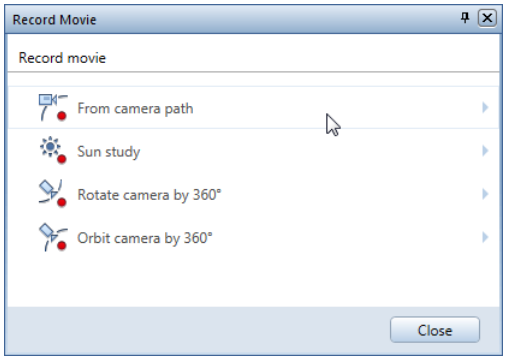
Recording an AVI movie

You will now record an AVI movie along the camera path you have just defined. This AVI movie will also include the settings for lights and surfaces. Note that recording an AVI movie can take some time.

To record an AVI movie

1 Click **Record Movie** (**Camera** task area).

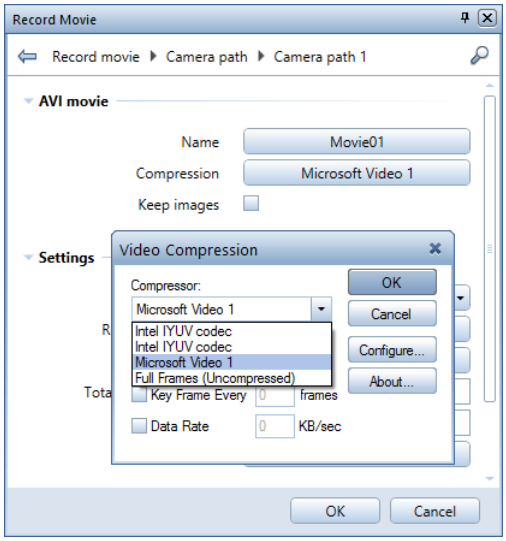
2 In the **Record movie** palette, click **From camera path**.



3 Click **Camera path 1**.

4 Enter a **Name** for the movie and specify the folder. The project folder is the default setting.

5 Select a **Compression** type or turn it off if you want to obtain top quality (requires much hard-drive space!).
Click **OK** to confirm.



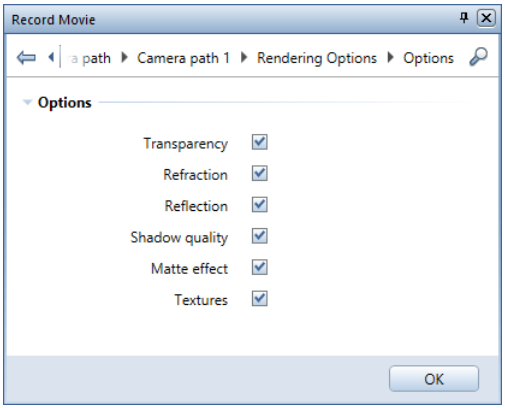
Note: You can choose from all **Compression** methods installed on your computer. With **Windows Media Player**, you can automatically update codecs (compression, decompression). You can find further information in the **Windows Media Player** Help.

6 Go to the **Settings** area and switch **Calculation** to **Render**.

7 Define the **Render options** by clicking the **Edit** button.

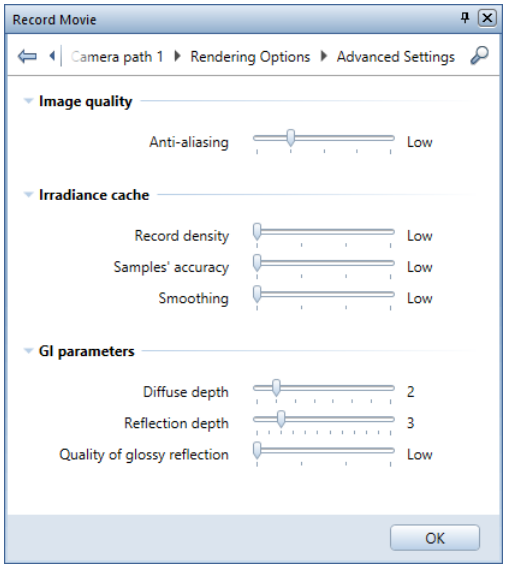
8 Go to the **General settings** area and select the **GI (IR+QMC)** render mode.

9 You can define further settings for rendering by clicking the **Edit** button beside **Options**.
Click **OK** to confirm.

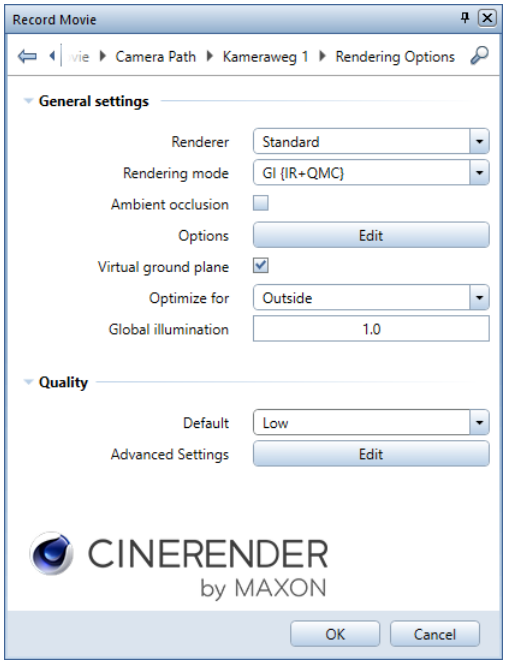


10 You can define the quality of the rendered images in the **Quality** area.
Switch the default to **Low**.
Remember: The better the quality, the longer the whole process will take.

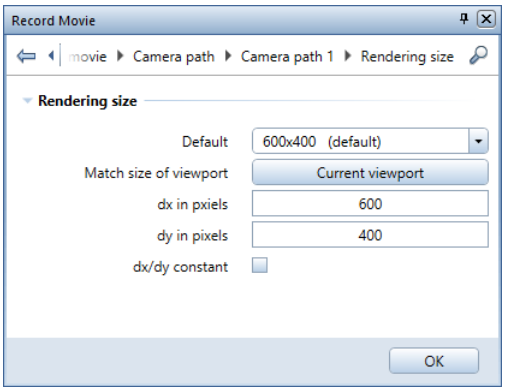
11 You can customize the quality settings by clicking the **Edit** button beside **Advanced settings**.
Click **OK** to confirm the settings.



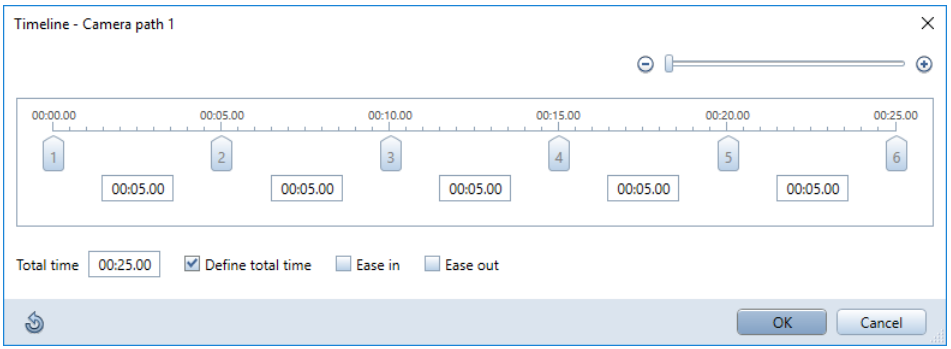
12 Click **OK** to confirm the **Rendering options**.



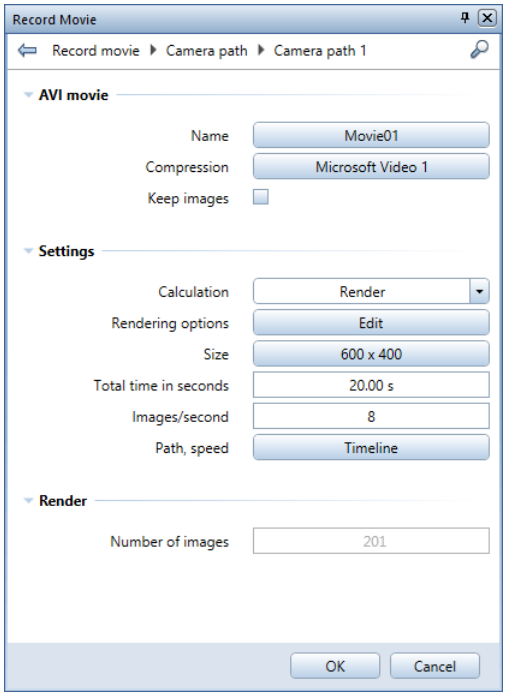
13 Specify the **Size** (= size of window with the rendered image) by clicking the button.
Select a default setting or enter the width and height in pixels.
You can also match the size of the active viewport.
Click **OK** to confirm the render size.



14 By using the **Timeline** button in the **Settings** area, you can make time settings for the movie. For example, you can modify the time between the camera positions.
Click **OK** to close the dialog box.



15 Finally, check the settings and click **OK**.



Note: Select the **Keep images** option only if you actually need the images. In addition to the AVI movie, the program saves all images calculated (see **Number of images**) to the folder you selected when you entered the **Name**. This can quickly lead to large volumes of data.

16 Start recording.

During calculation, you can always see how many images Allplan has already calculated.

You can find the final movie in the folder you specified (the project folder is the default setting). To view the movie, double-click it.

With the settings in the illustration, it can take the program quite a few minutes to record the movie.

For a high-resolution, flicker-free movie, select the following settings:

- Rendering method: global illumination (**GI (IR+QMC)**); switch the default quality to high or very high.
- Destination size: match the size of the active viewport
- Images per second: 16

... and start recording just before you leave work.

Appendix

If you want to create the project and the building structure yourself, this appendix provides useful information and step-by-step instructions on the following topics:

- Project organization - managing data with ProjectPilot
- Using layers
- Organizing projects only with the default layer
- Creating a project
- Creating a building structure
- Defining print sets

In addition, you can find general information on drawing files.

The "Overview of tools" section shows you the most important tools you need in this tutorial.

Note: If you want to skip the general sections, continue as described in **Creating a project** (see "**Creating the training project**" on page 459).

Note: You can also download the project template for the training project from the internet. For more information, see **Project templates on the internet** (on page 493).

Project organization

Project structure, that is, the way in which you organize your data, is an essential part of any building design project. With an efficient and logical structure, you can locate the data you need without having to spend a long time looking for the data.

It is worth spending time carefully planning a project's structure before even drawing the first line. Consider the time and effort spent doing this as a good investment – after all, in the long term, it will save you time and money.

With Allplan 2020's flexible approach, you can create your own office-specific structures which, in turn, can be altered to suit the needs of special projects.

Managing data with ProjectPilot

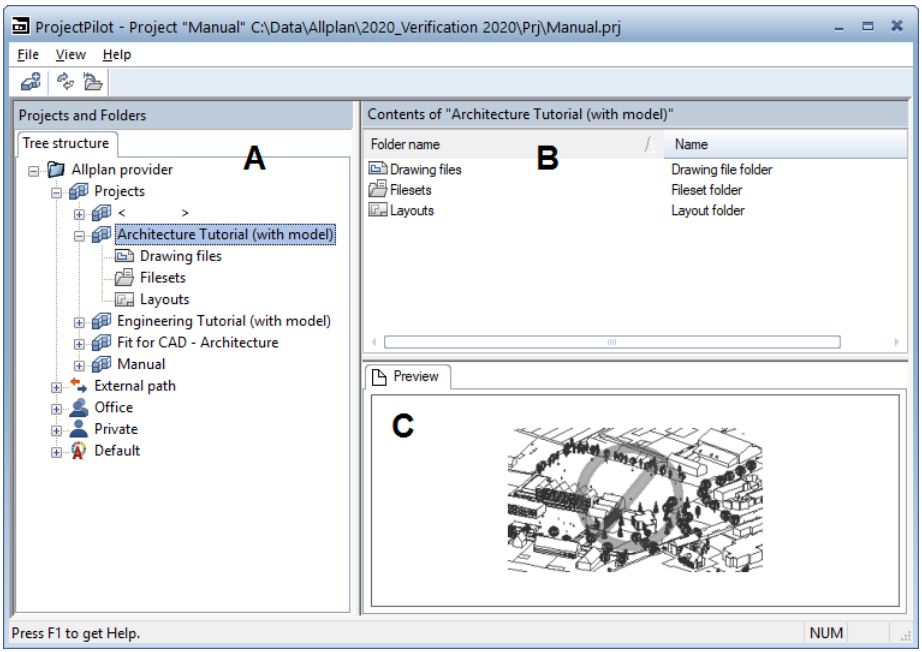
What is ProjectPilot?

You use **ProjectPilot** to create and structure projects in a simple and clear manner.

ProjectPilot is a powerful data management tool developed specially for the data structure of Allplan. ProjectPilot provides tools for copying, moving, renaming and deleting data (for example, projects, drawing files).

