VICO OFFICE

R6.5 USER GUIDE

June 2017

TRANSFORMING THE WAY THE WORLD WORKS

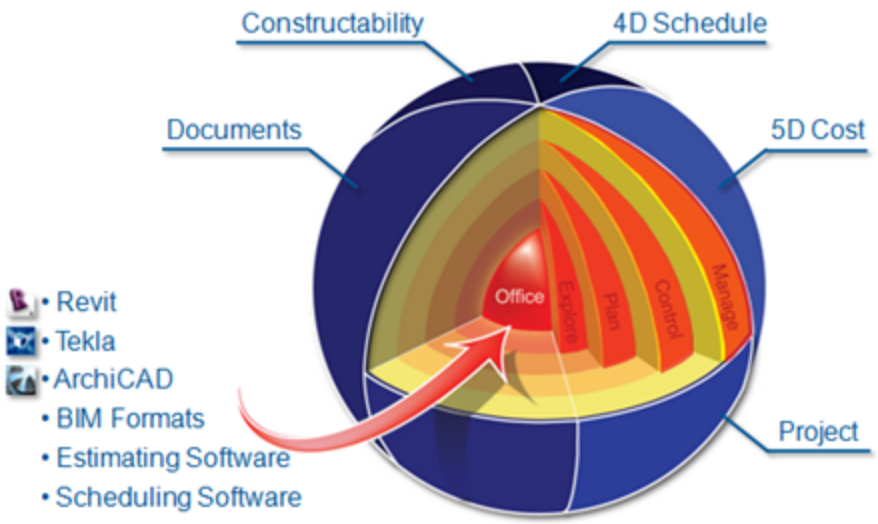
Trimble.

Vico Office Introduction

Welcome to Vico Office, Vico's integrated Virtual Construction environment. The Vico Office Suite consists of a core module and a set of discipline-specific application modules. Each Vico Office application shares access to the same integrated project database, which ensures that a change in one place is reflected everywhere.

The user interface across all modules is consistent, predictable, and highly visual. As a result users can quickly learn and use the system; moreover, they retain their knowledge over extended periods of non-use.

The Vico Office Environment supports the varied disciplines involved in the planning and management of complex building construction projects. And it supports them at a number of contextual levels that vary according to the user, the project phase, and the task at hand. These levels are called Explore, Plan, Control, and Manage.



So whether you are a cost planner working on a schematic-phase estimate, or a project engineer re-forecasting the schedule midway through construction, the Vico Office Environment delivers the right tools in the right context at the right time.

Vico Office Suite

The Vico Office Suite is composed of applications, or modules, that address specific disciplines or areas of interest across the project team.

The **Vico Office Client** is the central access point for models and model information. From here the user creates a project, manages the versions of published models coming into that project, performs reporting, and accomplishes viewing, navigation, and other filtering/selection. The Vico Office Client also contains read-only views for Cost Planner and Constructability Manager.

With the **Vico Office Client** as platform, Vico Office contains the following modules:

- Vico Office **Document Controller** helps project teams manage project documents and efficiently identify, interpret, and react to drawing changes in a collaborative environment.
- Vico **Takeoff Manager** performs automated quantity takeoff from the model. Create takeoff items, visually verify model elements included in the quantities, and manually subtract or add model elements in quantity calculations.
- **Takeoff Pad**, an extension of Takeoff Manager, provides a more granular view and manageability of the individual takeoff components. Takeoff components collectively form the basis of a takeoff item.
- Vico **Cost Planner** provides integrated cost calculation functionality in the Vico Office environment. Takeoff items, both manual and model-based, can be used as quantity input in the n-tiered cost calculation spreadsheet.
- In **Cost Explorer**, which graphically presents the cost breakdown structure and uses colors to indicate the status of groups of cost, analyze changes between cost plan versions.
- Published models can be checked for constructability issues in Vico **Constructability Manager**. This module provides clash detection, constructability workflow, and markup functionality. The current status of a project's constructability review work can be published by generating a constructability report that contains all recorded constructability issues with the report editor.
- Vico **LBS Manager** provides the tools that let users define a location structure, consisting of any combination of floors and zones, in their Vico Office project. The defined location structure has no relation with the locations that were defined in the authoring BIM application, which makes it possible to define and maintain a uniform location structure for all project information published to the Vico Office project.
- Vico **Schedule Planner** introduces the integrated location-based quantity and cost to schedule connection in Vico Office. Using Vico Schedule Planner, users can integrate model-based quantity takeoff information from Vico Takeoff Manager with resource quantities from Vico Cost Planner and project locations from Vico LBS Manager. Schedules created with Schedule Planner are quantity and location-based and optimized for continuous flow and minimized risk using Flowline technology.
- In **4D Manager**, define 4D simulations, using the schedule, cost and model information created with Takeoff Manager, Cost Planner, and Schedule Planner.

6/14/2017

Vico Office Workflow

The Vico Office workflow guides team members through the process of activating models, calculating costs, and analyzing schedule impacts.

After the BIM models are completed, publish and compare 3D models from multiple project stakeholders all within the Vico Office Client. For example:

- The architect can contribute an architectural model in ArchiCAD.
- The structural engineer can contribute a structural model in Tekla.
- The mechanical subcontractor can submit a model in Revit MEP.
- The HVAC subcontractor can submit a model in CAD-Duct.

These models can be combined in Vico Office, so any constructability issues are identified and reported to the design team for resolution. If the issues cannot be resolved, they are promoted to an RFI and tracked through the project management data flow.

Step	Workflow Process	Description
1	Create Project	Create a project on the Dashboard.
2	Define Settings	Define settings for the project, including units of measurement in the Define Settings task.
3	Publish to Vico or Import into Vico	Open one or more models in Revit, ArchiCAD or Tekla and publish to the Vico Office project, or import files into Vico Office.
4	Activate Model Version	Activate a version of published models, re-group the Takeoff items using the TOI Builder, and quantify the elements to calculate your Premium Quantities.

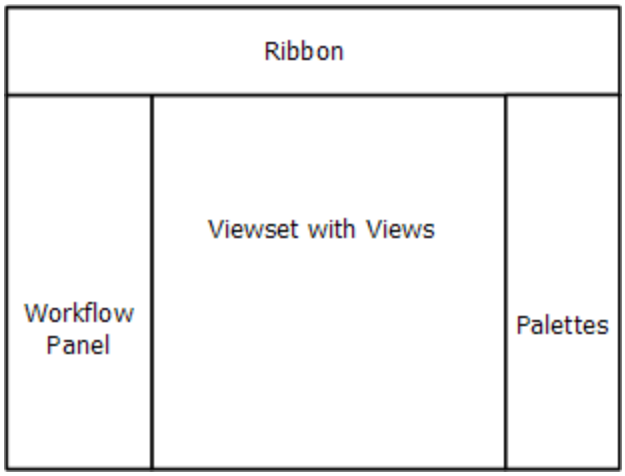
Step	Workflow Process	Description
5	Analyze Constructability	Detect and process clashes and constructability issues in the Manage Issues task.
6	Takeoff Model	Analyze quantity takeoff per takeoff item, create new takeoff items and (re)assign model elements in the Takeoff Model task. Regroup Takeoff items using the TOI Builder and then then selectively quantify.
7	Takeoff Pad	Add new calculation rules for the manually created takeoff quantities per elements in the Takeoff Pad task.
8	Manage Takeoff	Check and enter quantities per model location in the Manage Takeoff task.
9	Document Controller	Compare the 3D Model and the drawings, or the versions of each drawings or 3D Models in Document Controller.
10	Plan Cost	Calculate project resource quantities and cost with takeoff items for quantity input and references for standard content in the Plan Cost task.
11	Edit Tags	Define tags for cost estimating content in the project for sorting and filtering purposes in the Edit Tags task.

Step	Workflow Process	Description
12	Explore Cost	Analyze cost status and compare against project targets in the Explore Cost task.
13	Define Locations	Define floors, zones and optimized location breakdown structures per trade with Define Locations task.
14	Plan Schedule	Define tasks and schedule logic, assign crews and optimize the schedule with Schedule Planner.
15	Manage Layout	Assess the layout points in the Manage Layout Points task according to the 3D Model.
16	Compare & Update	Compare versions of the project to previous versions or other projects in the Compare & Update task.
17	Import from Excel	Import data from project data sources such as cost plans, quantity takeoffs and targets using Excel spreadsheet files in the Excel Importer view.
18	Create and View Reports	Use the extracted quantities, created cost plan(s) and detected constructability issues to generate reports for project or project by location in the Reports view.
19	Production Control	Keep your schedule up-to-date in Schedule Planner during the construction.

Vico Office User Interface

The Vico Office user interface is generally divided into four major components:

- Workflow Panel: The panel that contains a predefined sequence of tasks (workflow items).
- Viewset with views: The window or windows where you perform the actions related to the selected task.
- Ribbon: The area that contains the tools and options related to the selected task.
- Palette: The set of tools for performing the selected task or organizing information.



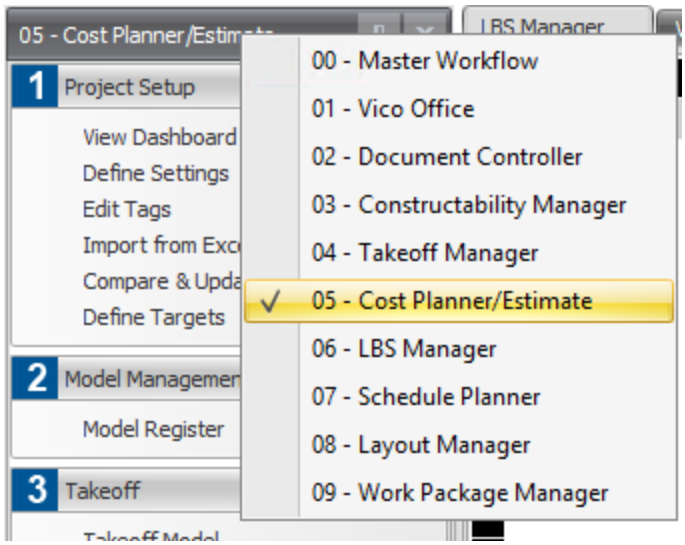
After you select a task in the Workflow Panel, the related views appear with their own ribbon and/or palettes.

Workflow Panel

The Workflow Panel displays the selected workflow module, which contains predefined steps to work within the integrated Vico Office environment. It is designed to provide guidance in the steps that you should take, starting with the definition of a new project and ending with the creation of a report. Each Vico Office module adds a specific set of tasks to the Workflow Panel. For more information, see "Workflow Modules" on page 11.

Note:

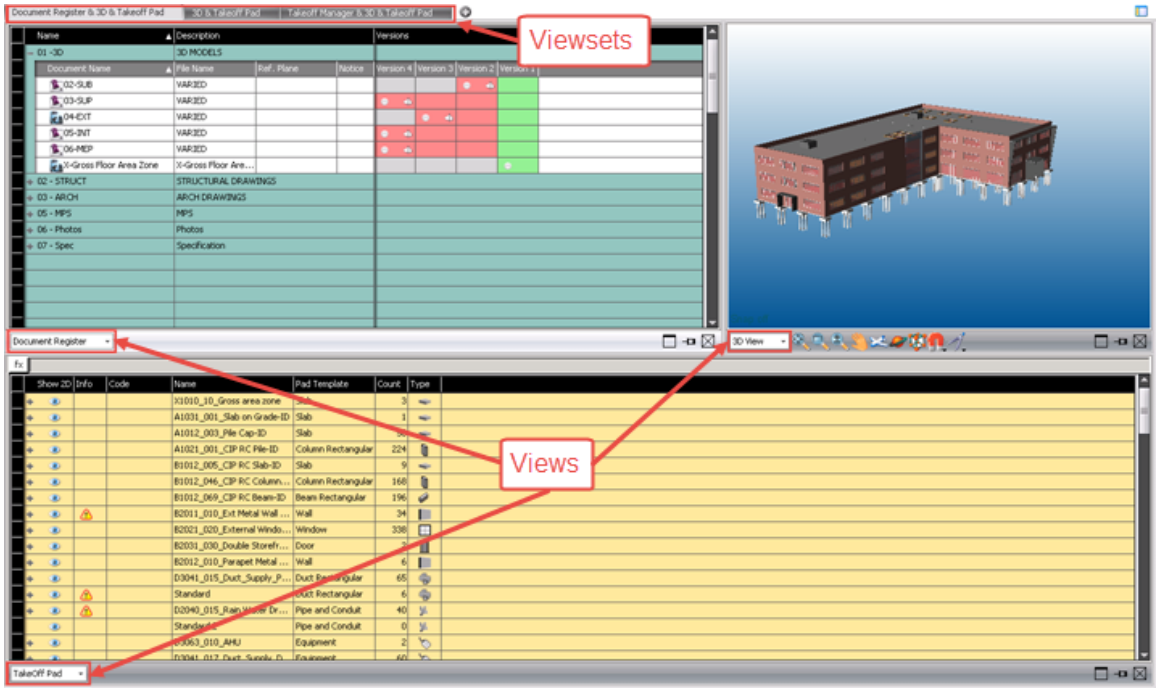
- To switch to a different module, right-click the Workflow Panel header. The available tasks depend on the selected module.
- If you have a license for one module, you must select that module.



Viewset with views

When you select a workflow item, the related viewsets open. Each viewset can contain one or more views. You can work in the default view or in a custom multi-task viewset that lets you size, restructure, and view any combination of available views.

Each view includes a taskbar that may contain a series of lists or buttons depending on the selected view. For more information about the available views and the taskbar, see "Views" on page 14.

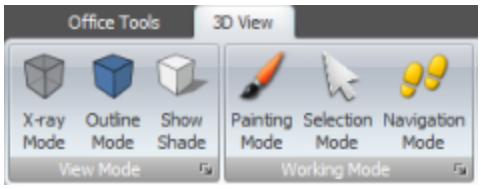


Tip:

- From any view, click the green arrow on the top-right corner to see a list of available shortcuts that apply to that module.
- Click the blue question mark in the top-right corner to access the **Help**.

Ribbon

All workflow items have a context-sensitive ribbon for each view activated in a viewset. The ribbon displays a tab with a set of tools and options for the active view.



Palettes

A view or viewset may have designated palettes available that help you to organize project information via filters and view properties of selected elements. The **Filtering** palette contains the tools to filter the 3D View based on properties of the BIM elements. The **Properties** palette displays the properties of the selected elements, so they can be analyzed and or edited.

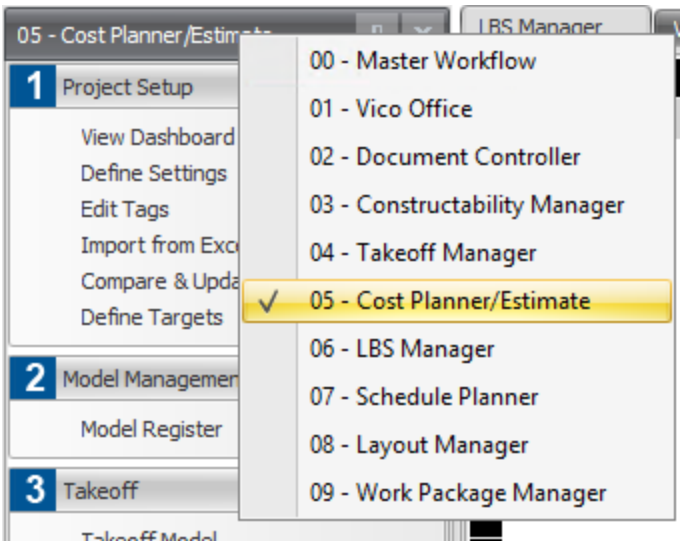
The names of available palettes appear along the right side of the screen. To select which palettes are visible, click the palettes icon in the upper-right corner.

Workflow Modules

The Workflow Panel displays the selected workflow module, which contains predefined steps to work within the integrated Vico Office environment.

Each module is divided into task-oriented groups of related workflow items that open dedicated views or viewsets. These workflow items or tasks help you perform project objectives such as cost and quantity analysis and scheduling.

If the required license is available on your system, you can right-click the Workflow Panel header and select the workflow module that best matches the task that you are working on.



Workflow Module	Description
00 - Master Workflow	Perform all the actions from setting up the project to schedule planning and reporting.
01 - Vico Office	Define projects, combine BIM models, manage model versions, and create reports.
02 - Document Controller	Review documents and 3D models at the same time. You can also compare their versions.
03 - Constructability Manager	Perform constructability analysis of the activated project models.
04 - Takeoff Manager	Perform visualization and analysis of model-based takeoff items and takeoff quantities. This module is available when the Takeoff Manager module is active and also contains the Vico Office Client workflow items.
05 - Cost Planner Planner/Estimate	Manage quantity takeoff, cost exploring, and cost calculation.
06 - LBS Manager	Define locations and location systems.
07 - Schedule Planner	Create and manage tasks and plan the project schedule.

Workflow Module	Description
08 - Layout Manager	Manage layout points that you can export to or import from CSV files and use on site.
09 - Work Package Manager	Create work packages and manage the related bids from the subcontractor.

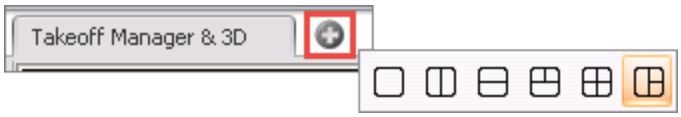
Views

A view is a window where you can perform actions related to a task. When you click a task in the Workflow Panel, the related views open in a viewset.

You can use the default viewset or do one of the following:

- From the **View** list on the taskbar, select a different view. On the viewset tab, the word 'Modified' is added to the original tab name.

- To create a custom viewset, click the **Add Viewset** button, and select the layout. Then you can select the view for each window.



On the taskbar, you can also do the following:

- To maximize the view, click .

  The other views in the viewset remain visible, but the maximized view takes up most of the screen.

- To restore the view to its original size, click .
- To unpin the view, click .

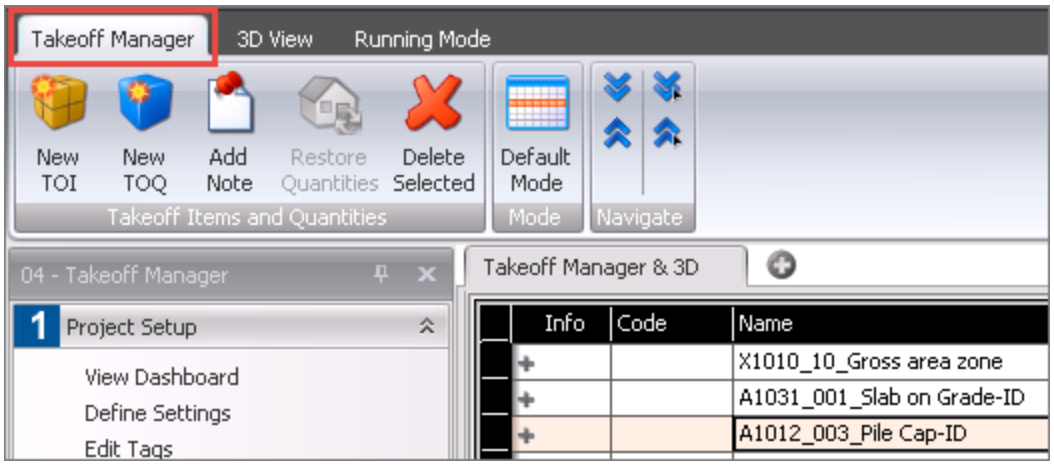
  The name of the unpinned view appears at the top of the viewset. To expand the view, point to the name.

- To pin the view, click .

  The view appears in its original location.

- To close the view, click .

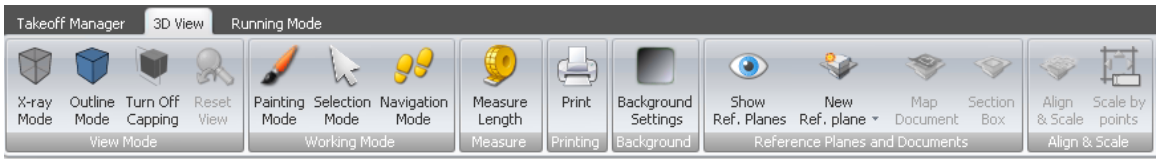
Note: To open the related tab on the ribbon, click in the view.



3D View

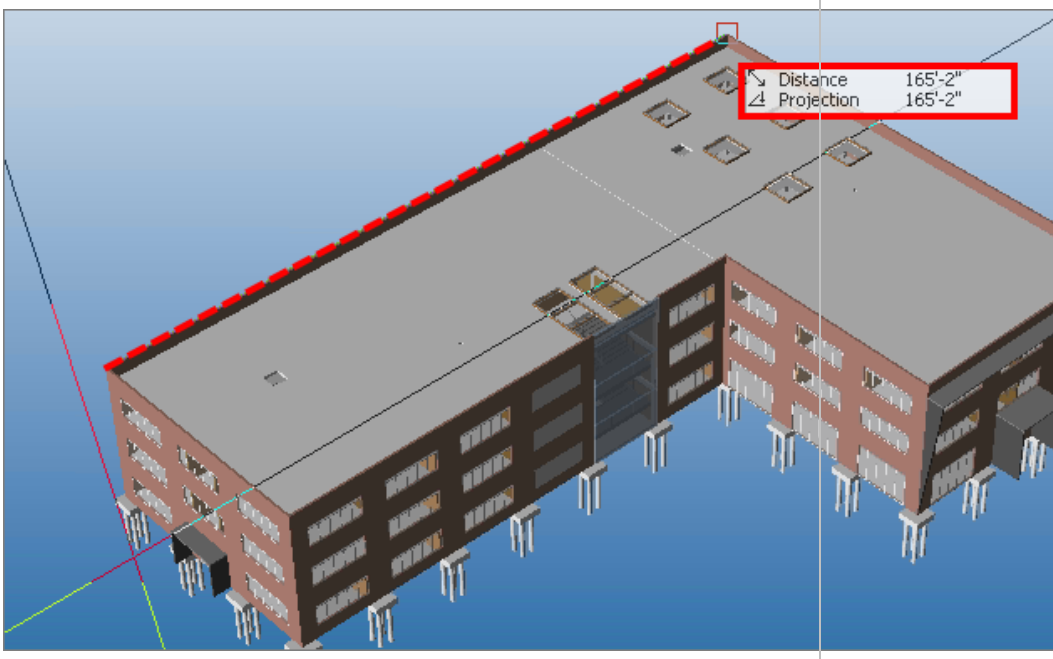
In the **3D View**, you can view 3D documents and access the following functions:

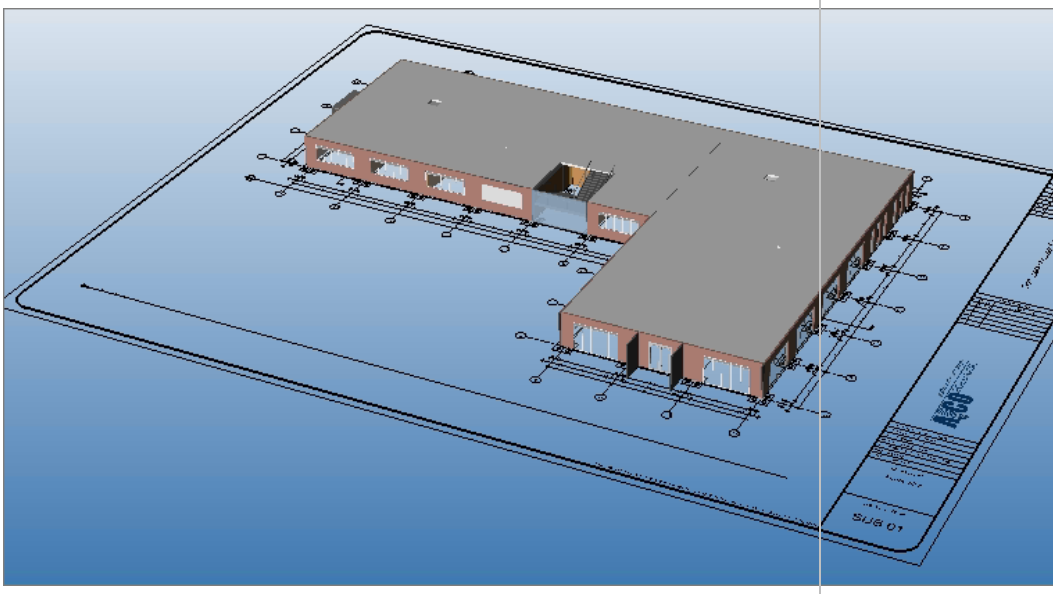
3D View Ribbon Tab



Ribbon Item	Description
X-Ray Mode	Render the 3D model in a transparent mode with the edges of elements highlighted.
Outline Mode	Render the 3D model with smooth shading.
Turn Off Capping	For models that were cut with the section box, turn off the red highlighting of the cut geometry and look inside the model elements.
Reset View	Remove every change made in the 3D model view, and see the default view.