If you are already familiar with File Explorer, then you'll find that working with ProjectPilot is just as easy. You can use the shortcut menu for almost everything. If you find that you need to move or copy files, you can simply drag them to the new folder.

User interface



Left window (A)

The left window shows the projects and folders in a tree structure. The current project is selected and open. Click the plus sign (+) to display the levels in a folder. Click the name of a folder to display its contents in the right window.

By double-clicking, you can display the contents of the folder and open it at the same time.

Right window (B)

The right window shows the folders and documents in the selected node (in the left window). You can sort the documents by clicking the title of a column. Right-click in the background to display the documents as a list or as icons.

Preview (C)

You can see the currently selected document (drawing file, layout) in the preview. To move the preview, click it with the middle mouse button and drag. Use a selection rectangle to zoom in on an area in the preview. Double-clicking with the middle mouse button restores the preview to its original size. Alternatively, select the * key on the numeric keypad.

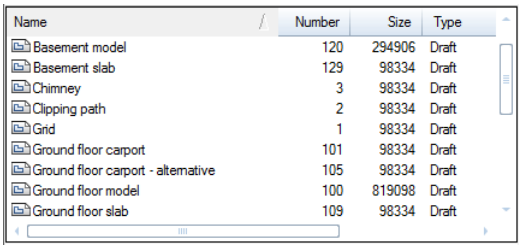
To display an isometric view: use the number keys on the numeric keypad. Check that the Num Lock key is active as you do so.

Common approaches in ProjectPilot

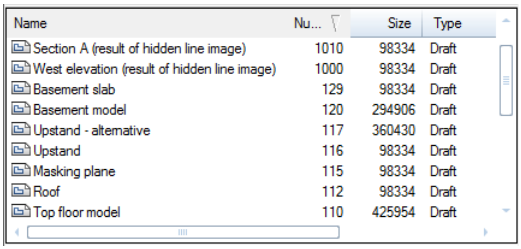
If you are already familiar with File Explorer, you will quickly find your way around ProjectPilot. You can accomplish most steps by using the shortcut menu or the drag-and-drop feature.

Sorting documents

You can sort the documents by clicking the title of a column. Click the column title to sort the documents in ascending order. Click the same column title again to sort the documents in descending order. An arrow indicates which column is being sorted and whether sorting is in ascending or descending order.



Sorted in ascending order (arrow points upward) by drawing file name



Sorted in descending order (arrow points downward) by drawing file number

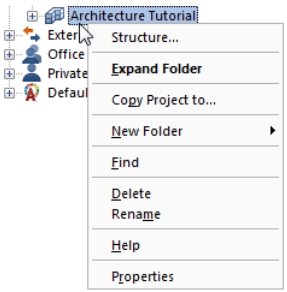
Copying and moving by means of drag-and-drop editing

Instead of the shortcut menu, you can also use the drag-and-drop feature to move or copy selected documents. Select the documents, click within the selection and drag. You can tell whether this is possible by the shape of the cursor when the mouse pointer is positioned over the destination.

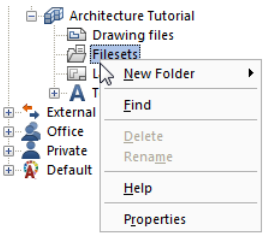
Cursor	Meaning
	Copies the document to the folder to which point.
	Moves the document to the folder to which you point. **Note**: To move documents, select and hold the Shift key while dragging the documents.
	Links the document with the folder to which you point (for example, when you assign drawing files to a fileset).
	The document cannot be placed here.

Working with the shortcut menu

You can use the shortcut menu to do almost everything in ProjectPilot. Depending on which element you click, a shortcut menu appropriate to the element opens.



Shortcut menu of a project



Shortcut menu of the fileset folder

Using the preview

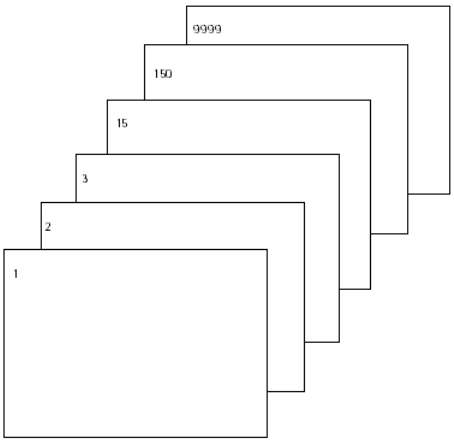
You can see the selected document in the preview. You can zoom in on the preview, pan the preview and display the preview in isometric view. Click **Preview** on the **View** menu to specify whether and where to place the preview.

- **To turn off the preview**, point to **Preview** on the **View** menu and click **None**.
- **To zoom in on the preview**, open a selection rectangle around the area you want to view in detail. The cursor changes to crosshairs.
- **To pan the preview**, move the view with the middle mouse button. The cursor changes to a hand. Alternatively, use the cursor keys.
- **To restore the preview to full view**, double-click the middle mouse button in the preview area or select the * key on the numeric keypad.
- **To display an isometric view**, use the number keys on the numeric keypad. Check that the Num Lock key and the preview are selected as you do so.

Note: The preview is only available with certain documents (drawing files, layouts).

Understanding drawing files

In Allplan, the actual design and data creation happens in *drawing files*. These are the equivalent of the transparencies used in conventional building design. Drawing files can be used to give projects a structure. In IT terms, a drawing file is a conventional file stored on your hard drive. You can display and edit up to 128 drawing files at once – in other words, you can have several files open simultaneously. A project can contain up to 9999 drawing files. Without layers, the individual building elements (such as walls, stairs, labeling) are drawn in different drawing files and superimposed like transparencies.



To edit the drawing files, you must open them. You can do this in the **Open on a project-specific basis: drawing files from fileset/building structure** dialog box.

Drawing file status

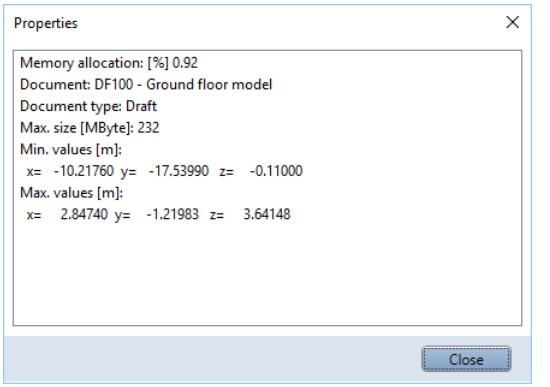
With the drawing file status, you define the drawing file on which you draw and which drawing files are visible and can be modified. The following illustration shows the different drawing file statuses. You can find an explanation in the table.

Number	Drawing file status	Comment
1	Current or active	The current or active drawing file is the one in which you draw. There must always be one current or active drawing file.
2	Open in edit mode	Elements in drawing files open in edit mode are visible and can be modified. Up to 128 drawing files can be open simultaneously (regardless of whether they are current, in edit mode or in reference mode).
3	Open in reference mode	Elements in drawing files open in reference mode are visible, but they cannot be modified. You can configure the program to use the same color for all elements in reference drawing files. To do this, select the **Options**, click **Desktop environment** and open the **Display** page. You cannot open empty drawing files in reference mode.
4	Not selected	Elements in these drawing files are not visible.
5	Empty	Empty drawing files have no data type icon.
6	Assigned temporarily	The drawing file is assigned temporarily to the fileset. Allplan clears this assignment as soon as you switch to a different fileset.

7	Open in reference mode	The drawing file has been opened by another user in the workgroup environment.
8	Open in reference mode	The drawing file has been opened by another user in the workgroup environment; the color red indicates that the drawing file has changed. You can apply the changes by selecting **Update drawing file** on the shortcut menu. In the **Options – Desktop environment** page, you can configure the program to inform you of changes in reference drawing files.
9	Linked drawing file	The drawing file contains model data or views and sections linked with other drawing files. Allplan links drawing files when you create views and sections with the tools in the **Reinforcement Views** task area. You can use the shortcut menu to list all reference drawing files of the current drawing file or open its reference drawing files in edit or reference mode.
10	Views and sections created automatically	The drawing file contains views and sections that you created by using the shortcut menu in the "Derived from building structure" area or views and sections that you created with the tools in the **Sections** task area of which the results were saved in this drawing file. These views and sections usually refer to other drawing files. Allplan considers the model data in these drawing files.
11	Update locked	By using the shortcut menu in the "Derived from building structure" area, you can lock the update of drawing files with views and sections created with the **Update automatically** option not being selected. Allplan cannot update the result until the drawing file is unlocked or the **Update automatically** option is selected. After having confirmed a prompt, you can create a new view or section in the drawing file.
12	Views and sections placed manually	The drawing file contains views and sections created with the tools in the **Sections** task area. These views and sections can refer to other drawing files. Allplan considers the model data in these drawing files.

Information on the active drawing file

To get information on the active document, right-click in the workspace and choose **Properties** on the shortcut menu. An information box with all the important information about the file opens.



Information	Meaning
Memory allocation	This shows how much of the memory reserved for a file has already been allocated (as a percentage). Background information: A certain amount of memory is reserved for files.
Document	This shows the number of the current file. You can also find this number on the title bar of the Allplan window.
Document type	This shows the file type, which corresponds to the data type icon on the status bar.
Maximum size	This shows the maximum amount of memory available for the file in kilobytes.
Min. values, max. values	This shows the minimum and maximum coordinates in the file.

Using layers

Understanding layers

Layers provide an additional means of structuring design entities within drawing files. You can display exactly the information you need just by turning the relevant layers on and off. This way, you can proceed quickly, as you can see better what you are doing.

You can use layers to define the format properties of elements.

Layers are important organizational elements. Their importance increases the more people are involved in a project and the more a CAD system is used for specialist design processes. Layers do not replace drawing files. Rather, they complement them.

Defining the current layer

When created, each element is given the current layer. The layer which is used as the current layer is governed by the following settings:

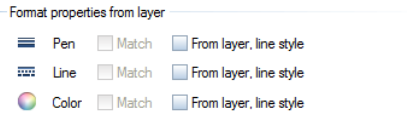
- When you activate a tool (for example, line) for the first time, a specific layer is automatically selected as the current layer (if the **Auto-select layer with tool** option is selected in the **Layer** dialog box). The layer in question depends on which tool you activate. If the **Auto-select layer with tool** option is not selected, the program automatically uses the layer you selected last.
- The **Layers** palette shows the current layer. You can change the layer status with just one click.
  You can display the entire layer hierarchy, the layers assigned to the currently selected tool or the layers used in open documents. To do this, you can use the extensive shortcut menu of the **Layers** palette.

- The **Objects** palette – **Sort by layer** criterion also shows the current layer. You can change the layer status by clicking the icon indicating the layer status.
  You can see all the layers in the documents loaded. The tree structure lists all layers with their elements sorted by element group.
- If a tool (for example, Line) is active, you can use the **Properties** palette to define a different layer as the current one. This layer will then automatically be used as the current layer the next time you activate the tool.
- When you save components as styles or favorite files, the program also saves the current layer. When you retrieve these components later, the layer saved automatically becomes the current layer.
- Normally, openings like recesses in walls and slabs or window and door openings get the same layer as the element into which they are inserted. Click the **Special** button in the **Options – Components and architecture – Miscellaneous area** to specify whether these openings can be assigned separate, independent layers.
- As walls can consist of multiple construction layers and each layer can have different format properties, you can define the layer for each of the construction layers in a wall or upstand directly in the **Properties** dialog box (you usually make these settings in the **Properties** palette).

Defining the format properties of layers

Every layer has **pen**, **line** and **color** properties. In the **Layer** dialog box, you can specify that an element is to automatically assume the properties of the layer on which it is drawn.

The format properties of a layer can also be defined as a **line style** and saved under a name of your choice. Elements can then assume the format properties of this layer.



When defining **line styles**, you can specify how they change with the scale or drawing type. You can define different line styles for various scale ranges or drawing types so that the way the elements look changes with the reference scale or drawing type. By using line styles, you can work across scales.

Drawing types define how elements look on the screen and in printouts. How elements look varies depending on the selected drawing type. Requirements: You take the format properties from the layer in a fixed manner and use line styles.

Layer access rights

There are different layer access rights. On the one hand, there is the visibility setting which controls whether a layer is visible or hidden. On the other hand, there is the edit setting which controls whether a layer can be edited or not (that is, it is frozen). You can save visibility settings in print sets (see "Using print sets" on page 458) and edit settings in privilege sets. The status of a layer is indicated by **icons** in the **Layer** dialog box (**Select Layer/Visibility** tab) and in the **Layers** palette:

Icon	Access right	Explanation
	Current	The layer on which you draw.
	Modifiable	Elements in this layer are visible and can be modified.
	Visible, frozen	Elements in this layer are visible but cannot be modified.
	Hidden, frozen	Elements on this layer are not visible and cannot be modified.