Ribbon Item	Description
Painting Mode	Modify the content of the currently selected takeoff item by clicking the model elements that should be included or excluded with the painter. When hovering over an element with the paint brush cursor, the element in focus is highlighted, and a tooltip displays the basic element information. Selecting **Takeoff Items** and **Takeoff Quantities** in the Mini Takeoff Manager highlights associated elements in the **3D View**. Clicking a non-highlighted element adds the element to the selected takeoff item. Clicking with the paint brush on a highlighted element removes it from the selected takeoff item.
Selection Mode	Select one or more elements in the 3D model. Click to select individual elements, or draw a rectangular selection window with the cursor. When you draw a selection window from top-left to bottom-right, all elements inside the boundary are selected. When you draw a selection window from bottom-right to top-left, all elements that are inside or intersected by the boundary are included in the selection. All selected elements are highlighted in red.
Navigation Mode	Navigate through the 3D viewer using the available tools on the navigation toolbar.

Ribbon Item	Description
Measure Length	Measure any distance within the 3D model. The recognized points of the model are indicated by colored squares. 
Print	Create an image of the activated model. In the **Print Setup** dialog, you are can set up the orientation, the printer, or you can add the output folder.
Background Settings	Set up the solid or gradient background color as desired.

Ribbon Item	Description
Show Reference Planes	Make the mapped documents visible. For information on importing documents into a project, see "Document Control " on page 197. 
New Reference Plane	Insert reference planes both vertically and horizontally into the 3D model. The 2D drawings slide into the model on these reference planes to compare the differences between 2D and 3D information.
Map Document	After creating reference planes, map 2D drawings to the reference plane for validating the 3D model.
Section Box	Cut the model with the reference plan of the selected document.
Align & Scale	Match the building footprint of a drawing, which by default comes in at its scaled size, often around 36"x48".
Scale by points	Define the distance between any points of the document.

3D Navigation Toolbar

The navigation toolbar appears on the taskbar of the **3D View**.

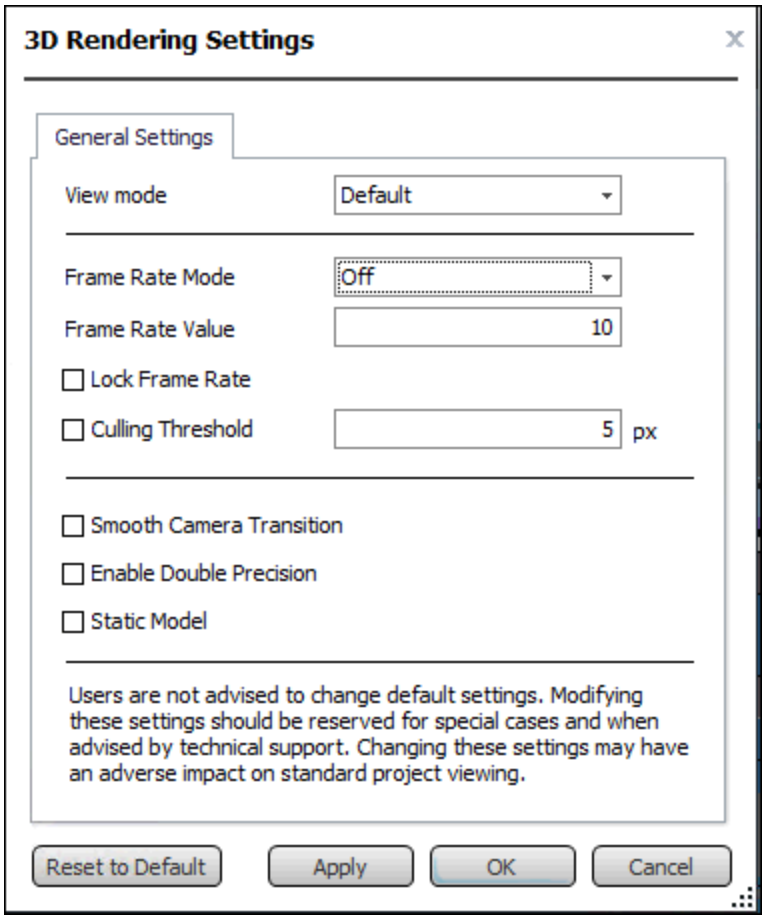
Toolbar Item	Description
Zoom All 	Zoom in so the entire project can be seen. Use this option to quickly clear the **Dynamic Zoom** mode.
Selected Zoom 	Select an area to zoom in to. Click and drag to select an area.
Dynamic Zoom 	Zoom in and out as desired. Click and drag to adjust the zoom level of your model. You can activate the **Dynamic Zoom** mode by pressing the **Z** key.
Pan 	Explore the model by moving the model up, down, left, or right in the current view angle. You can activate the **Pan** mode by pressing the **P** key when the 3D View is active.
Fly 	Navigate freely through the model environment at a desired elevation. Direct the airplane cursor by clicking and dragging with the mouse.
Orbit 	Rotate the model around a focal point at any position and desired angle. You can activate the **Orbit** mode by pressing the **O** key when the **3D View** is active. **Tip:** When you press the **Ctrl** and click in your model, the point that you clicked is used as the rotation point for the orbit function.
Section Box 	Display a section bounding box that has spheres on each of the corners. Grab and drag a sphere to adjust the size of the whole box. Click and drag one of the six planes to dynamically create sections over your model. You can change the angle of the cutting plane by selecting an edge and dragging the edge in the desired direction or angle.

Toolbar Item	Description
Snap Points	Select the snap points that are available in the 2D/3D content.
Polar Constraints	Select the desired polar constraints when drawing a cloud to get straighter lines for your markups.
Rotate	Select how to rotate the selected model. The available views are the Top, Bottom, Front, Back, and Isometric (the entire view) views of the model. **Tip:** When switching between views, you can press the Back or Delete key to return to the previous view.

3D Rendering Settings

The default 3D rendering settings have been carefully selected to yield the best results for typical systems. However, your machine may require you to adjust these settings to obtain better results.

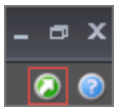
Click the 3D Rendering Settings icon , which is located on the top-right corner of the screen.



Setting	Description
View Mode	Select from the list of graphic card drivers. You will be prompted to reload 3D view after switching to a different view mode. Simply re-select 3D view.
Frame Rate Mode	If selected, a frame rate mode will determine how much of the scene is rendered at any given time. Two options are available: - Fixed rate (Default): Because it maintains the exact specified frame rate during model manipulation, it will rotate slower and flashing may occur. - Target rate: It will try to maintain the frame rate during model manipulation while offering a smoother transition between frames. It is disabled by default and recommended that users leave it as 'OFF' to improve visual rendering. To enable this setting, clear the 'Culling Threshold' setting.

Setting	Description
Frame Rate Value	Indicates the target frame rate per second. For example, 0.1 is equivalent to 10 frames per second. A larger value will draw more elements but will render more slowly.
Lock Frame Rate	When disabled, frame rate is switched on only when rotating. Recommended to disable this setting.
Culling Threshold	If selected, it will set the pixel culling threshold for occlusion culling. This setting allows a smoother navigation of larger models that contain many small parts, such as arm chairs or electricity objects. When enabled, smaller elements are not drawn.
Smooth Camera Transition	Allows for a smoother rotation but may decrease performance. Used for smaller and medium sized models to improve visual effect.
Enable Double Precision	Use this setting for models that have large coordinates. For these large models, it is necessary to enable double precision to ensure that the model is displayed correctly.
Static Model	When selected, it generates a parallel optimized segment for rendering. This improves performance of 3D rendering.

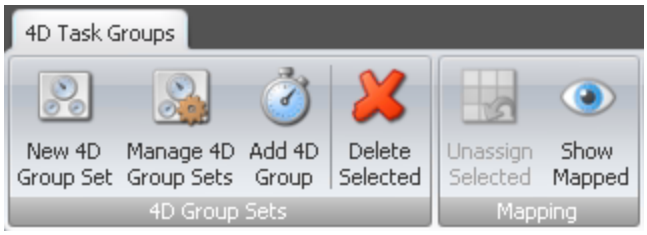
Tip: To see the keyboard shortcuts for these commands, click the shortcuts icon on the top-right corner of the screen.



4D Task Groups View

In the **4D Task Groups** view, you can set up 4D groups. For more information, see "Defining a 4D Group" on page 487.

4D Task Groups Ribbon Tab

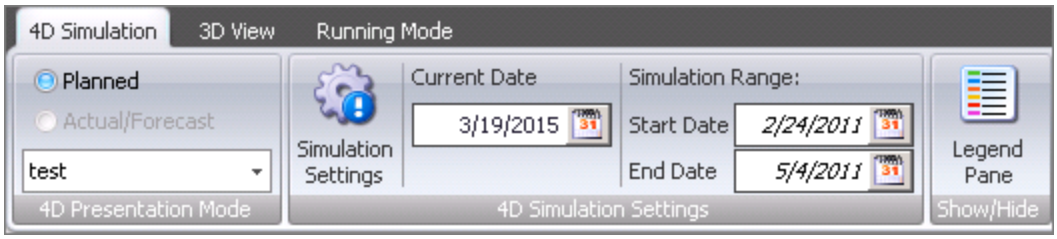


Ribbon Item	Description
New 4D Group Set	Create a new 4D simulation representation for the project, which in the **4D View** (**4D Presentation Mode** group on the ribbon).
Manage 4D Group Sets	Add new 4D group sets or remove existing sets.
Add 4D Group	Add a new 4D representation group to the project's collection of 4D groups.
Delete Selected	Delete the selected 4D groups.
Unassign Selected	Unassign selected tasks that have been assigned to a 4D group.
Show Mapped	By default, tasks that are mapped to a 4D group are hidden from the **Task Manager** view. Click **Show Mapped** to make them visible again.

4D View

In the **4D View**, you can define and map tasks to 4D groups. These groups are used to specify the behavior and representation of linked elements when tasks occur, thus creating the 4D simulation. For more information, see "Manage 4D" on page 486.

4D Simulation Ribbon Tab



Ribbon Item	Description
4D Presentation Mode Group	Select the desired 4D simulation configuration.
Simulation Settings	Define the presentation of the 4D simulation. For more information, see "Preparing the 4D Simulation" on page 490.
Current Date	Set the current date. In the **Simulation Settings** dialog, you can show or hide this date in the top-left corner of the simulation.
Simulation Range	Set the date range for which the simulation will be displayed.
Legend Pane	Show or hide the legend pane. This button is active when a 4D group set is selected as the 4D presentation mode.

Bid Manager View

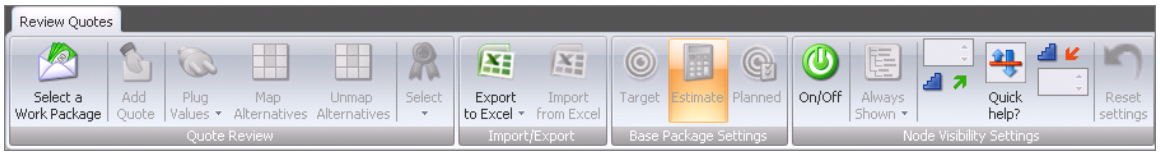
In the **Bid Manager** view, you can compared bids to find the best one for your defined work package. For more information, see "Manage Bids" on page 568.

Columns

Column	Description
Code	The code that is added automatically after you create a work package. This code can be modified anytime in the future.
Description	The description of the work package.

Column	Description
Monitoring Quantity	The values that belong to the defined unit. This cell is filled automatically after you select the monitoring unit.
Monitoring Unit	The units that were used in the project. This is available for the work packages but not for the whole project.
Total	The estimated total package cost, which is the sum of the Committed and Plugged values.
Committed	The total of values submitted by the chosen subcontractor.
Plugged	The plug value applied to a cost assembly or component.
By Others	The sum of items to be released from the chosen subcontractor if they will not be involved with a particular job. Item can be re-allocated to another package.
Approval State	The level of selection. The states are Target, Estimate, Planned, Bid, and Contracted.

Review Quotes Ribbon Tab



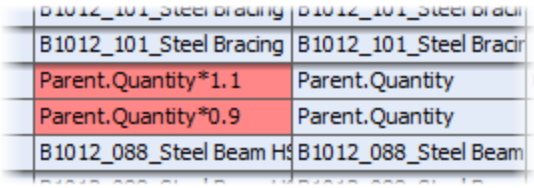
Ribbon Item	Description
Select a Work Package	Select the work package that you want to work with.
Add Quote	Add extra bidder columns on the right-side of the spreadsheet.
Plug Values	Select the type of plug value. For more information, see "Using Plug Values" on page 576.

Ribbon Item	Description
Map Alternatives	After entering an alternative, map it to the buyout item that you want to replace. For more information, see "Entering and Mapping an Alternative" on page 575.
Unmap Alternatives	Unmap an alternative from a buyout item.
Select	Assign an award level to a bidder. For more information, see "Awarding a Bid" on page 571.
Import/Export Group	Import data from Excel, or export data to Excel.
Base Package Settings Group	Select a stage for comparing bids. For more information, see "Entering Bid Data Manually" on page 568.
Node Visibility Settings Group	Determine the cost plan hierarchy levels displayed in each package. Fore more information, see "Node Visibility Settings" on page 554.

Compare & Update View

The **Compare & Update** view is a grid that contains all the content of the selected type (**Comparison Preset**) from the current project (column '1') and the reference (column '2'). For more information, see "Compare & Update" on page 523.

For data fields in the selected comparison preset, differences between the current project data and the selected reference are highlighted in red.



Compare & Update Ribbon Tab

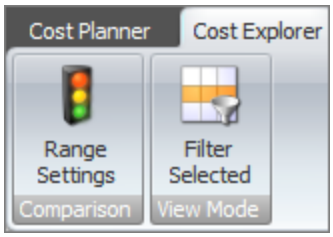
Ribbon Item	Description
Setup Comparison	Select the project snapshot or reference for comparison in the **Compare and Update Settings** dialog.
Comparison Preset	Select the data type to review in the **Compare & Update** view.
Update All	Immediately update all the content that is identified as different in the selected reference to the current project, thus synchronizing the reference with the current project.
Update Selected	Copy only the different content of the selected items into the current project.
Isolate Differences	Show only the items that contain differences in the **Compare & Update** view. All items that are identical in reference and current project are hidden.
Reset List	Restore the full list of content in the current project and reference after using **Isolate Differences**.
Navigate Group	Quickly expand and collapse the data in the n-tiered spreadsheet. Click the **+** button to expand to the next hierarchy level or the **-** button to collapse the lowest hierarchy level. The double arrows on the ribbon collapse or expand all levels at once. Point to each button to view a tooltip that describes what each will do.

Cost Explorer View

The **Cost Explorer** view contains the **Cost Explorer Tree**, a tree structure that matches the assembly and component structure that was set up in the **Cost Planner** view. All assemblies are shown as nodes

in the tree. Two cost plan versions (and a target, depending on the selected mode) can be active at a time. For more information, see "Cost Explorer Tree" on page 349.

Cost Explorer Ribbon Tab



Ribbon Item	Description
Range Settings	Define how the result of the comparison is presented in the **Cost Explorer** task. Four colors are available for the 'Too High', 'At Risk', 'Within Budget', and 'Too Low' statuses.
Filter Selected	Change the presentation mode for cost data associated with the selected node in the **Cost Explorer** task. When **Filter Selected** is active, assemblies and components that belong to the selected node are filtered in the **Cost Planner** view. When **Filter Selected** is deactivated, assemblies and components that belong to the selected node are highlighted.

Taskbar

Taskbar Item	Description
Viewset List	Available viewsets. The **Explore Cost** task has two default viewsets: **Cost Explorer & Cost Planner** and **Cost Explorer & 3D View**. Click the tab at the top to activate the desired viewset.

Taskbar Item	Description
Comparison Mode List	Options for comparing cost plan versions. The following options are available: 1. **Assemblies to Components:** Select up to two cost plan versions. 2. **Cost to Target:** Select up to two cost plan versions and a target against which the cost in the selected cost plan versions can be compared. For more information, see "Comparison Modes and Versions" on page 347.
Version Lists	Collections of cost plan versions that were saved from the **Plan Cost** view.

Cost Planner View

In the **Cost Planner** view, you can build a 'living cost estimate', which is a key to making information-driven decisions that keep the budget on track.

This view includes references, so you can use your own historical data and store a collection of standards and reusable estimating content. For more information, see "Plan Cost" on page 304.

Key Cost Plan Definitions

Term	Definition
Source Qty	A number entered manually in the cost plan or a formula that refers to a takeoff item.
Consumption	The amount of a component required to install a certain element. This column is mainly used to calculate labor (per HR price) and to define production rates for scheduling purposes. Example: How many hours are needed to install a certain amount of work like pouring concrete.
Waste	Unwanted material produced directly or incidentally by the construction project component. Example: Building materials such as insulation, nails, electrical wiring, and rebar.

Term	Definition
Qty	Calculated field. **Qty** = **Source Qty** x **Consumption** x **Waste**
Labor	Summarizes the working hours of the subtree. Note that the unit must be in hours (HR) in order for this column to add up all the hours.
Unit Cost	Cost per unit.
Total Price	Calculated field. **Total Price** = **Qty** x **Unit Cost**

Formula Bar

The formula bar displays the formula that was defined for the selected component. You can edit the defined formula directly in the formula bar without opening the Formula Editor.

n-Tiered Spreadsheet

The n-tiered spreadsheet is the main user interface element of the **Coner** view. It allows you to gradually increase the level of detail of your cost plan by adding subcomponents to existing cost components, thus overriding previous assumptions or estimates. The automatic comparison to the previous status helps you understand cost implications of design decisions.

Cost Planner Ribbon Tab

Ribbon Item	Description
New Component	Add a new cost item to the project underneath the selected component or assembly.

Ribbon Item	Description
New Subcomponent	Create a new component as a child of the selected component. Later you can activate the subcomponent and thereby turn the component into an assembly.
Activate Selected	Activate the set of subcomponents after adding them to a component. As a result, the component is converted into an assembly.
Promote/Demote	Move a component up or down the hierarchy of the assembly or component structure in your cost plan. If a component is demoted, it is included as a component in the component or assembly in the row above it.
Add Note	Insert an empty row below the current row in which you can enter quick notes as a reference for the selected component.
Add Row	Insert a blank row above the selected component or assembly.
Delete	Delete the selected rows in the cost plan. If you select a parent component, the included child components are deleted as well.
Enable Text Wrap	Makes the cells in the **Cost Planner** view wrap the text and back.

Ribbon Item	Description
Reference Browser	Open the **Reference Browser** dialog with the default reference loaded. The settings include: • **Server Name:** Select a computer in the network that contains the assemblies and components that you want to copy into the current project. • **Project Selection:** Represents the project of which assembly and component content is shown in the **Reference Browser**. By default, the reference that is selected in the Define Settings view is opened. • **Add in selected Component:** Add the selected content inside the selected component as subcomponents. • **Add below selected Component:** Add the selected content below the selected component, which adds the selection to the same level in the assembly and component structure.
Include Hierarchy	When dragging over a cost item from a reference project to the current project's cost plan, it will also include the parent levels of the mapped item. Note that if the same code is in the existing project, you will be prompted to resolve the conflict by either overwriting the existing code, add a new one, or keep the existing code.
Quantity Copy Options	For all copy operations in the **Cost Planner** view, determine how quantity information is included in the target location: • **Descriptions and Consumptions Only:** Keep the default value for the target quantity. • **Include Formula:** Copy the defined formula from the source and, if possible, reuse the takeoff items and takeoff quantities in the current project. This is the default option. • **Include Quantities:** Only copy the formula's results from the source.

Ribbon Item	Description
Navigate Group	Quickly expand and collapse the data in the n-tiered cost plan. Click the **+** button to expand to the next level or the - button to collapse all to the previous level. The double arrows collapse or expand all levels at once.
Auto Complete Group	Copy assemblies and components from a reference without opening the Reference Browser or the **Project and Reference** viewset. When **From Project** and/or **From Reference** are active, a search operation is executed every time you enter a code or description in the respective cell. The present possible matches are displayed in a list in the **Cost Planner** view, and you can then select the desired assembly or component.
TOQ Filter	Filter the cost line items in the following ways: • Show Components with Model-based Quantities • Show Components with Manual Takeoff Quantities • Show Components with Manually Inserted Quantity Data • Show Components with Mixed Quantity Data
Layout Presets	Quickly turn on or off the desired set of columns for the task that you want to work on. • **Quantity** • **Cost** • **Variance** • **Margins** • **Cost Range** • **Bid** • **Reset System Presets** • **Manage**

Ribbon Item	Description
Add-On & Markup Group	Select add-ons, which are the cost items that can be included in a project's bid price in addition to the direct cost calculation. Add-ons can be calculated as a percentage of the calculated direct cost of the project. • **Show:** Display a dedicated band in the 3D spreadsheet in which you can define add-On items • **Add:** Create an add-on item. • **Activate:** Include the defined add-on items in the project's bottom line bid price. • **Divide:** Hide the add-on cost from the cost plan by dividing it over the active components in your project, based on the share of the component's cost in the calculated project cost. • **Undivide:** Reverse the divide operation and make the selected add-on visible in cost reports again. • **Markup Values:** Access the set of cost type tags in your project. Additionally, you can define the default markup percentage by which the calculated cost price should be increased to get to a bid price per cost type.
Import and Export	Import or export sbXML and Modelogix files.
Disable Cost Ranges	Remove all the cost data after you have defined the cost ranges for your current project.
Default Mode	Reset the component sorting in the **Cost Plan** view.
Show Alternatives	Display alternatives within a separated line item, the #1000 Alternatives with green background. The alternative items can be moved under other line items, but they still disappear as soon as you turn off the Show Alternative function.
Save Cost Plan Version	Create a snapshot of the current status of your cost plan. The created version can later be used for comparison purposes in Cost Explorer.

Ribbon Item	Description
Manage Cost Plan Versions	View all the cost plan versions that you created in the project. You can also edit comments and remove cost plan versions.

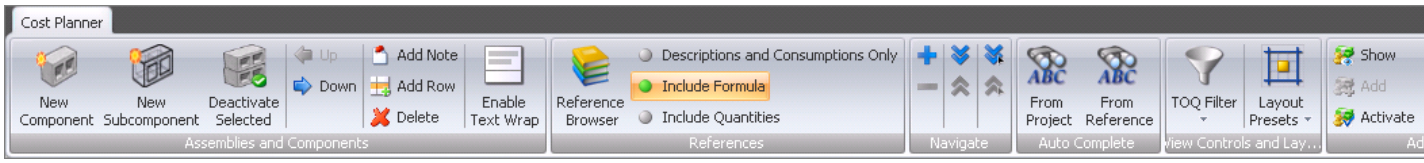
Context-Menu

- Save to reference: Copies the selected components to the reference project. This option is enabled only if there is a reference project set in Define Settings.
- Reset Manual Addon value: Resets addon columns that were made visible and set for components.
- Re-evaluate Formulas: Importing a localized Excel file into a project that does not already contain the TOIs may result in TOIs created with invalid formulas and zero quantities in the Cost Plan. This option will re-run the formulas.

Cost Reference View

In the **Cost Reference** view, you can select the reference project from which you want to copy assemblies and components into the active project. For more information, see "Copying Content from a Reference to a Project" on page 330.

Cost Reference Ribbon Tab



Ribbon Item	Description
New Component	Add a new cost item to the project underneath the selected component or assembly.
New Subcomponent	Create a new component as a child of the selected component. Later you can activate the subcomponent and thereby turn the component into an assembly.
Activate Assembly	Activate the set of subcomponents after adding them to a component. As a result, the component is converted into an assembly.