You can restrict access to layers on the **Select Layer/Visibility** tab or in the **Layers** palette. For example, you can change the status of layers from **Modifiable** to **Visible, frozen**.

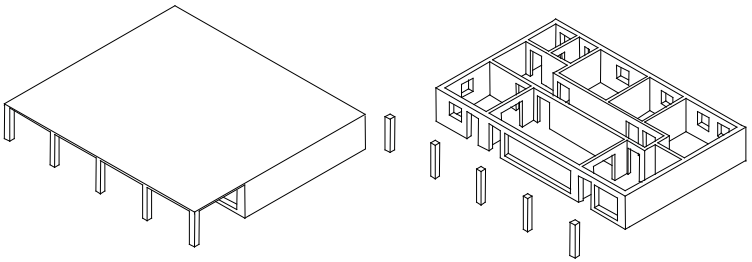
The **Objects** palette – **Sort by layer** criterion shows the layers in the loaded documents. The tree structure lists all layers with their elements sorted by element group.
When you point to the icon indicating the layer status in the list, Allplan opens a flyout menu where you can change the status of the layer. Here, too, you can change access to layers. You can switch between **Current**, **Modifiable**, **Visible, frozen** and **Hidden, frozen**.

Layer access rights also depend on the privilege set to which a user belongs. Therefore, you cannot assign a higher status to layers (for example, switch hidden layers to modifiable) when you belong to a privilege set that is not granted full access rights to the relevant layers.

Setting layer visibility in drawing files

You can make layers visible or invisible, thus showing or hiding the corresponding elements.

Thus, you can quickly hide the elements you don't need during the current design phase, selectively modify elements on the visible layers, check your plan and see whether all the elements are assigned to the correct layer. For example, you might choose to hide the slab layer and then view the spatial arrangement of the building as a hidden-line image in perspective view.



Note: Right-click an element and, on the shortcut menu, select **Modify Layer Status** and then **Isolate layer - set all other layers to hidden** to hide all the layers except the layer of the element clicked.

If you often need the same combination of visible and hidden layers (for dimensioning or labeling at certain scales, for example), we recommend that you define what is known as a print set. You can also use this print set when you assemble the layout later, thus making sure that only the visible layers are included in the printout.

Note: You can choose to **Display elements on frozen layers in a fixed color** by selecting this option in the **Layer** dialog box.

Managing layers and layer structures

The office administrator is usually in charge of managing layers and layer structures. This person defines which layers are used, defines privilege sets and grants access rights. By assigning the other users (architects, engineers and so on) to the privilege sets, the office administrator grants the users access to the layers.

When you create a project, you can decide whether you want to use the layer structure of the office standard or a project-specific layer structure.

You can name and save layer structures and retrieve these structures later. If you have assigned line styles to layers, these line styles are saved together with the layer structure (with the same file name plus the extension `.sty`). When importing a layer structure you saved, you can decide whether to import the associated line style file too.

Advantages of data organization with layers

With large projects in particular, organizing data with layers has significant advantages:

- Associative elements – such as wall dimensions or sill elevation labels – are in the same drawing file and yet can still be hidden from view.
- So that components interact, the components in question must be in the same drawing file. This is also the case for certain analyses. With layers, you can meet these requirements easily.
- Easier to assemble layouts thanks to print sets. Print sets are user-defined compilations of layers, which are very useful for editing and assembling layouts. When assembling a layout, you can choose to display only the elements in a specific print set – switching between 1:50 and 1:100 is thus no problem.
- Exporting drawing files to DXF/DWG layers is easier, because you can assign each layer in a drawing file to a different DXF/DWG layer When importing DXF/DWG files, the DXF/DWG layer structure can be automatically integrated in the layer hierarchy.

- It is often faster to modify the layer of an element than to modify the drawing file of an element.
- If a layer is missing from the layer structure, you can create it quickly and use it in all the drawing files of the project.
- A project can contain more layers (approximately 65,000) than drawing files (9,999). With layers, you can distinguish more precisely between the individual design entities.
- You can display and edit 65000 layers at once whereas the number of drawing files that you can have open simultaneously is 128.
- You can show and hide layers very quickly (for example, by means of print sets, layer favorites, the **Layers** palette or the **Objects** palette – **Sort by layer** criterion).
- You can change the format properties of a layer later. All the elements of this layer that were drawn with the **From layer, line style** setting will adapt automatically. So, you do not need to modify the elements separately.
- You can copy format properties including layers by double-clicking with the right mouse button. This method also works with wizards. Similarly, you can use **Copy Format** to quickly copy the format properties of an element and apply them to other elements.

Relationship between layers and drawing files

The use of layers doesn't mean that drawing files don't play a role when it comes to organizing your data. With large project in particular, a combination of both is essential. With the same structural depth, the number of drawing files required is far less when working with layers.

The number of drawing files you need not only depends on the size of the project, but also on your hardware. Modern, fast computers with a lot of memory can handle a lot more data per drawing file without this leading to a noticeable downturn in performance.

The interplay between layers and drawing files depends on the following factors:

- The size of the project and the number of designers involved at any one time.
  If several designers are working on one floor, create one drawing file per area of responsibility (East Wing, Central Unit, West Wing, for example.)
- Simultaneous involvement of specialist designers on the project. Always use separate drawing files for specialist designs to facilitate concurrent activity.

Using privilege sets

With privilege sets, you can control users' access to layers. You should assign privilege sets if several people work on the same project. With workgroup manager, you can assign individual users to one or more privilege sets. As a result, these users can see or edit only the layers that are associated with the relevant privilege set.

Privilege sets can do more than just control who accesses which layers. They simplify your whole work, as you can define privilege sets with a selection of layers that are to be available while drawing.

After installation, the **ALLPLAN** privilege set is preset. This privilege set has read/write permissions for all layers. Consequently, all users can see and modify all data.

Using print sets

A print set is a set of layers that you can select when compiling and arranging layouts. You can also use print sets to control which layers are visible or hidden. Only the elements whose layers are included in the selected print set are visible in the layout.

For example, you can select a print set for working drawings so that only the data that is relevant to a working drawing appears in the final printout.

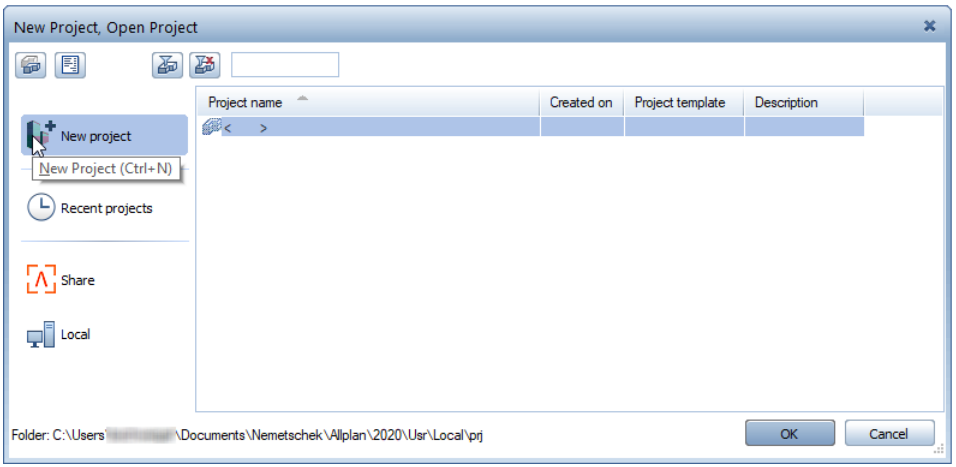
Creating the training project

Start by creating a project.

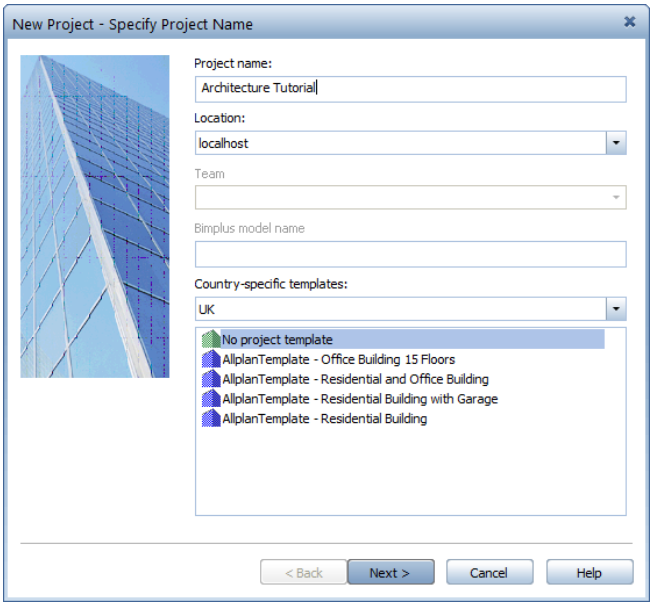
To create a project

1 Click **New Project, Open Project...** on the Quick Access Toolbar (title bar).

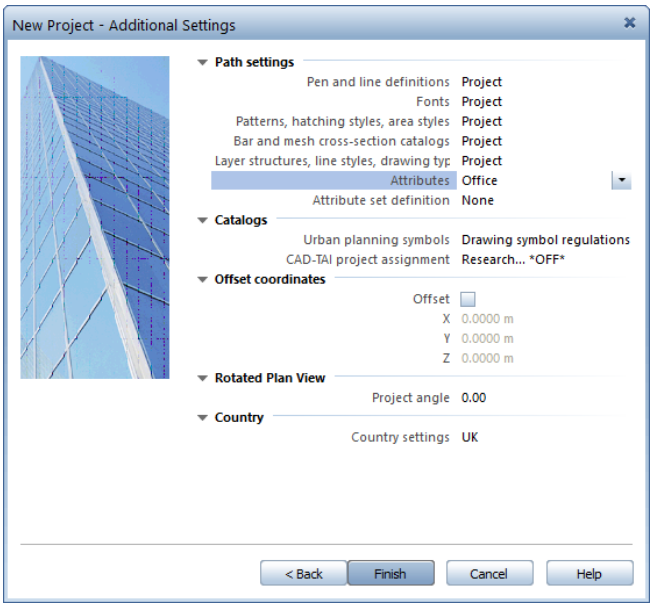
2 The **New Project, Open Project** dialog box opens. Click **New Project**.



3 *New Project – Specify Project Name*
For the project name, enter **Architecture Tutorial**. In the **Project templates** area, click **No project template** and then **Next >**.



4 *New Project – Additional Settings*
Check that **Project** is selected for all path settings (except **Attributes**). Then click **Finish** to confirm.



You are back in Allplan; the **Architecture Tutorial** project is open.

Note: To create a new project, you can also use **ProjectPilot** (in the drop-down list of the Allplan icon on the title bar).

Path settings

This defines which pen, line, hatching settings, fonts and material catalogs are used. In practice, the office standard is generally used.

Office: Choose this option if you want different projects within the same office to use the same settings (for hatching, line types and so on). If you work on a network, the office standard is the same on all computers and can be changed only by users with special privileges.

Project: Choose this option if you want the settings, for instance for patterns and hatching styles, to apply to this project only (in this case they can be different from those used as the office standard).

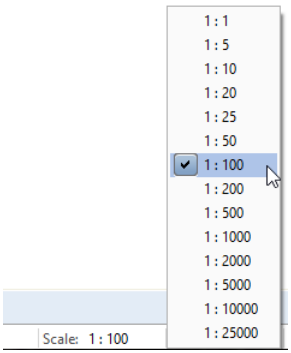
Selecting the scale and unit of length

Define scale and length settings for the project.

Start by selecting a reference scale of 1:100.

To select the reference scale

1 Click in the field beside scale on the status bar and select **1:1**.



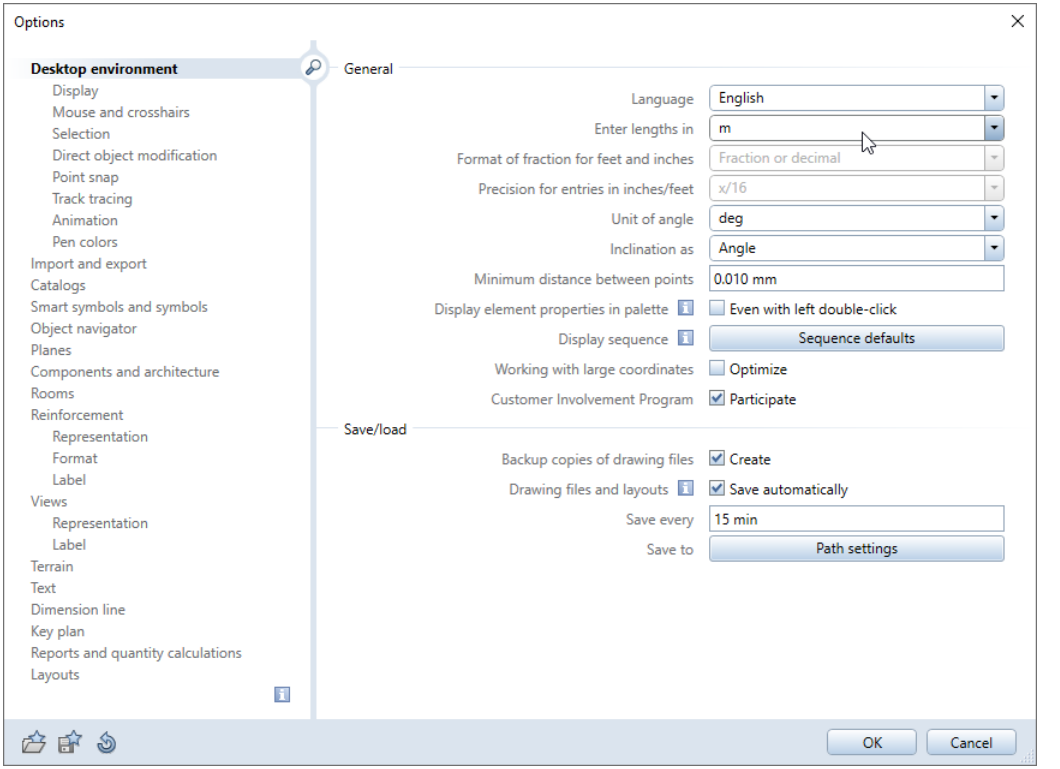
Select the unit you want to use to enter values. The values are to be interpreted in **meters**.