Ribbon Item	Description
Promote/Demote	Move a component up or down the hierarchy of the assembly or component structure in your cost plan. If a component is demoted, it is included as a component in the component or assembly in the row above it.
Add Note	Insert an empty row below the current row in which you can enter quick notes as a reference for the selected component.
Add Row	Insert a blank row above the selected component or assembly.
Delete	Delete the selected rows in the cost plan. If you select a parent component, the included child components are deleted as well.
Enable Text Wrap	Makes the cells in the **Cost Planner** view wrap the text and back.
Reference Browser	Open the **Reference Browser** dialog with the default reference loaded. The settings include: • **Server Name:** Select a computer in the network that contains the assemblies and components that you want to copy into the current project. • **Project Selection:** Represents the project of which assembly and component content is shown in the **Reference Browser**. By default, the reference that is selected in the Define Settings view is opened. • **Add in selected Component:** Add the selected content inside the selected component as subcomponents. • **Add below selected Component:** Add the selected content below the selected component, which adds the selection to the same level in the assembly and component structure.

Ribbon Item	Description
Quantity Copy Options	For all copy operations in the **Cost Planner** view, determine how quantity information is included in the target location: • **Descriptions and Consumptions Only:** Keep the default value for the target quantity. • **Include Formula:** Copy the defined formula from the source and, if possible, reuse the takeoff items and takeoff quantities in the current project. This is the default option. • **Include Quantities:** Only copy the formula's results from the source.
Navigate Group	Quickly expand and collapse the data in the n-tiered spreadsheet. Click the **+** button to expand to the next hierarchy level or the **-** button to collapse the lowest hierarchy level. The double arrows on the ribbon collapse or expand all levels at once. Point to each button to view a tooltip that describes what each will do.
Auto Complete Group	Copy assemblies and components from a reference without opening the Reference Browser or the **Project and Reference** viewset. When **From Project** and/or **From Reference** are active, a search operation is executed every time you enter a code or description in the respective cell. The present possible matches are displayed in a list in the **Cost Planner** view, and you can then select the desired assembly or component.
TOQ Filter	Filter the cost line items in the following ways: • Show Components with Model-based Quantities • Show Components with Manual Takeoff Quantities • Show Components with Manually Inserted Quantity Data • Show Components with Mixed Quantity Data

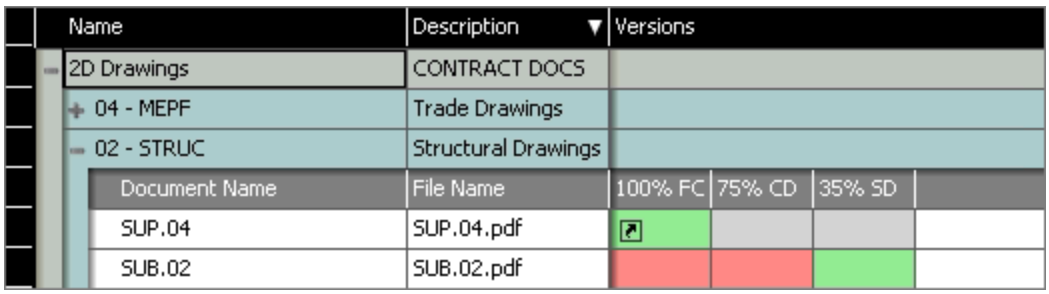
Ribbon Item	Description
Layout Presets	Quickly turn on or off the desired set of columns for the task that you want to work on. • **Quantity** • **Cost** • **Variance** • **Margins** • **Cost Range** • **Bid** • **Reset System Presets** • **Manage**
Add-Ons & Markup Group	Select add-ons, which are the cost items that can be included in a project's bid price in addition to the direct cost calculation. Add-ons can be calculated as a percentage of the calculated direct cost of the project. • **Show:** Display a dedicated band in the 3D spreadsheet in which you can define add-On items • **Add:** Create an add-on item. • **Activate:** Include the defined add-on items in the project's bottom line bid price. • **Divide:** Hide the add-on cost from the cost plan by dividing it over the active components in your project, based on the share of the component's cost in the calculated project cost. • **Undivide:** Reverse the divide operation and make the selected add-on visible in cost reports again. • **Markup Values:** Access the set of cost type tags in your project. Additionally, you can define the default markup percentage by which the calculated cost price should be increased to get to a bid price per cost type.
Save Cost Plan Version 	Create a snapsot of the current status of your cost plan. The created version can later be used for comparison purposes in Cost Explorer.

Ribbon Item	Description
Manage Cost Plan Versions	View all the cost plan versions that you created in the project. You can also edit comments and remove cost plan versions.

Document Register View

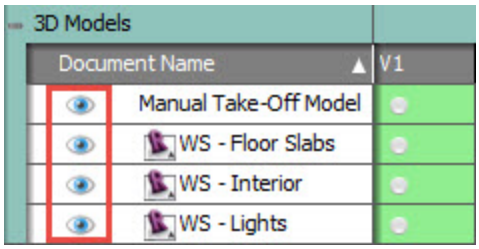
The **Document Register** view displays all of the documents that have been loaded into your Vico Office file. A folder for 3D models is created by default whenever models are sent to Vico Office.

You can create folder structures that are as detailed as your project drawings by including placeholders for floor plans, elevations, sections, details, notes, and so on. Versions can be created for each folder to organize all your drawings by design release, allowing the user to know which documents have been updated or changed with the latest release. The **Document Register** view displays changes across multiple drawings or models, clouds that are placed onto drawings, and the active model (indicated by a circle on the model version). For more information, see "Document Control " on page 197.



Show/Hide Model Button

The **Show/Hide** button, which works in conjunction with the **Filtering** palette, shows or hides a model in the view. Hiding the model via this button reduces the **3D View** load times while maintaining the quantity values associated with an active model.

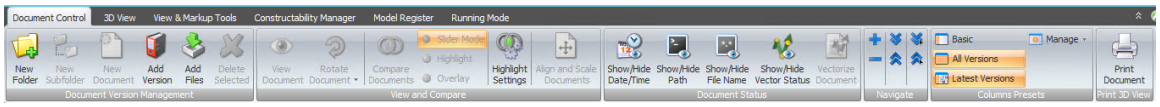


Version Identifier

The version columns display all the versions of a document. It also displays variations between versions and which documents have associated clouds and issues.

- **Gray cell:** The document is not part of a version.
- **Green cell:** The document is new or unchanged as part of a version.
- **Red cell:** The document has been changed as part of a version.

Document Control Ribbon Tab



Ribbon Item	Description
New Folder	Add a folder.
New Subfolder	Add a folder at a nested hierarchy level. Vico supports an n-tiered folder structure, so you can create a folder structure that is as deep needed.
New Document	Add a placeholder for a document. Use placeholders to organize the data structure according to your plans. If you want to add files first, you do not need to create placeholders by clicking **New Document**.
Add Version	Create a design release version. You can add individual files or folders and then provide a version name and a comment, such as information about the release date. You can also create an empty version if you want to set up your entire organizational structure before importing documents.
Add Files	Populate the previously created versions with project documents. This button becomes active after a version is created. You can choose the drawing folder and the version that you wish to populate with the selected file or folder.

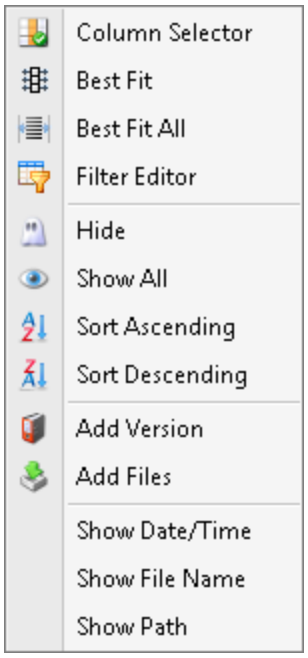
Ribbon Item	Description
Delete Selected	Remove the selected item such as a folder, subfolder, document, row (a series of documents), or column (a version of documents). The selected items are permanently deleted from the Vico Office project, and this action cannot be undone. • To select several documents for deletion, **Ctrl-click** each cell. **Note:** **Shift-Click** does not remove several documents at once because the Vico grid is more complex than traditional spreadsheets. • To select a folder and all its content for deletion, select the folder row at the parent hierarchy level. • To select an entire version and its documents within a folder for deletion, select the version header in the folder. • To select multiple versions of a single document for deletion, select the row.
View and Compare Group	View and analyze your 2D documents.
Document Status	Click each button to show/hide the following statuses for each document in the latest version column. Date/Time: The date and time when it was imported. Path: The path where it was imported from. Vectorize: indicates it has not been vectorized. Indicates it has been vectorized. Vectorize Document: Vectorizes the currently selected document. Recommended for large PDFs as they may not fit in your computer's graphic memory. If you encounter issues where your PDF cannot be viewed, or when your PDF cannot be aligned and scaled, you may wish to vectorize your document.

Ribbon Item	Description
Navigate Group	Quickly expand and collapse the data in the n-tiered spreadsheet. Click the **+** button to expand to the next hierarchy level or the **-** button to collapse the lowest hierarchy level. The double arrows on the ribbon collapse or expand all levels at once. Point to each button to view a tooltip that describes what each will do.
Columns Presets Group	Control the view settings of the documents that are displayed in the Document Register. The default setting is the **Basic** view, which displays only the drawing list. The **All Versions** view displays the multiple versions that have been published to the Document Register. The **Latest Versions** view displays only the most current release of each document that exists in the register list.
Print	Print the images that appear in the active viewing window.

Context Menus

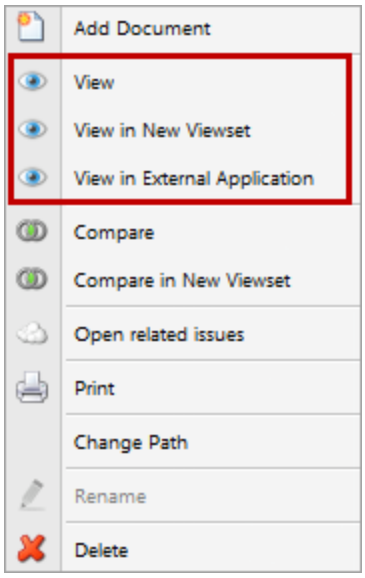
Note: To access the context menu of frequently used commands, right-click various areas of the Document Register.

- **Column Selector:** Select which columns are visible in the Document Register.
- **Best Fit:** Evenly allocate the width of the visible columns across the Document Register.
- **Best Fit All:** Evenly allocate the width of all the columns across the Document Register.
- **Filter Editor:** Filter what is displayed on the screen by applying a viewing criteria to the list of possible items. This can be used to quickly identify a specific item within a lengthy list.
- **Hide:** Conceal a version that you do not wish to see in the Document Register. Choose **Column Selector** to re-display a version after it has been hidden.
- **Show All:** Display all the possible versions in the Document Register.
- **Sort Ascending/Descending:** Reorder the Document Register alphabetically by the selected column header.
- **Show File Name:** Display the actual file name in each of the green or red document cells.
- **Show Path:** Display the folder path for each document within the green or red document cells.
- **Change Path:** Change the folder path where the document is stored. The correct folder path is important if you want to display it on the cells or use the **View in an External Application** function.
- **Rename:** Rename a document .



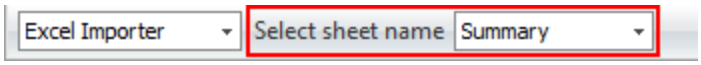
To open the document context menu, right-click the selected document. The following options are available:

- **View:** Display the document in the active viewset.
- **View in New Viewset:** Display the document in a different viewset. The current viewset remains available, so you can return to it.
- **View in External Application:** Open the document in the native viewing tool that is set for that document type on your computer.



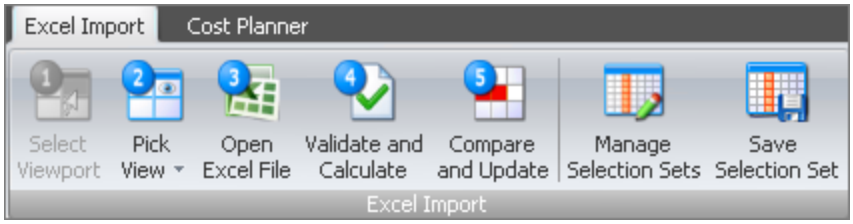
Excel Importer View

In the **Excel Importer** view, you can open an Excel spreadsheet and import the data in the columns and cells. The **Select sheet name** list on the taskbar indicates the current sheet in the Excel file. You can also switch between different sheets.



For more information on import data, see "Import from Excel" on page 103.