To select units

1 Click **Options** in the **Default Settings** drop-down list on the Quick Access Toolbar (title bar).

2 The **Options** dialog box opens. Click **Desktop environment** in the left area.

3 Go to the **Enter lengths in** box and click **m**.



4 Click **OK** to confirm the settings.

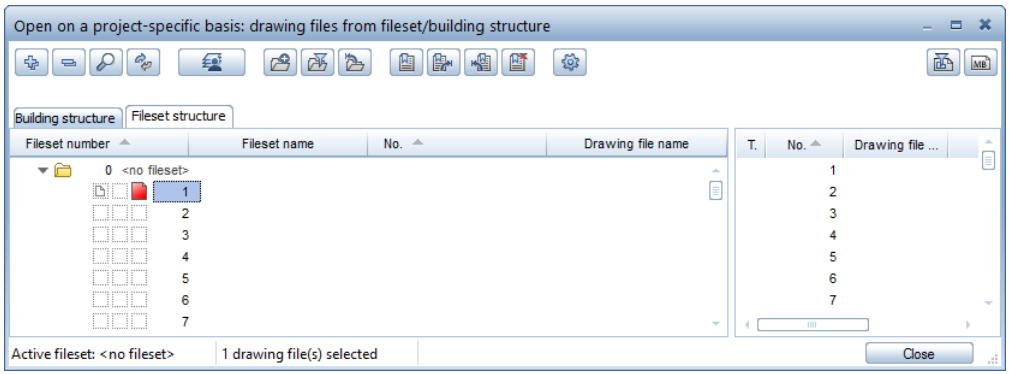
Tip: Alternatively, select the unit on the status bar: Click to the right of **Length** and select **m**.

Building structure

In Allplan, the actual design and data creation happens in *drawing files*. These are the equivalent of the transparencies used in conventional building design. Drawing files can be used to give projects a structure. Allplan provides two options for structuring drawing files in a project:

- the building structure
- the fileset structure

You can select either option in the **Open on a project-specific basis: drawing files from fileset/building structure** dialog box. Click **Open on a Project-Specific Basis...** (Quick Access Toolbar).



Use the building structure to clearly structure the training project of this tutorial. By using the building structure, you can generate views, sections and building lists quickly and easily.

An important difference between the building structure and the fileset structure is that each drawing file can be assigned only once to the building structure.

To create the building structure for the training project, do the following:

1 Define structural levels

2 Assign heights to structural levels (floor manager)

3 Assign drawing files to structural levels (creating the building structure)

4 Naming drawing files

Note:
You can find advanced information on the building structure in the Allplan Help.

Creating structural levels and the plane model

Now you will create your own project structure. We recommend that you work with stories and print sets in a real project.

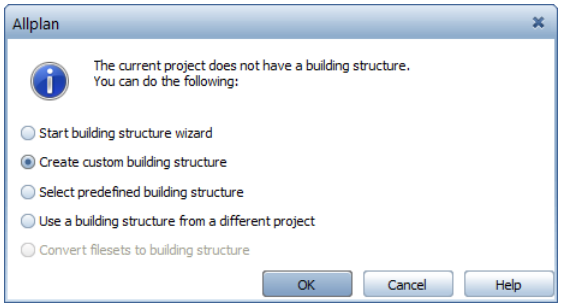
Our example involves a detached house of which you will design the basement, ground floor and top floor.

When creating the building structure, you start by defining the necessary structural levels. This example requires the **Building** and **Story** structural levels. To define the structural levels, you will use **Floor Manager**.
By using floor manager, you first define the number of stories and assign height settings to the entire building and the individual stories. In the **Floor Manager** dialog box, you can also configure Allplan to create the building structure automatically. If you have selected this option, you can assign drawing files to the selected structural levels. In addition, you can specify whether to create views and sections.

To define structural levels

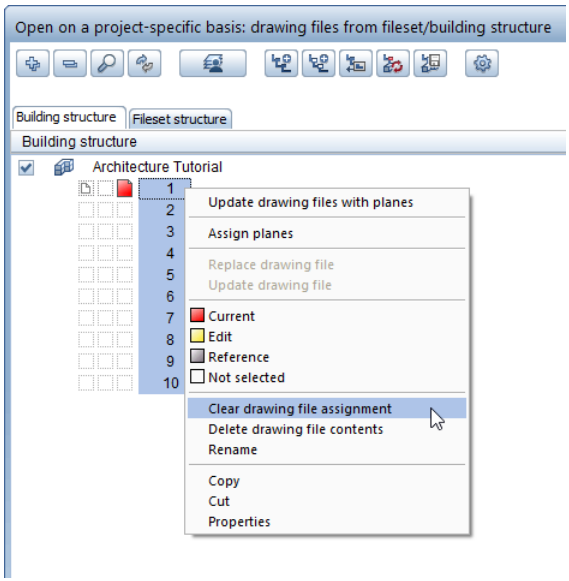
1 Click **Open on a Project-Specific Basis...**. (Quick Access Toolbar).

2 Click **OK** to confirm the **Create custom building structure** option, which is the default setting.



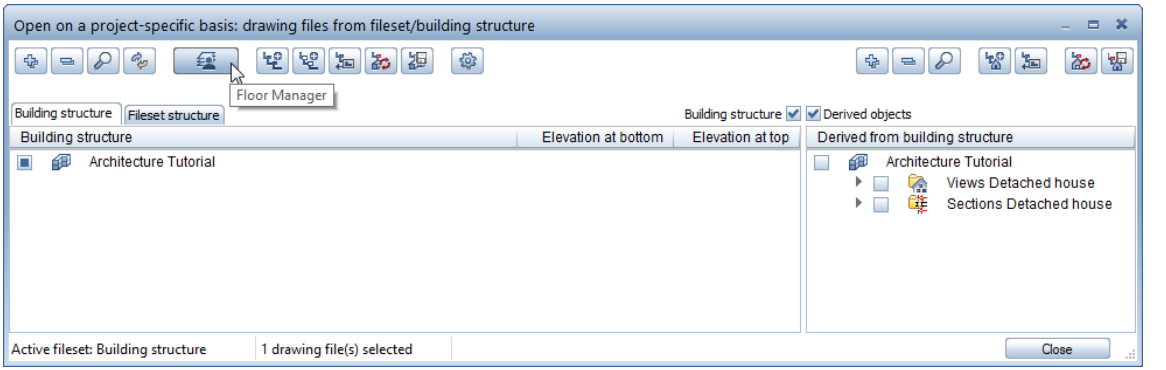
The program automatically assigned some drawing files to the building structure. You do not need these drawing files.

3 Select the drawing files, open the shortcut menu and click **Clear drawing file assignment**.

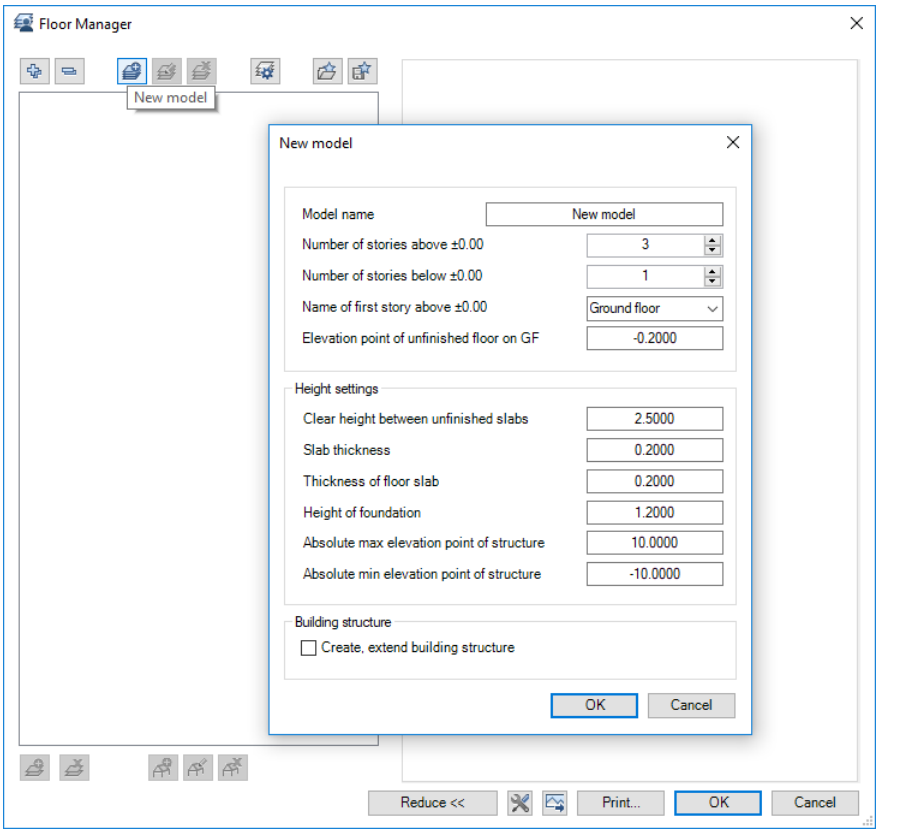


4 *Would you really like to remove the selected entries from the structure?*
Click **Yes** to confirm the prompt.

5 Click **Floor Manager**.



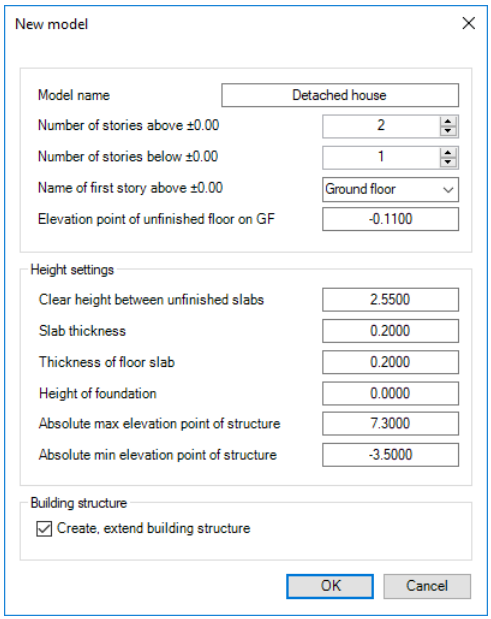
6 The **Floor Manager** dialog box opens. Click **New model**.



7 Make the following settings in the **New model** dialog box:

Model name: Detached house
Number of stories above 0.00: 2
Number of stories below 0.00: 1
Name of first story above 0.00: Ground floor
Elevation of unfinished floor on GF: –0.11

Clear height between unfinished slabs: 2.55
Slab thickness: 0.20
Thickness of floor slab: 0.20
Height of foundation: 0.00
Absolute max elevation point of structure: 7.30
Absolute min elevation point of structure: –3.50



Do not forget to select the **Create, extend building structure** option.