Excel Import Ribbon Tab

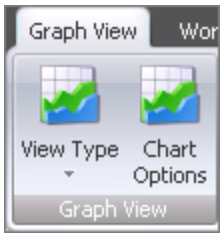


Ribbon Item	Description
Select Viewport	Select the viewport (window) that will display the Content Preview. **Note:** This button is only active when using a custom layout that contains more than two viewports.
Pick View	Select a content view that is supported by the **Import from Excel** task. The content view displays an empty preview and makes the related data types available for selection in the Excel viewer.
Open Excel File	Open a Microsoft Excel 1997-2003 or Microsoft Excel 2007 file, and display the contents of the file in the Excel Viewer.
Validate and Calculate	After selecting the data to be imported into the current project, validate the data. This function completes the dataset by adding default values for empty data fields.
Compare and Update	Compare the data in the temporary preview, where the data is placed after the first four steps, with the data in the project. Then copy the data in the preview to the project.
Manage Selection Set	Open the list of saved selection sets. If you choose one, it is applied to the active Excel spreadsheet.
Save Selection Set	After setting the data type for the columns in your Excel spreadsheet, save them as a selection set that can be used during other imports.

Graph View

The **Graph** view displays the work package data in a pie chart or a bar chart. For more information, see "Viewing a Pie Chart" on page 559 and "Viewing a Bar Chart" on page 562.

Graph View Ribbon Tab



Ribbon Item	Description
View Type	Select the type of graph for displaying the data.
Chart Options	Set up how the data is displayed.

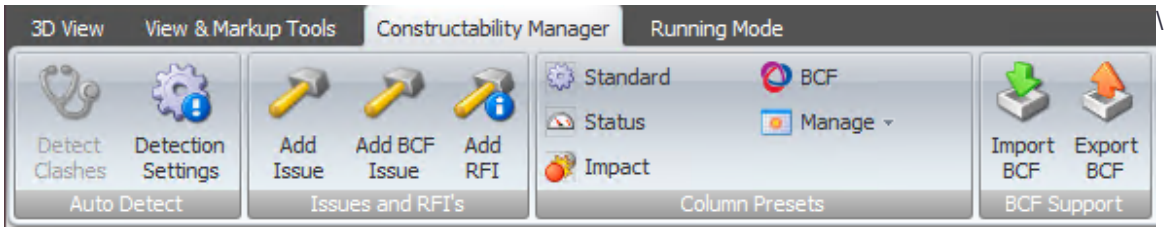
Issue List View

In the **Issue List View**, you can manage the clashes that are found through automatic clash detection. For more information, see "Manage Constructability Issues" on page 494.

To see viewpoints and images attached to an issue, you can switch to the **Issue Card View**.

Note: Issues can be deleted only in the **Issue List View**.

Constructability Manager Ribbon Tab



Ribbon Item	Description
Detect Clashes	Run the clash detection process using the most recently used settings. To create a new class detection setting, click **Detection Settings**.
Detection Settings	Select the two sets of layers and elements types that will be compared to each other. Detection settings can be saved under a user-defined name for later use. For more information, see "Defining Clash Detection Settings" on page 495.
Add Issue	Manually add a constructability issue without using a clash as a starting point. Use this function when a constructability problem exists without an associated clash between geometry (such as a gap between elements).

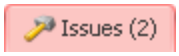
Ribbon Item	Description
Add Issue	Add a constructability issue with a 3D marker placed in the model that helps you identify recognized problems during the review phase.
Add BCF Issue	Add a BCF (BIM collaboration format) issue to the Issues tab on the Issue List View. A 'Is BCF' column distinguishes an issue from a BCF issue. A newly created BCF issue will have this check box automatically selected, which indicates it is BCF transferable.
Add RFI	Manually add a request for information if parts of the model or document are unclear (for example, if there is a contradiction between the two plans). You can enter the detailed problem with a saved view point (if it is possible).
Add RFI with Symbol	Add an RFI and place a blue diamond symbol in the 3D view to indicate the relevant area or element.
Column Presets	The column presets displays the data fields that are only applicable to the selected preset.
Import BCF	Imports a BCF file and all important issues are marked as BCF. Text content (Subject, Description, Creation Date, and Messages), image and viewpoint are imported.
Export BCF	When exporting a BCF file, only issues marked with the BCF flag are exported. Text content (Subject, Description, Creation Date, and Messages), image and viewpoint are exported.

Clashes

The **Clashes** tab displays the result of one or more automatic clash detection processes. During a clash detection process, new clashes are added to the existing list. To remove a clash, set the **Ignore** status for it.

Issues

The **Issues** tab contains all the clashes that have been classified as a constructability issue. In the constructability issue list, you can add comments, viewpoints, and markup.



RFIs

The **RFIs** tab contains all Issues that have been classified as RFI. The RFI list allows you for adding comments, viewpoints, and markup.

Clash and Constructability Issue Lists

The clash and constructability issue lists contain all items in the current project. Filters and sort criteria can be applied to define subsets of this content. See "Sorting and Filtering Clashes and Constructability Issues" on page 503.

Layout Manager View

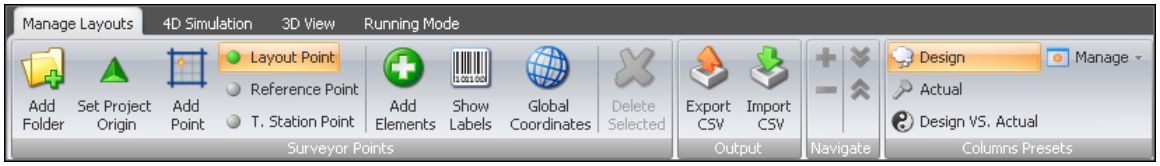
In the **Layout Manager** view, you can create a folder structure for storing virtual survey points. For more information, see "Manage Layout Points" on page 530.

Hierarchical Folder Structure and Layout Points

The **Layout Manager** view supports a hierarchical folder structure. Layout points can be added to the selected folders, and the export/import functions are folder-specific. Filtering and sorting criteria can be applied via the column headers.

Point ID	X	Y	Z	Descrip..	Location
Project					
05_Roof					
LP00017	0'	55'	30'-8"		Project-3RD; Project-ROOF
LP00016	109'-2"	55'	30'-8"		Project-3RD; Project-ROOF
LP00015	164'-2"	55'	30'-8"		Project-3RD; Project-ROOF
LP00014	109'	0'	30'-8"		Project-3RD; Project-ROOF
LP00013	164'-2"	-54'	30'-8"		Project-3RD; Project-ROOF
LP00012	109'-2"	-54'	30'-8"		Project-3RD; Project-ROOF
LP00011	3'-3 7/8"	58'-5 1/4"	30'-8"		Project-3RD; Project-ROOF
04_Floor 3					
03_Floor 2					

Manage Layouts Ribbon Tab



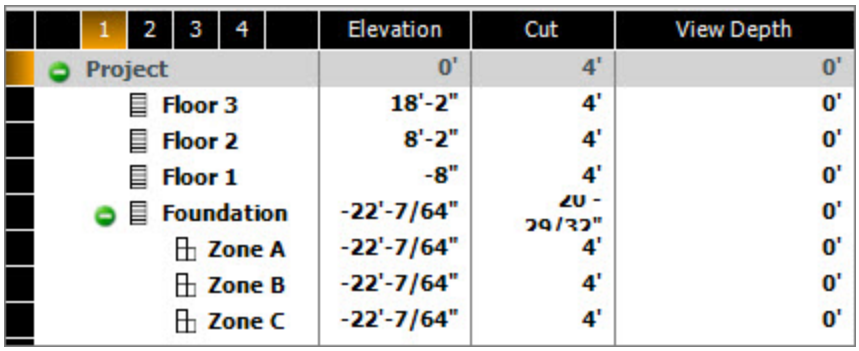
Ribbon Item	Description
Add Folder	Folders are used to group and manage layout points. Layout points properties such as the prefix, suffix, tolerance and graphic appearance are specified per folder. To create a folder inside the selected folder, click **Add Folder**.
Set Project origin	The project origin is the 0,0,0 point for the project. All layout point coordinates are calculated relative to the project origin. To insert the project origin point, click **Set Project Origin** and snap to a point in the model.
Add Point	Layout points, reference points, or total station points are added to the elected folder. To add a point, select one of the three point types, click **Add Point**, and snap to the 3D geometry in the 3D View.
Add Elements	Associate 3D elements with a selected set of layout points. Associated elements are highlighted/isolated when selecting a related point. Select a layout point in the grid view, click **Add Elements**, and select the 3D element from the 3D View.
Show Labels	Show text labels with the names and coordinate values of the layout points in the 3D View.
Global Coordinates	To toggle between local and global coordinate values (as defined for the origin point) click **Global Coordinates**. Coordinates are displayed in the Layout Manager view and in the 3D labels.
Delete Selected	Delete the currently selected folders or points.
Export to CSV	Export folder contents to a CSV file.

Ribbon Item	Description
Import CSV	Import layout points from a CSV file to a selected folder.
Navigate Group	Quickly expand and collapse the data in the n-tiered spreadsheet. Click the **+** button to expand to the next hierarchy level or the **-** button to collapse the lowest hierarchy level. The double arrows on the ribbon collapse or expand all levels at once. Point to each button to view a tooltip that describes what each will do.
View Presets	Use layout presets to quickly turn on or off the desired set of columns for the task on which you want to work. • **Design** includes Point ID, X, Y, Z, Description and Location columns. • **Actual** includes Point ID, X', Y', Z', Description and Location columns. • **Design VS. Actual** includes Point ID, X, Y, Z, X', Y', Z', Description Distance, Out of Tolerance and Percent columns.

LBS Manager View

In the **LBS Manager** view, you can define locations for location-based quantity takeoff, location-based cost, and schedule planning. For more information, see "Define Locations" on page 356.

LBS Tree

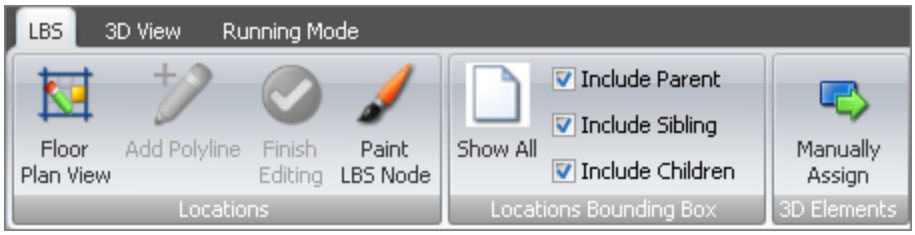


1 2 3 4	Elevation	Cut	View Depth
Project	0'	4'	0'
Floor 3	18'-2"	4'	0'
Floor 2	8'-2"	4'	0'
Floor 1	-8"	4'	0'
Foundation	-22'-7/64"	20' - 29/32"	0'
Zone A	-22'-7/64"	4'	0'
Zone B	-22'-7/64"	4'	0'
Zone C	-22'-7/64"	4'	0'

The **LBS Tree** view contains the following columns:

- **Locations:** Aligned based on the level of the locations in the location breakdown structure. LBS levels are indicated with numbers in the column header.
- **Elevation:** Values show the elevation above the project "0" of a location. Zones are always on the same elevation as their parent floor location. Changing the elevation results in moving the bottom of the selected location bounding box up, and moving the top of the location bounding box below it up at the same time.
- **Cut:** Values indicate how far above the defined floor elevation the 2D section for the floor plan view is generated. Default value is 4' or 1.2m.
- **View Depth:** The floor plan view's viewing distance from the cut height is defined. Default value is 0' or 0m. above the defined floor elevation; increasing this value results in decreasing the reach of the view, decreasing the value results in increasing the reach of the floor plan view.

LBS Ribbon Tab



Ribbon Item	Description
Floor Plan View	Activate the Location Edit Mode, which activates the set of tools needed for location editing in the view. At the end of the location editing process, all affected elements are assigned to the appropriate location and split as needed when reactivating the models in the project.
Add Polyline	Define the boundaries of zones in the selected floor. This button is available when **Floor Plan View** is clicked on the ribbon.
Finish Editing	Revert to the 3D model view and apply the changes made in the floor plan view. This button is available when **Floor Plan View** is clicked on the ribbon.
Paint LBS Node	Assign location bounding boxes to locations in the LBS.