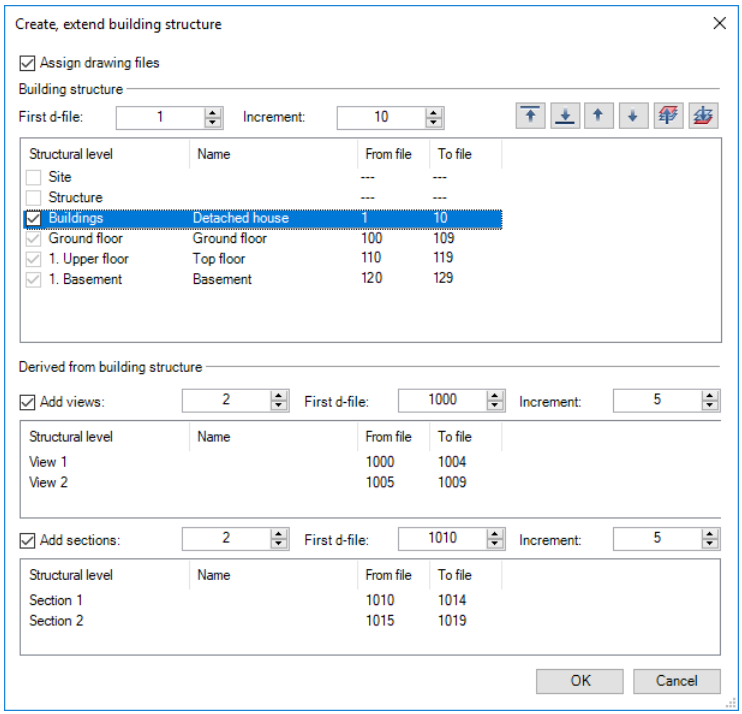
8 Click **OK** to confirm the **New model** dialog box.

The **Create, extend building structure** dialog box opens.

9 Make the following settings in the **Create, extend building structure** dialog box:

- Enter **10** for **Increment** in the area at the top.
  The number of drawing files assigned to the structural levels changes.
- Enter names in the **Name** column (see illustration).
- In the **Ground floor** line, **From file** column, click number **11** and change it to **100**. Select the Enter key to confirm. The drawing file numbers of the subsequent stories adapt automatically.
- Select **Add views** and enter **2**.
- The **First drawing file** for the views is the drawing file with the number **1000**.
- Enter **5** for the **Increment**.
- Select **Add sections** and enter **2**.
- The **First drawing file** for the sections is the drawing file with the number **1010**.
- Enter **5** for the **Increment**.

The **Create, extend building structure** dialog box should now look like this:

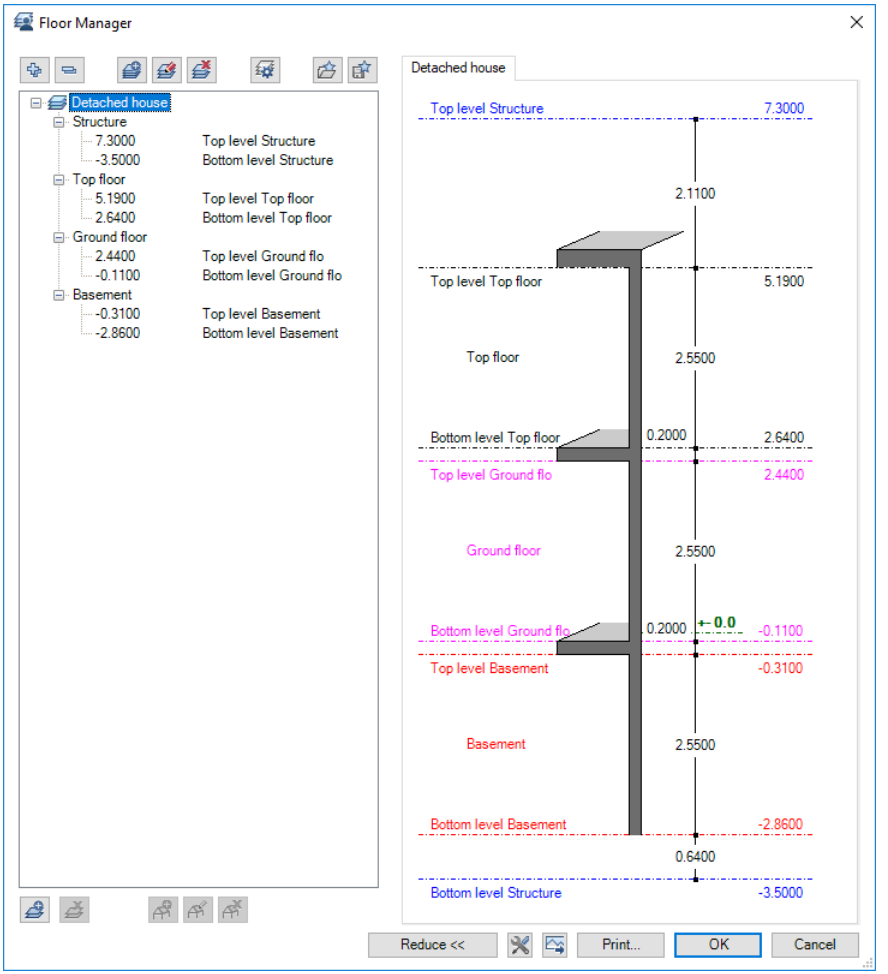


Note: You can use the buttons to change the sequence of the levels making up the **Story** structural level.

10 Click **OK** to confirm the **Create, extend building structure** dialog box.

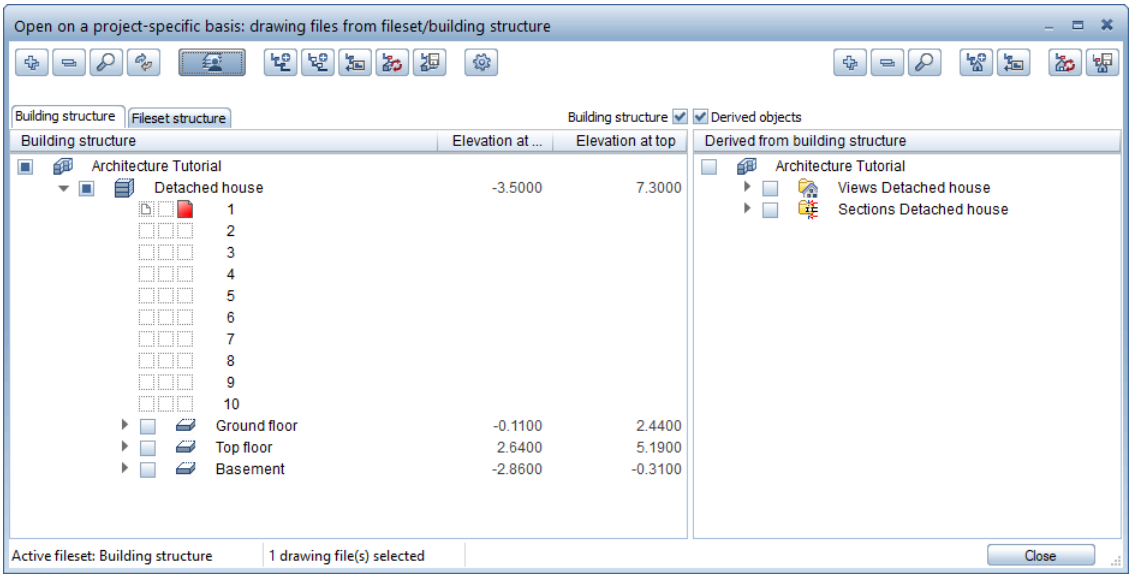
11 Select **Detached house** in the **Floor Manager** dialog box (left pane) and click to display all entries.

The **Floor Manager** dialog box should now look like this:



12 Click **OK** to confirm the **Floor Manager** dialog box.

13 You are back in the **Open on a project-specific basis: drawing files from fileset/building structure** dialog box, which now looks like this:

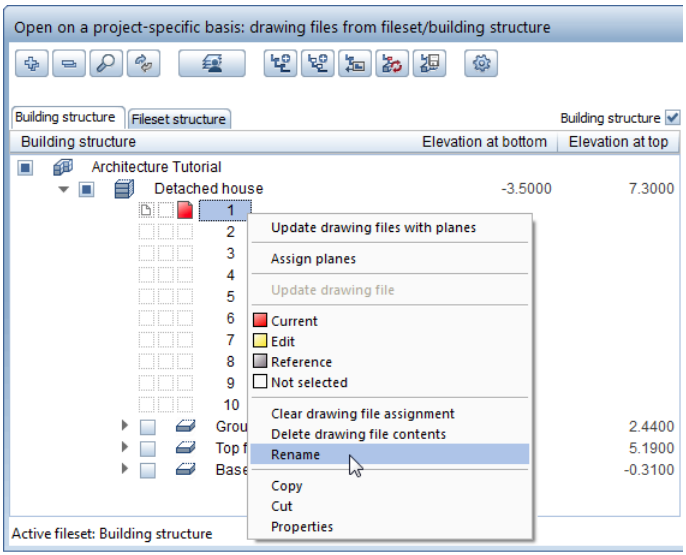


Naming drawing files

When you create a building structure, the last step is to name the drawing files.

To name drawing files

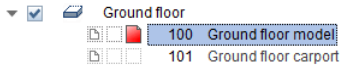
1 Select the relevant drawing file number. Right-click the drawing file number. The number is highlighted blue and the shortcut menu opens.
Click **Rename**.



2 Enter the drawing file names as shown in the table:

Drawing file number	Name
1	Grid
2	Clipping path
100	Ground floor model
101	Ground floor carport
112	Roof
120	Basement model

3 Select drawing file **100** by selecting the **Ground floor** check box and drawing file **100 Ground floor model**.
Make sure drawing file **1 Grid** is closed.



4 Click **Close** to close the dialog box.

Tips on project organization

Allplan is a very flexible system you can use to develop your own custom solutions for projects and entire offices. This structure is intended as a guide and can be used for large-scale projects too. You can use the entire structure or just parts of it.

You will probably find this structure useful when you start. As you progress, you will be in a better position to judge what needs changing to suit your own needs and requirements. We would like to emphasize once again that a carefully thought-out project structure will save time for everybody in the long run. The system has the following structure:

- Store general project information in drawing files 1-99. For example, the site plan, axis system or layout.
- Story design starts at drawing file 100.
  The first digit indicates the number of the story. The last two digits provide information on the contents. The sequence in which the drawing files are named should be identical on each floor.
- Use the drawing files starting at number 1000 for elevations and the relevant sections.
- Use the drawing files starting at number 2000 for detailing.

Setting up layers

When you created the project, you selected **Project** for the layer structure. All the settings you make, therefore, will apply to this tutorial project only.
The office standard is thus unaffected by any changes. You will probably use the office standard in your daily work. The office standard's settings are defined by the system administrator and apply for the entire office.

Allplan 2020 provides a very extensive layer structure designed to meet a broad range of requirements.
You can also define your own layer categories, layer hierarchies and layers. For this tutorial, you will be using the layers in the main **ARCHITECTURE** category.

You can specify whether the format properties (pen, line, and color) are based on your custom settings, whether these properties are proposed by the program in the **Properties** palette – **Format** area (you can change these settings at any time) or whether these attributes are always taken from the relevant layers (from the line style or the setting assigned to the layer).

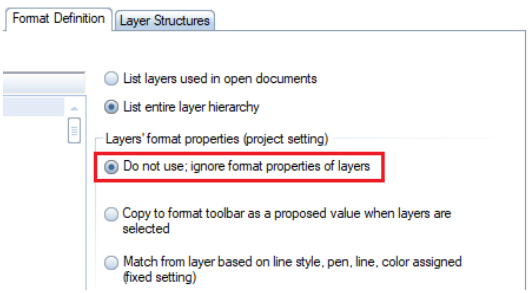
In this tutorial, you will work independently of the predefined layer format properties and make these settings while drawing.

To turn off predefined format properties

1 Open the **Layers** palette.

2 Click **>> Expand** at the bottom of the palette.

3 The **Layer** dialog box opens. Switch to the **Format Definition** tab and select **Do not use; ignore format properties of layers**.



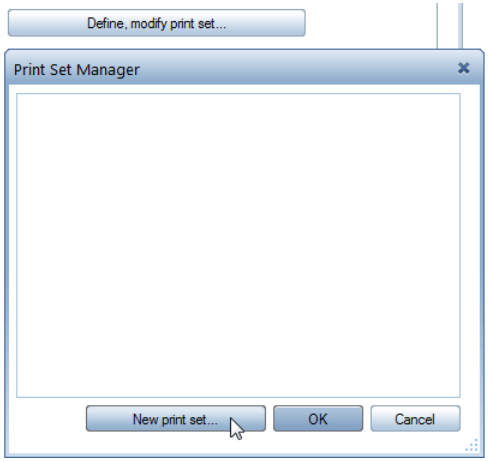
Defining print sets

A print set (see "Using print sets" on page 458) is a saved combination of visible and hidden layers.
Both when setting up your layouts and when turning layers on and off, activating a print set is a rapid way of showing or hiding those layers that are required for a specific print set. First create and name the print sets. Then assign layers to these print sets.

To define print sets

➲ The **Layer** dialog box is still open.

1 Select the **Print Set** tab and click **Define, modify print set...**.



2 The **Print Set Manager** dialog box opens. Click **New print set...**.

3 Name the first print set **SC Entry** and click **OK** to confirm.

4 If you work with Workgroup Manager, assign the user **local** to the print set.

5 Repeat steps 2 to 3 (4) and create more print sets:

- PR Design
- Model
- SC Rooms

You can enter any name you choose. The names here mean the following:

- **DR**: layout elements that are **pr**inted
- **SC** (**SC**reen)
- **Model**: contains the components for the visual 3D check.