Ribbon Item	Description
Locations Bounding Box Group	Visibility of the collection of location bounding boxes can be managed by selecting which levels of the location breakdown structure should be visualized through translucent boxes in the **3D View**. • **Include Parent:** Shows the bounding box for the parent location of the selected location. • **Include Sibling:** Shows the bounding boxes for all locations on the same level of the LBS as the currently selected location. • **Include Children:** Shows the bounding boxes for all locations below the selected location. • **Show All:** Shows all location bounding boxes in the project, regardless of which location is currently selected.
Manually Assign	Override the automatic assignment of 3D elements to the locations they are included in by selecting a location, then the 3D elements that should be included.

Location Systems View

In the **Location Systems** view, you can define alternative location breakdown structures, which can be maintained within the same parent location. For more information, see "Define Location Systems" on page 378.

Location Systems Ribbon Tab

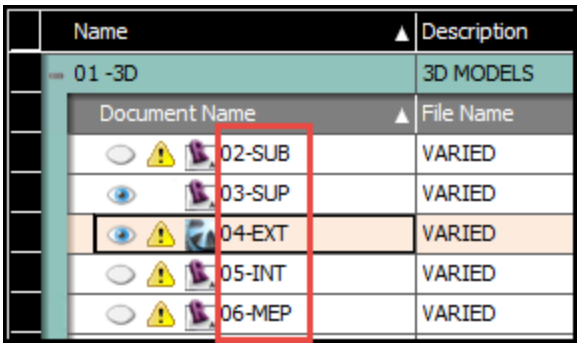
Ribbon Item	Description
New Location System	Create a location breakdown structure.

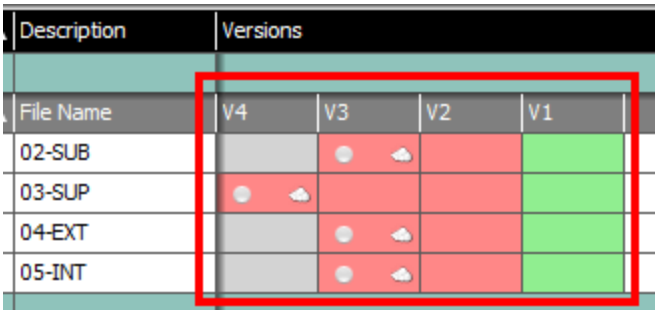
Ribbon Item	Description
Delete Selected	Delete the selected location system.
Unassign Selected	Unassign the selected task from the location system.
Show Mapped	If activated, shows the mapped tasks in the **Task Manager** view.

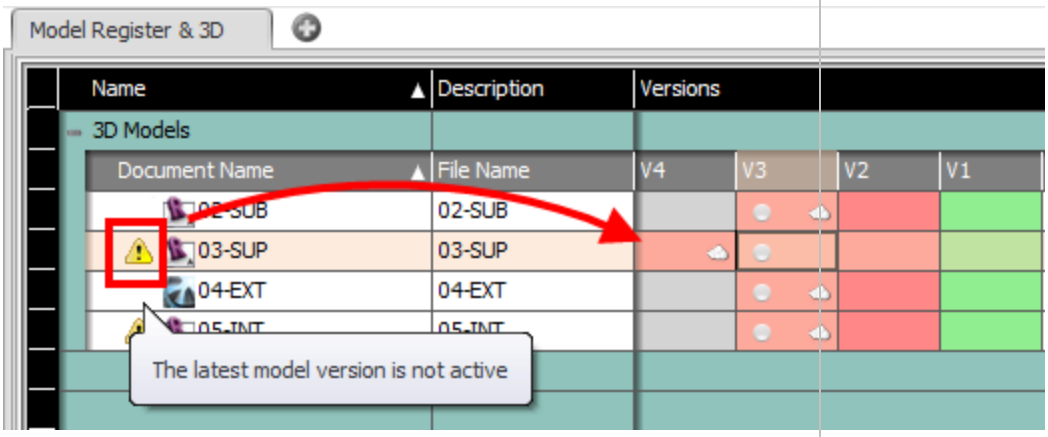
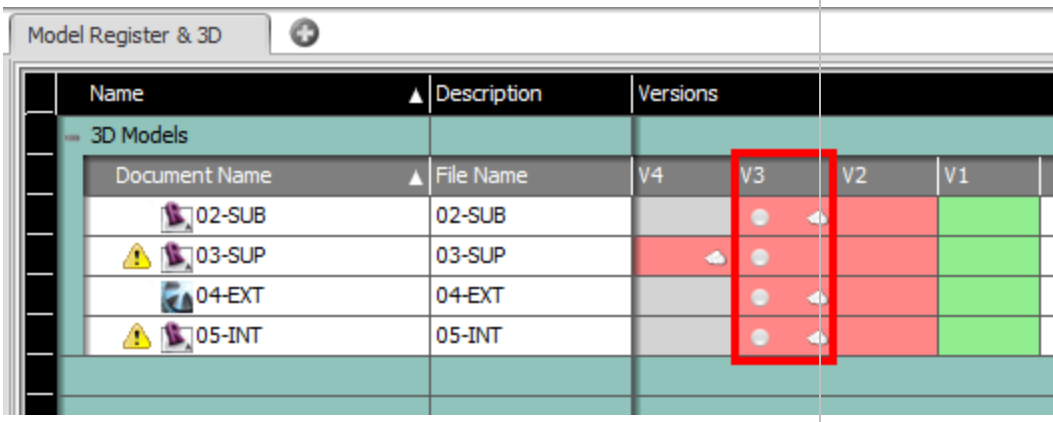
Model Register View

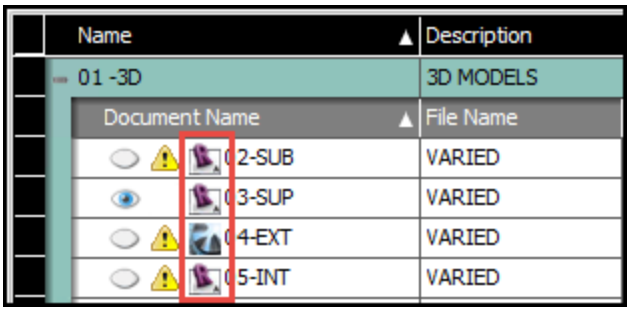
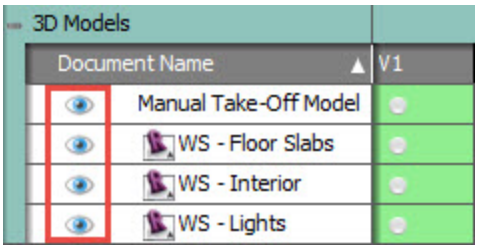
The **Model Register** view displays the models that are published to Vico Office. For more information, see "Model Register" on page 233.

Columns

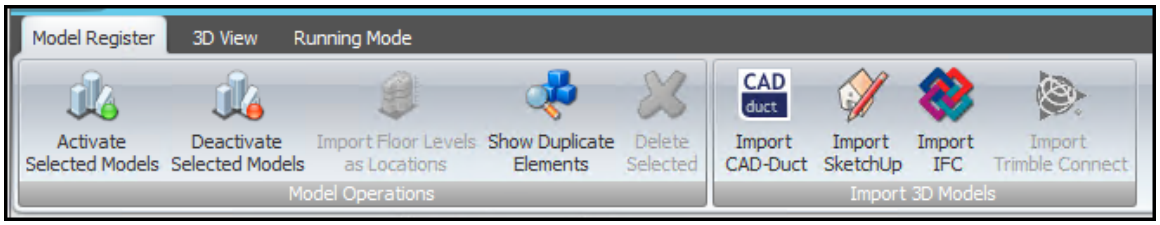
Column	Description
Model	When the model is published to Vico Office for the first time, its file name is the CAD file name. The BIM application icon indicates the source application of the model.  Models can be removed from the quantity takeoff calculations by deactivating the model.

Column	Description
Model Version	Each time you publish an updated to the same model in Vico Office, a new model version is added to the row. The name of the new model version has this structure: **version [n] - [model name]**. • [n] is the version number, which is based on the publishing order. • [model name] is based on the CAD file name. **Note:** For each model, only one version can be active at a given time. Version Identifiers: • **Small Circle**: The active model that supplies the project quantities. • **Cloud**: The models that include a view point that has been clouded and marked with an issue. • **Gray cell:** The document is not part of a version. • **Green cell:** The document is new or unchanged as part of a version. • **Red cell:** The document has been changed as part of a version.  For more information on model versions, see "Adding Versions and Files" on page 199.

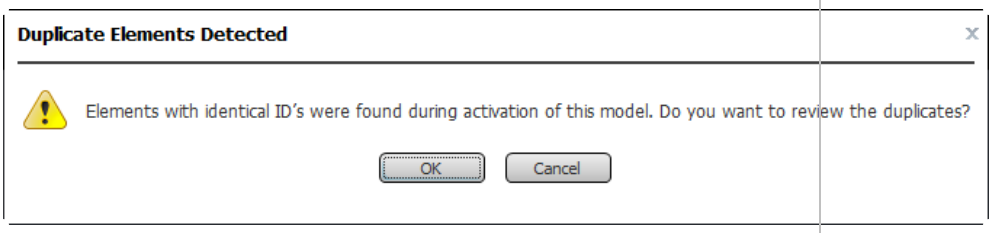
Column	Description
New Model Version Indicator	If a newer model version exists, the **New Model Version Indicator**, a yellow exclamation icon, is displayed in the model column. This icon disappears after the latest model version is activated. 
Status Icon	A gray circle is displayed when a model and its model version are active in the 3D view and Takeoff. **Note:** The gray cloud indicates that a constructability report belongs to the model. 

Column	Description
BIM Application Icon	The BIM application icon indicates the CAD model source application. 
Show/Hide Button	The **Show/Hide** button, which works in conjunction with the **Filtering** palette, shows or hides a model in the view. Hiding the model via this button reduces the **3D View** load times while maintaining the quantity values associated with an active model. 

Model Register Ribbon Tab

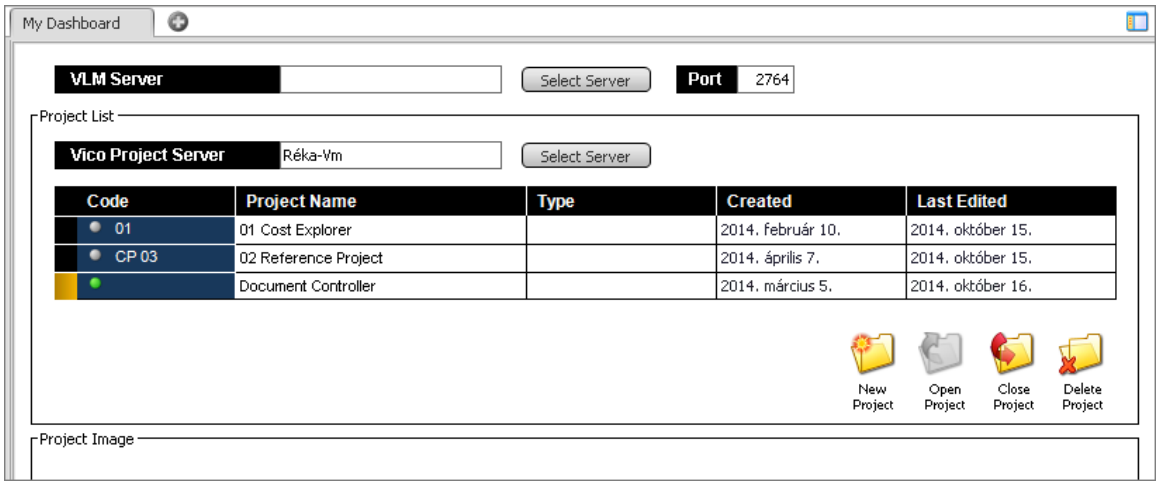


Ribbon Buttons	Description
Activate Model	Activate the currently selected model version, and deactivate the previously active model version if applicable. When the model is activated, the active model version is displayed in the adjoining 3D view. You can access this option from the ribbon or from the context menu when you right-click a model.
Deactivate Model	Remove the active status of an active model version. The model is removed from the 3D view, and related takeoff item and takeoff quantity information is removed from the Takeoff view. You can access this option from the ribbon or from the context menu when you right-click a model.
Import Floor Levels as Locations	Import the floor/level information as floor locations, including the elevation values, from the ArchiCAD model into the Vico Office project.