6 Click **OK** to confirm print set manager.

Defining visible and hidden layers for print sets

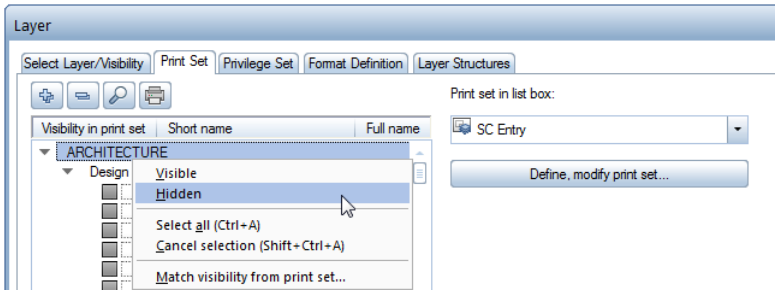
Now you need to define which layers are to be visible and which hidden in each print set.

To define visible and hidden layers for the print sets

➲ The **Layer** dialog box is still open.

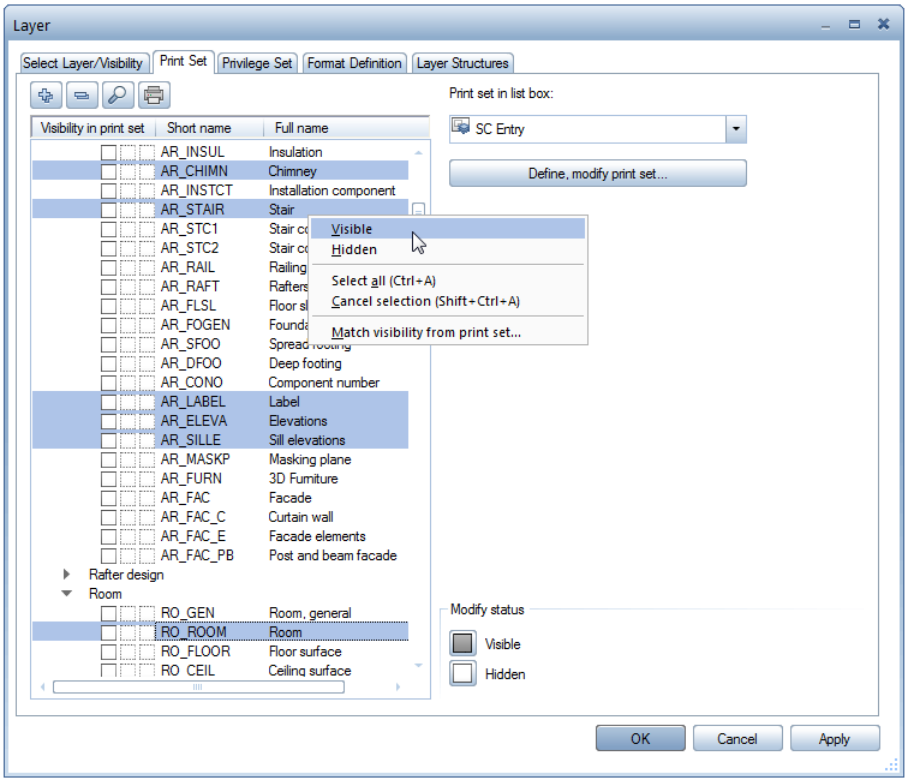
➲ The first print set – **SC Entry** – is visible.

1 As only a few layers are to be visible, start by setting all architectural layers to **Hidden**. To do this, right-click **Architecture** and choose **Hidden** on the shortcut menu.



2 Select and hold the Ctrl key and select the layers which are to be visible in the **SC Entry** print set (see table).

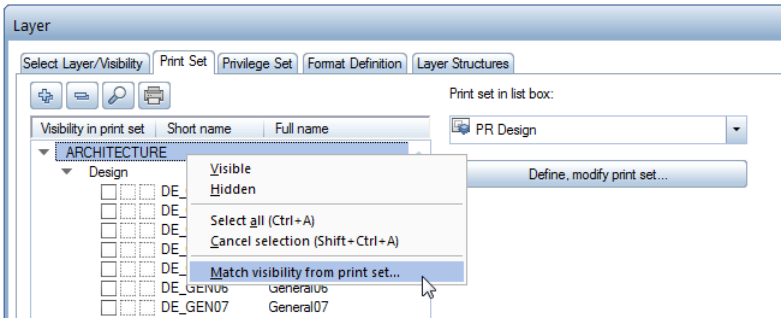
3 Right-click the selection and select **Visible** on the shortcut menu.



4 Click **Apply** to save the current setting.

5 Select the next print set in the **Print set in list box** area and define which layers are to be visible and which hidden in this print set (see table).

Tip: For other print sets, you can match the setting of a print set you have already defined and then adapt it as appropriate.

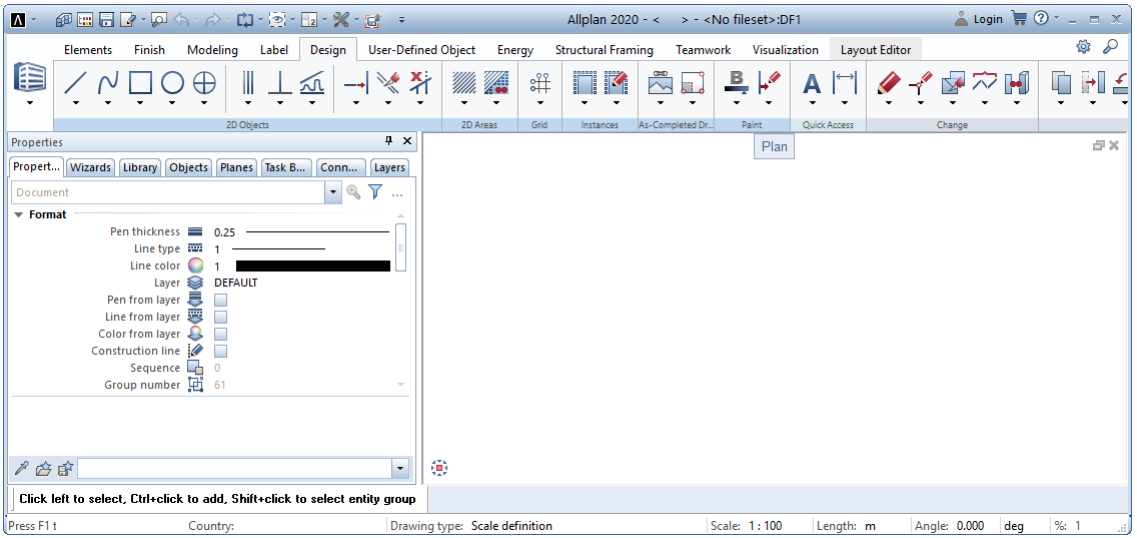


Hierarchy	Layer	Short name	SC Entry	PR Design	Model	SC Rooms
Design	General 1	DE_GEN01	✓	✓		✓
	General 2	DE_GEN02	✓	✓		
	Grid	DE_GRID	✓			
	Furniture	DE_FURN	✓			
	Sanitary facilities	DE_SANI	✓			
Text	Text 1:100	TX_100	✓			
Dimension line	Dimension line 1:100	ML_100	✓	✓		
Architecture	Wall	AR_WALL	✓	✓	✓	✓
	Column	AR_COL	✓	✓	✓	✓
	Slab	AR_COL	✓		✓	
	Window	AR_WIND	✓	✓	✓	
	Window sill	AR_WSILL	✓	✓	✓	
	Planes	AR_PLANE	✓			
	Roof	AR_ROOF	✓	✓	✓	
	Roof covering	AR_ROOFC	✓		✓	
	Chimney	AR_CHIMN	✓		✓	
	Stair	AR_STAIR	✓		✓	✓
	Label	AR_LABEL	✓			
	Elevation specs	AR_ELEVA	✓			
	Sill height	AR_SILLE	✓	✓		
Room	Room	RO_ROOM	✓			✓

6 When you have assigned layers to all print sets, click **Apply** and then **OK**.

Actionbar configuration

The Actionbar configuration is the default setting in Allplan 2020. This configuration shows the **Actionbar** above the workspace. In addition, you can see the **Properties**, **Wizards**, **Library**, **Objects**, **Planes**, **Task Board**, **Connect** and **Layers** palettes on the left side.



Click the **Allplan icon** on the left side of the title bar to open important tools such as save, copy, import and export. The title bar also includes the **Quick Access Toolbar**. By using a drop-down list, you can select the tools you want to display on this toolbar. In addition, you can also show and hide the menu bar, define the sequence of the tools on the Quick Access Toolbar and click **Customize User Interface...** to open the **Customize** dialog box – **Actionbar** tab.

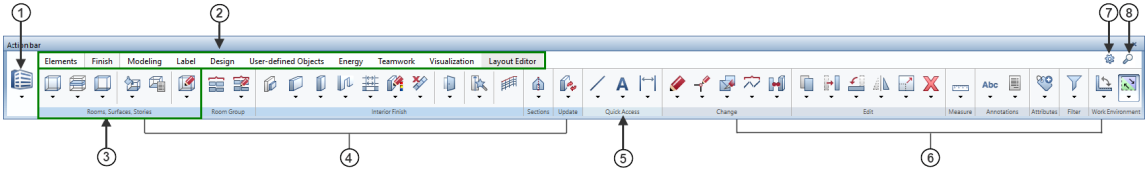
Contents and structure of the Actionbar

The **Actionbar** contains all Allplan tools grouped by role and task.

The **Actionbar** is docked to the top of the working area. If you want, you can drag the Actionbar to the bottom of the workspace and dock it there. You can also make the **Actionbar** float anywhere on

your screen. By double-clicking, you can dock it to the place where it was docked last.

Structure of the Actionbar



1 – Role

2 – Tasks arranged on tabs

3 – Task area

4 – Varying task areas

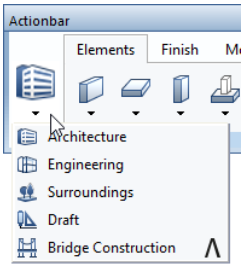
5 – **Quick Access** task area

6 – Fixed task areas

7 – **Actionbar Configurator**

8 – **Find**

Selecting the role

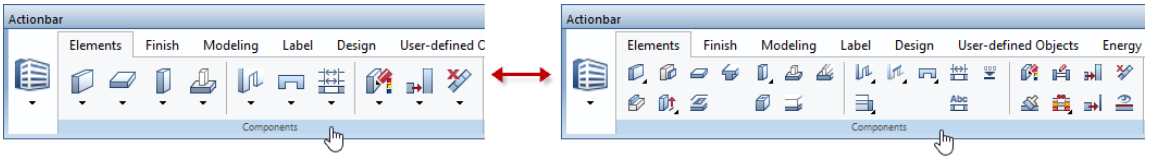


You start by selecting a **role** (1). The roles that are actually available to you depend on the selected **configuration** (7). If **Actionbar [Default]** is selected, you can choose from all the roles you purchased (depends on the license).
The **tasks** (2) that are available to you change with the selected role.

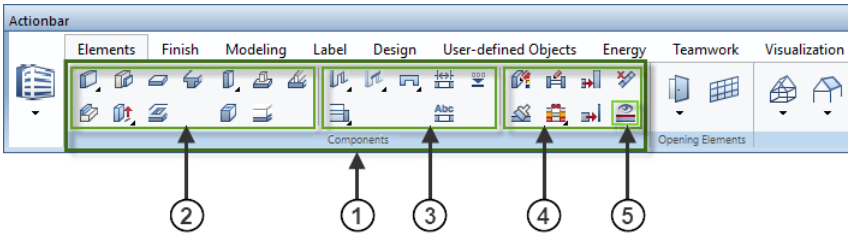
To open a task, click the corresponding tab. Each task is subdivided into appropriate areas. You can find areas in different colors, indicating varying and fixed **task areas** (3). The varying task areas (4) change with the selected task, such as the **Components** task area of the **Elements** task. You can find the fixed task areas (6) in all roles and tasks, such as the **Change** and **Filter** task areas. The **Quick Access** task area (5) contains tasks with tools used frequently.

The first time you open Allplan the task areas of the **Actionbar** are collapsed. To open the flyout menu of the tools, click the downward arrow. You can then see all the tools in the collapsed area.
When you point to the name line of a task area, the cursor changes to .
You can maximize or minimize a task area by double-clicking within the name line of a task area. A maximized task area shows more tools, which can also have flyout menus.

Note: You can maximize or minimize **all** task areas of the task currently selected by selecting and holding the Ctrl key while double-clicking within the name line of a task area. You can expand or collapse **all** areas **across tasks and roles** by selecting and holding Ctrl+Shift while double-clicking within the name line of a task area. The width of the Allplan window defines how many task areas can be maximized. If the window is not wide enough, Allplan starts on the left side, expanding as many task areas as possible.



Structure of a task area in detail



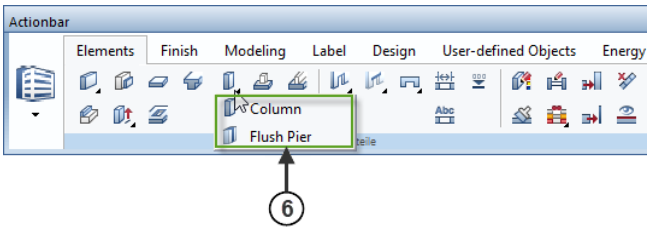
1 – Task area

2 – **Create** group of tools

3 – **Create in context** group of tools

4 – **Modify in context** group of tools

5 – Tool



6 – Tool menu = flyout menu of a tool

An expanded task area (1) contains one or more groups of tools (2/3/4). Different groups of tools are separated by vertical lines. The tools are grouped by topic. Some tools have flyout menus (6) where you can find similar tools.

Palette window

The palette window displays the palettes as tabs. Palettes are important controls of Allplan, making the user interface simple and easy to use. You can float or dock each palette individually. In addition, you can arrange the palette window or individual, free-floating palettes around the edge of the workspace or make them float anywhere on your screen. You can even configure Allplan to automatically show or hide the palette window or palettes arranged around the edge.

Properties palette

When the **Properties** tab is open, you have the following options:

Drop-down list at the top

Select active elements

Tools at the top and bottom

Zoom in on selected objects

Filter step by step

Change the properties of the selected object

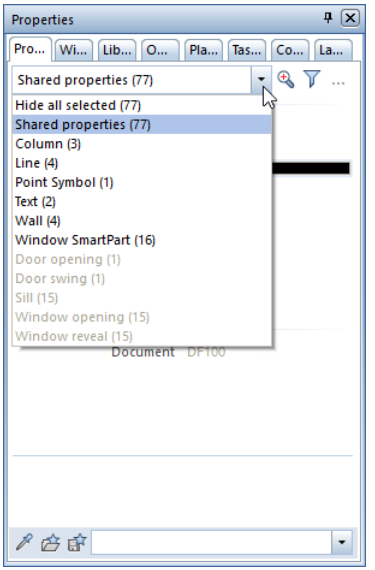
Match parameters

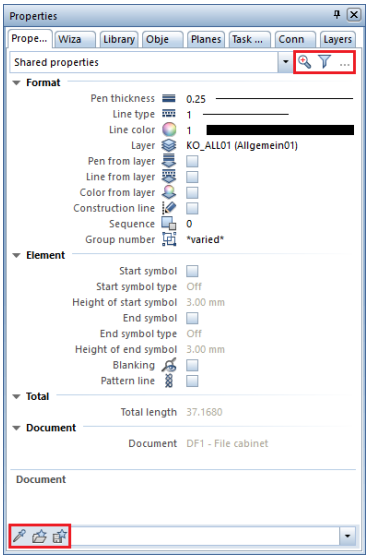
Load favorite

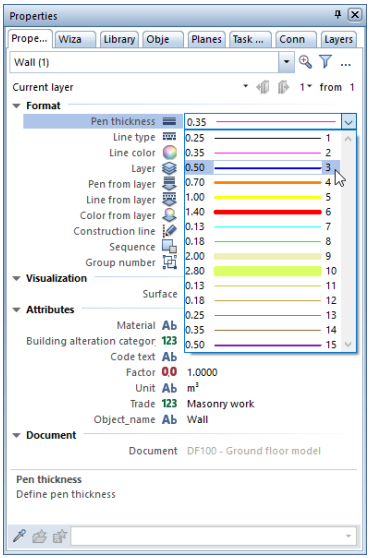
Save as a favorite

Properties

Modify properties





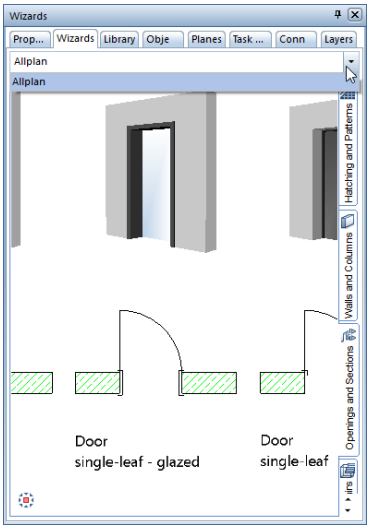


Wizards palette

When the **Wizards** tab is open, you have the following options:

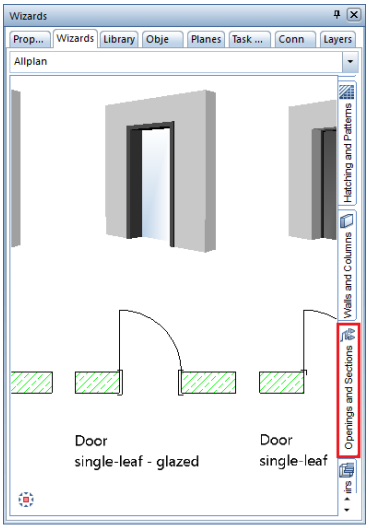
Drop-down list at the top

Select a wizard group



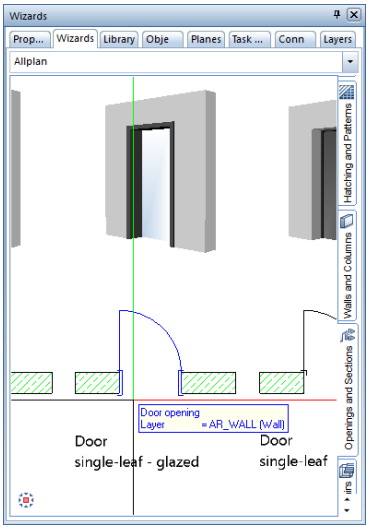
Tabs on the right side of the palette

Select a wizard



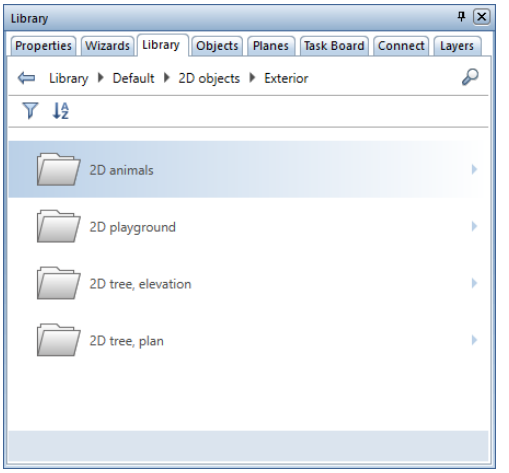
Available tools

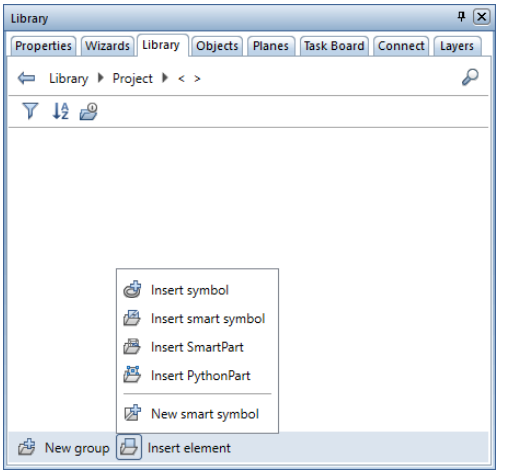
Select a tool



Library palette

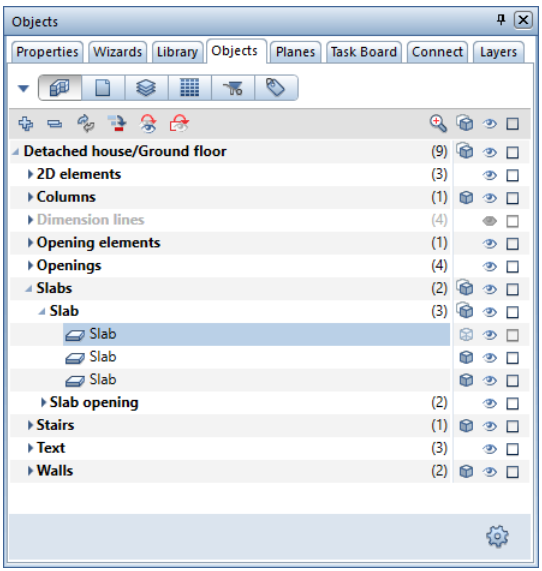
The **Library** palette provides a **Filter** that you can use to show or hide specific types of library elements (symbols, smart symbols, SmartParts and PythonParts).
After having opened a folder, you can see all subfolders with library elements (symbols, smart symbols, SmartParts and PythonParts) if you have not filtered out library elements. You can select the objects you want to use. You can also add your own objects to the corresponding library folders.





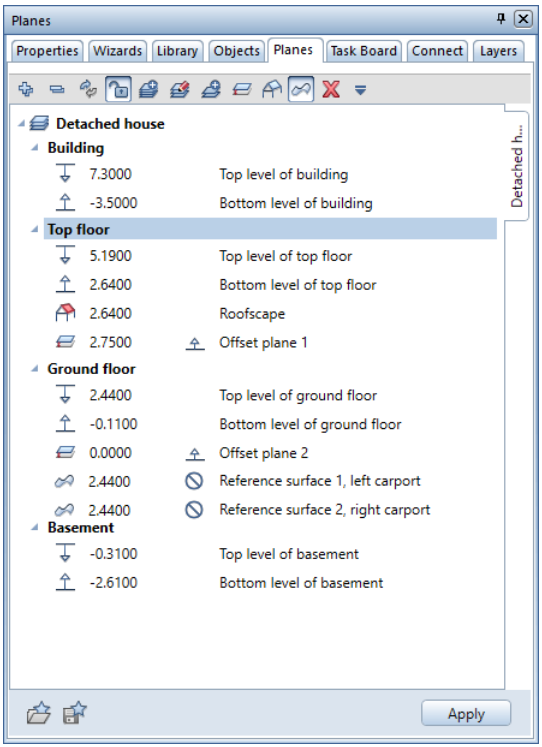
Objects palette

The **Objects** palette lists all objects and elements in the currently open drawing files (**current** or **open in edit mode** or **open in reference mode**). You can sort these objects by **Topology**, **Drawing file**, **Layer**, **Material**, **Trade** or **Attribute**. You can show or hide selected objects as you need. In addition, you can define the transparency of 3D objects (this effect is evident only in viewports of the **animation** view type). You can even activate or deactivate objects and elements via the **Objects** palette.



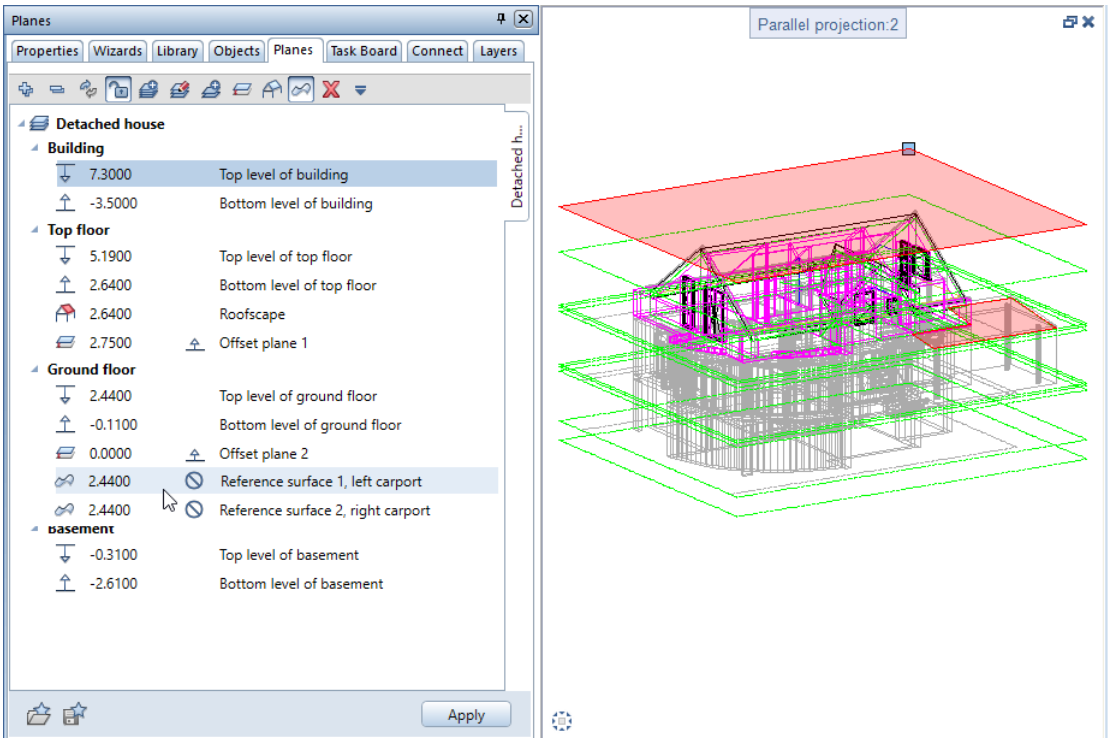
Planes palette

The **Planes** palette displays all plane models in the active project. Each plane model has its own tab. While creating components, you can keep track of the default planes and all other objects on which the heights of the components can be based.



To edit a plane model, click **Modification mode on/off**. If modification mode is on (), you can make entries in the **Planes** palette. Allplan displays the planes of the plane models in all viewports. When you point to or select an entry of the plane model in the tree structure, this entry is also highlighted in the detection color in the viewport. So, you can immediately check the position of the plane and see the effects of changes.

The tools in the **Planes** palette are similar to those provided by the **Floor Manager** (see "**Creating structural levels and the plane model**" on page 464) dialog box of the building structure. For example, you can use the **Insert pair of planes**, **Insert or replace roofscape**, **Insert or replace reference surface** and **Insert offset plane** tools. Use **New model** to create a new plane model.



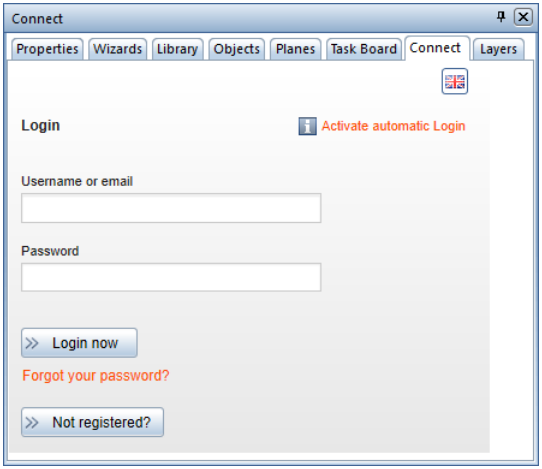
Task Board palette

You can use the **Task Board** palette to communicate with all those involved in a Bimplus project. In Allplan, you can access the tasks of the currently loaded Allplan project straight from Bimplus. In addition, you can use Allplan to create new tasks for Bimplus or edit existing tasks. You can also import or export tasks in BCF format or export the complete task list as an Excel table.

Note: This is only possible if you have used the Allplan workstation to sign in to Bimplus and if the Allplan project is linked with a Bimplus project, that is to say, the Allplan project data has been uploaded to Bimplus *at least once*. See Handling projects using Allplan Bimplus in the Allplan Help for more information on handling projects in a BIM-compliant manner using Bimplus, the web service offered by ALLPLAN GmbH.

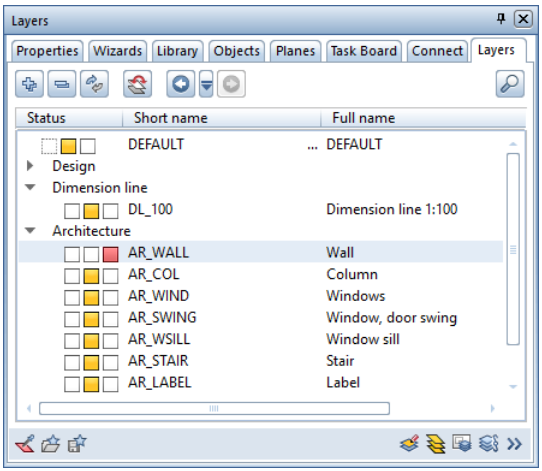
Connect palette

The **Connect** palette takes you straight from Allplan to content on Allplan Connect. You can enter your username and password either directly in the palette or on the **Palettes** tab of the **Customize User Interface...** tool you can find in the drop-down list of the **Quick Access Toolbar**.



Layers palette

You can use the **Layers** palette to access the layer structure quickly and easily. The palette displays the entire layer hierarchy. You can define the visibility of layers, change the layer status, select the current layer and choose privilege sets and print sets. When you select the **Match current layer** button at the bottom of the palette, you can click an element to use its layer as the current layer. Click to save the current layer setting as a favorite file (*.lfa); click to load a favorite file.



Note:
You can find the **Customize User Interface...** tool in the drop-down list of the Quick Access Toolbar. When you open the **Palettes** tab, you can arrange and customize the palettes to suit your needs. You can show and hide the palettes as you need.
As an alternative, open the shortcut menu of a palette and select **Customize...**.

Project templates on the internet

Allplan Connect offers two project templates:

- Allplan 2020 Architecture Tutorial. This project template comes with a building structure consisting of structural levels and assigned drawing files. It provides predefined objects derived from the building structure, such as views, sections and reports. In addition, it provides four print sets you can use to control which layers are visible.
  You can use this project template if you want to start with Unit 1: Basics and work through the entire Architecture Tutorial.
- Allplan 2020 Architecture Tutorial (with model). This project template contains the data of the finished project with all the drawing files, views, sections and various reports. You can fall back on this project template if you do not want to work through the entire tutorial. In addition, you can use the Architecture Tutorial (with model) project template to compare this model with the model you created yourself.

Downloading project templates

You can download the project templates with the training data for this tutorial from Allplan Connect, the service portal for all Allplan users.

Go to
connect.allplan.com

- Register with your customer number and email address. Registration is free and not subject to any conditions.

  After a few minutes, you will be able to access the data and information there.

- You can find the project templates with the training data for this tutorial in Allplan Connect. Go to the **Training – Documentation – Manual and tutorials** area.
  Here, you can find the two project templates.

- You can also find the latest version of this document as a PDF file (**Allplan 2020 Architecture Tutorial**).

- Save the zipped project templates with the training data to any folder on your computer.

- Extract the data in any folder, for example, **C:\Training data for Allplan Architecture Tutorial**.

Note: Serviceplus customers have access to more step-by-step guides in the **Training** area of Allplan Connect. It usually takes one to two working days until Serviceplus customers can access this restricted area and download documents. This service is available to Serviceplus customers only.

For general information on Serviceplus, go to
http://www.connect.allplan.com

A note on organizing projects only with the default layer

Allplan is a very flexible and open system that allows you to develop your own custom solutions for offices and special projects. The layers used in this tutorial help you a lot.

However, it is also possible to structure projects without layers. In this case, you place the individual elements in drawing files.

This structure for large-scale projects is intended only as a guide.

Drawing file organization without layers

- Place general project-related information in drawing files **1–99**. This data is universally required (layouts, axis system and so on).
- Start story design at drawing file **100**. The first digit indicates the number of the story. The last two digits provide information on the contents. Use the same drawing file sequence on each floor.
- Place other data in drawing files starting at **2000**. Numbers **2000–2099** contain sections; numbers **2100–2199** contain views; numbers **2200–2299** contain presentation data; numbers **2300** and greater contain detail drawings.

Fileset	File	Contents
Grid	1	Axis system (coarse)
	2	Axis system (fine)
	3	Axis dimensions
	4	Axis labels
Layout	5	Title block
	6	Legend
Surveying	11	Survey points
	12	Dimensions
	13	Labels
	:	
Site plan	21	Plot boundaries
	22	Neighboring buildings
	23	As-built data
	24	New buildings
	25	Hatching
	26	Dimensions
	27	Text
	:	

Fileset	File	Contents
Outdoor facilities	51	Draft
	52	Symbols
	53	Dimensions
	54	Design
	55	Texts
	:	

Foundation	71	Foundations
	72	Hatching
	73	Sections
	74	Hatching
	75	Dimensions
	76	Text
	:	
1st floor	100	Background pattern, fill
	101	Load-bearing walls
	102	Nonbearing walls
	103	Beams
	104	Stairs, elevator
	105	Slab
	106	Doors (2D)
	107	Windows (2D)
	108	Wall recess (2D)
	109	Slab recess (2D)
	110	Reflected ceiling
	111	Reflected plan
	112	Furniture
	113	HVAC
	114	Grids, axes
	115	Dimensions

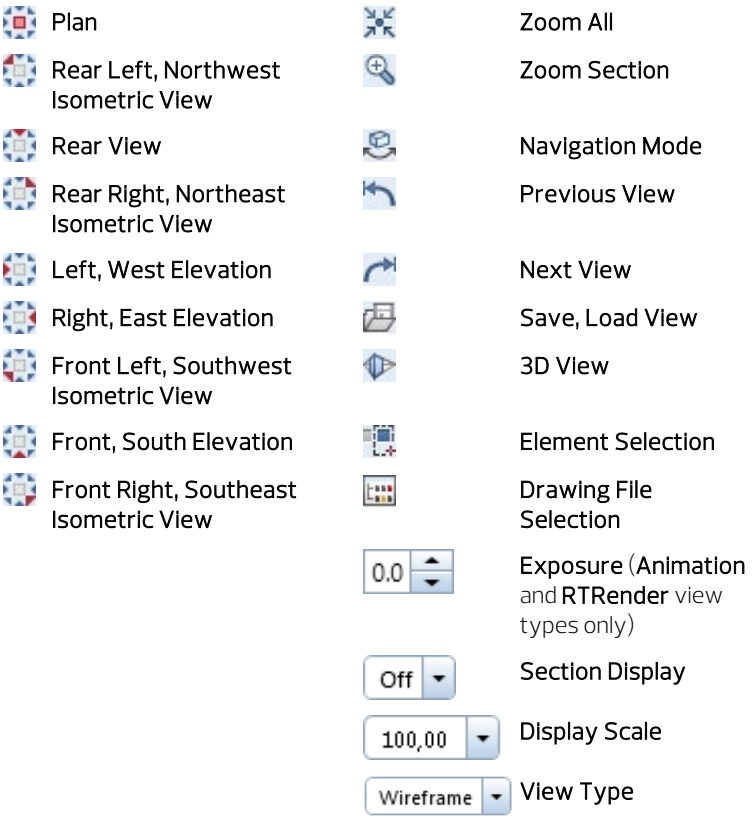
Fileset	File	Contents
	116	Additional dimensions
	117	Text
	118	Additional text
	119	Rooms
	120	Living space
	121	DIN 277 areas
	122	DIN 276 costs
	123	Prelim. roof design
	124	Special components
	125	Adjacent components
	126	Foreground patterns, fills
	:	
2nd floor	200	Background pattern, fill
	201	Load-bearing walls
	:	
3rd floor	300	Background pattern, fill
	301	Load-bearing walls
	:	
Section A-A	2000	Section (hidden-line image)
	2001	Level of detail
	2002	Hatching, pattern, fill
	2003	Fixtures
	2004	Dimensions
	2005	Text
	2006	Outdoor facilities
Section B-B	2010	Section (hidden-line image)
	:	
	2019	

Fileset	File	Contents
East elevation	2100	Hidden-line image, result
	2101	Level of detail
	2102	Hatching, pattern, fill
	2103	Dimensions
	2104	Text
	2105	Outdoor facilities
South elevation	2110	Hidden-line image, result
	:	
	2119	
Perspective views	2201	Hidden-line image, result
	2202	Hatching, fill, textures
	2203	Outdoor facilities
	2204	Text
	:	
	2299	
Detail A	2300	Draft
	2301	Details
	2302	Hatching, patterns
	2303	Dimensions
	2304	Text
	:	
	2309	
Detail B	2310	Draft
	:	
	2319	

Overview of tools

We recommend photocopying this page and placing it somewhere near your monitor so that you can refer back to it as you work through the workbook.

Viewports



You can find more tools for working with viewports in the **Window** drop-down list (Quick Access Toolbar).

Height dialog box

You can use these icons to define how the component you are drawing – for example, a wall or placement of rafters – is attached to the reference planes.

Top level relative to lower plane **Top level relative to upper plane**	Use this to define the offset between the **top level** of the component and the **lower or upper reference plane**.
Bottom level relative to lower plane **Bottom level relative to upper plane**	Use this to define the offset between the **bottom level** of the component and the **lower or upper reference plane**.
Absolute value for top level **Absolute value for bottom level**	Use this to define the top or bottom level of the component as an **absolute height**.
Match bottom level of component **Match top level of component**	Use this to match the top or bottom level of a component from the top or bottom level of a different component or plane. When you select this option, you must click the **reference level** immediately.
Fixed component height	Use this to enter the component height directly.
Vertical offset **Perpendicular offset**	This toggle controls whether the offset entered is to be interpreted as a **vertical** offset or **perpendicular to the plane**.
Normal	This makes the component adapt to the upper plane in its entirety.
Jamb wall	With this, the top, outside edge of the component will adapt to the upper reference plane.
Chimney	With this, the component will pierce the upper reference plane by the value you specify.

	Maximum component height	If the top level of the component is attached to the upper reference plane, you can use this to have the component not exceed a certain height and to run horizontally at that height.
	Button for selecting the **reference plane**	If the project contains a building structure with a plane model, you can click the button to the right of to open a dialog box where you can select any part of the plane model. If the project contains neither a building structure nor a plane model, you can select the default planes and reference surfaces in the drawing file.
	Restore basic settings	Use this button to define the upper or lower default plane of the drawing file as the reference plane.

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