Ribbon Buttons	Description
Show Duplicated Elements	If you activate a published model that has duplicated elements, the following message appears:  • If you click **OK**, a list of duplicated elements is displayed. You can select a model, and then delete the duplicated element from it. • If you click **Cancel**, you can still open this view by clicking **Show Duplicated Elements** on the ribbon.
Delete Selected	Deletes the inactive model version form the project.
Import 3D Models	Import models into Vico Office using the applicable importer. You can import models created in CAD-Duct, SketchUp, AutoCAD (3D), or any other BIM tool that can save IF files. CAD-Duct files are imported through IFCxml files created from CAD-Duct using the **IFCe** command from the CAD-Duct command line.
Import Trimble Connect	Documents can be downloaded from Trimble Connect server too. Click on the Import Trimble Connect button and sign in for the server. **Important:** The URL of the server should be entered in the Project Settings workflow item.

My Dashboard View

In the **My Dashboard** view, you can select the project in which you want to work. For more information, see "View Dashboard" on page 89.

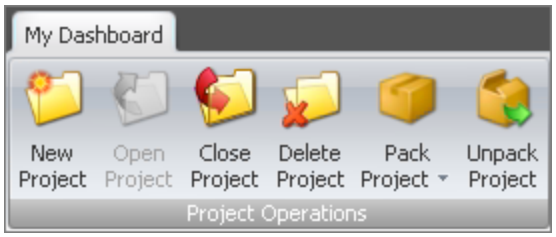


My Dashboard View

Area	Description
VLM Server	The computer that currently provides the license or licenses to use the selected Vico Office module or modules. By default, the **VLM Server** is set to your own computer. You can click **Select Server** to select a computer in the network that hosts floating licenses for any modules that you do not have a local license for.
Project List	The list of all your projects are listed. The currently opened project is indicated by a green dot.
Vico Project Server	Accept the default local server (your computer's name), or browse to select a computer in the network on which your company's Vico Office database will be stored. By default the server name is set to the name of your computer because the database that Office connects to after installation is located here.
Code	Assign a code to your project. Click the field header to sort the projects based on values in this column.
Project Name	Define a name for the selected project. Click the field header to sort your projects alphabetically.
Type	Assign a code to your project. Click the field header to sort the projects based on values in this column.

Area	Description
Created	The time and date of when the project was created. When you create a new project, a time and date stamp is automatically generated and displayed in this field as a historical record of your project. If desired, you can sort projects by this property by clicking the header on the Dashboard.
Last Edited	The time and date of when the project was last edited. Each time the project is modified, a time and date stamp is automatically be generated in this field.
Project Image	The project image uploaded in the Project Settings view.

My Dashboard Ribbon Tab

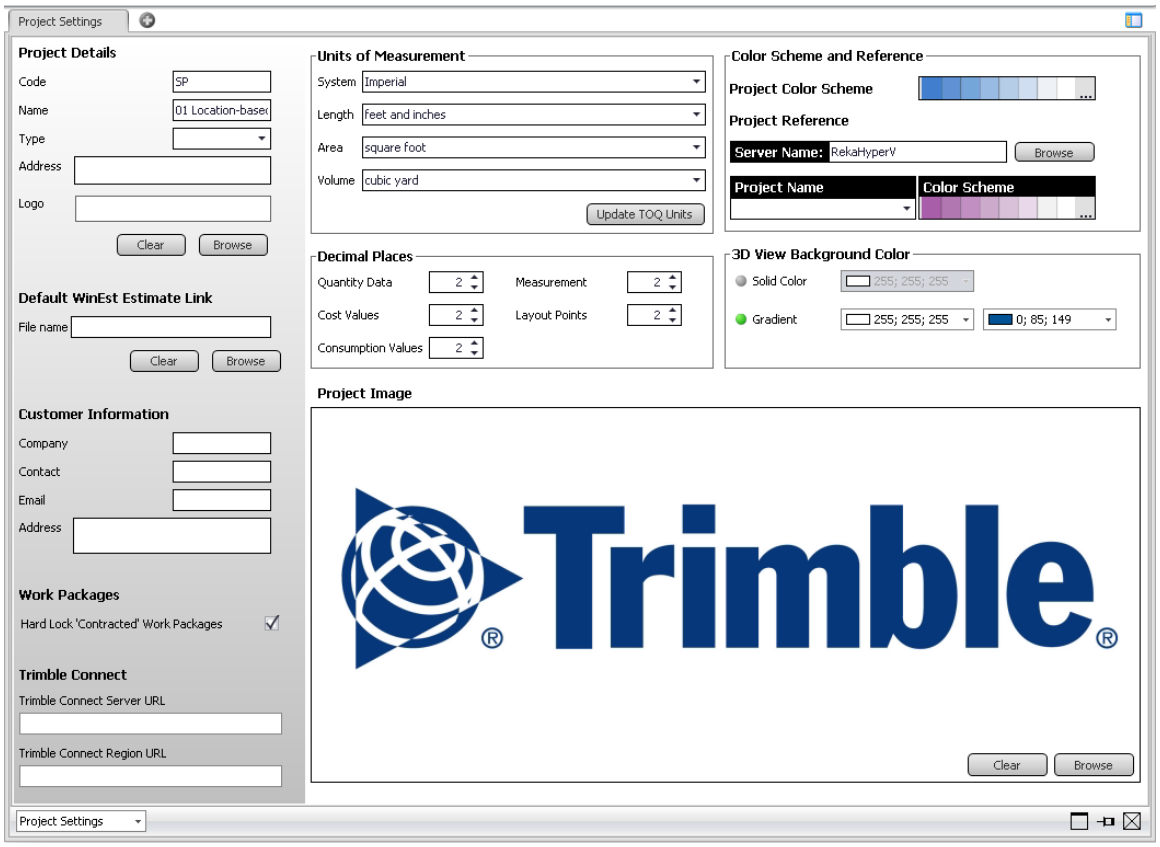


Ribbon Items	Description
New Project	Create and add a project to the Vico Office database. When you create a project, you can immediately share it with other project team members connected to the same database. The project is also available in external BIM applications such as Tekla, ArchiCAD, Bentley, and Revit.
Open Project	Access the information in the selected project via the workflow items. Available models can be activated and viewed in the Model Register view. Detailed takeoff data can be reviewed for the active models in the Takeoff Manager view.
Close Project	Close the currently opened project on your Dashboard. You must close an opened project before you can open another project.

Ribbon Items	Description
Delete Project	Delete the selected project on your Dashboard.
Pack Project	Pack and store the currently selected project with its active database components into a compressed, portable file. You can use this method to create a file that can be saved to a portable disk or sent electronically. For example, send this file to another team member or to a client who is working outside of the network.
Unpack Project	Open a packed project file. The packed project is added to your collection of projects on the Dashboard. Then you can open and view the project information at the state that it had when it was backed up. By packing and unpacking projects, you can view stored project data in Vico Office for sharing, reference, or backup purposes.

Project Settings View

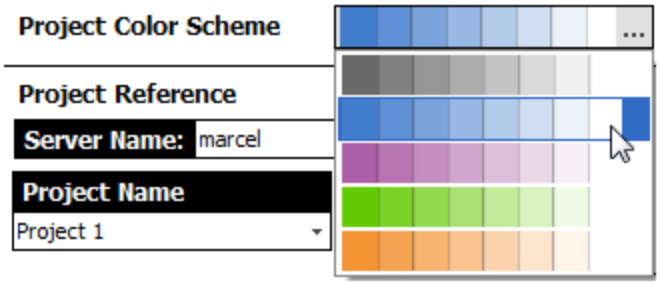
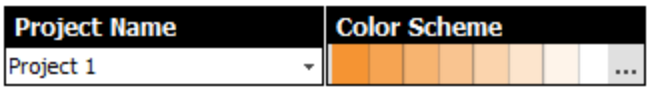
Customize project information in the **Project Settings** view. For more information, see "Define Settings" on page 94.



Project Settings View

Area	Description
Project Code	Assign or edit a project code. The field data is the same as the **Code** field in the My Dashboard view.
Project Name	Assign or edit a project name. The field data is the same as the **Project Name** field in the My Dashboard view.
Project Type	Assign or edit a project type with an unlimited number of characters. Use the assigned project type to quickly find similar projects by sorting them based on this property in the My Dashboard view
Project Address	Enter address information that can be used for reporting purposes later.
Company Logo	Under the **Logo** field, click **Browse** to find and select a company image to be associated with the project. You can include the inserted logo in your reports later.

Area	Description
WinEst Project Link	Establish a connection between Vico and WinEst. Click **Browse** and locate the WinEst project to which you wish to link. **Note:** The Vico-WinEst plugin must be installed before you can view your WinEst project. For more information, see WinEst Vico Integration.
Company	Type the client's company name.
Contact	Type the name of the primary project contact.
Email	Type the email address of the primary project contact
Address	Type the mailing address of the primary project contact.
System	Select the system for the units of measurement that you plan to implement to all your takeoff quantities. You can choose between the Imperial or Metric system. Based on your selection, the available options for **Length**, **Area**, and **Volume** are adjusted. In the Takeoff Manager view, the quantity units are also adjusted. If you do not make a selection, Imperial units are applied by default.
Length	Select the unit of measurement that you plan to implement throughout your takeoff quantities. In the Takeoff Manager view, all length quantities are adjusted according to your selection. If you do not make a selection, the default Imperial unit of measurement (feet and fractional inch) is applied to all takeoff quantities.
Area	Select the unit of measurement that you plan to implement throughout your takeoff quantities. In the Takeoff Manager view, all area quantities are adjusted according to your selection. If you do not make a selection, the default unit of measurement (square feet) is applied to all takeoff quantities.

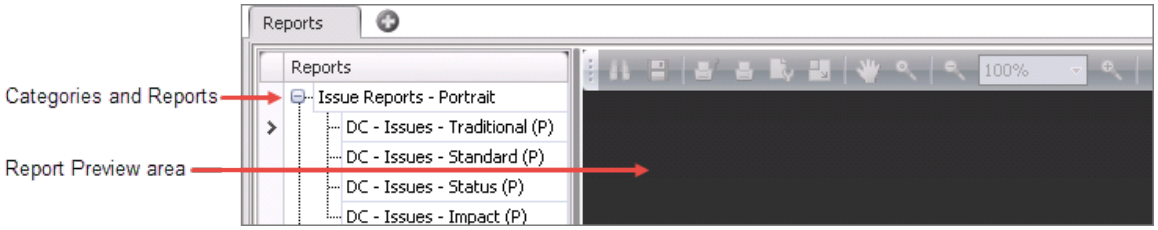
Area	Description
Volume	Select the unit of measurement that you plan to implement throughout your takeoff quantities. In the Takeoff Manager view, all volume quantities are adjusted according to your selection. If you do not make a selection, the default unit of measurement (cubic yard) is applied to all model geometry and calculations.
Project Color Scheme	From the **Project Color Scheme** list, select a color scheme for the project, so you can easily recognize project and reference information in the user interface. 
Project Server	Select a default reference for a project from any Vico Office database. Specify the computer (server) with the database that contains the reference information you want to use here. By default, the server is set to the local computer.
Reference Selection and Color Scheme	The default reference is the project, or set of standard data, that is opened when you first open the Reference Browser or the Project and Reference viewset. A reference can be any completed project or a project that contains the standard cost information for your company (often referred to as 'Library'). Select any of the projects in the selected database server, and specify a color scheme to easily recognize reference data in the user interface. 

Area	Description
Project Image	Upload the project image that you would like to associate with the active project. This image is displayed in the My Dashboard view when you select the project in the **Project List** area.
Decimal Settings	In the **Decimal Settings** field, define the number of digits to appear after the decimal symbol. You can specify this for quantity data, cost values, consumption values and measurements. For more information, see "Defining Number of Decimals " on page 96.
Hard Lock 'Contracted' Work Packages	To allow the contracted bid to be unlocked later, select the **Hard Lock 'Contracted' and Work Package** check box. If you want to modify the contracted bid, first open the **Project Settings** view and clear the **Hard Lock 'Contracted' and Work Package** check box.
Trimble Connect Server URL	Type the URL that is the main Trimble Connect site for user authentication.
Trimble Connect Region URL	Optional: Type the URL that is used to access the projects and files in the client's region. If this field is blank, the Server URL is used.

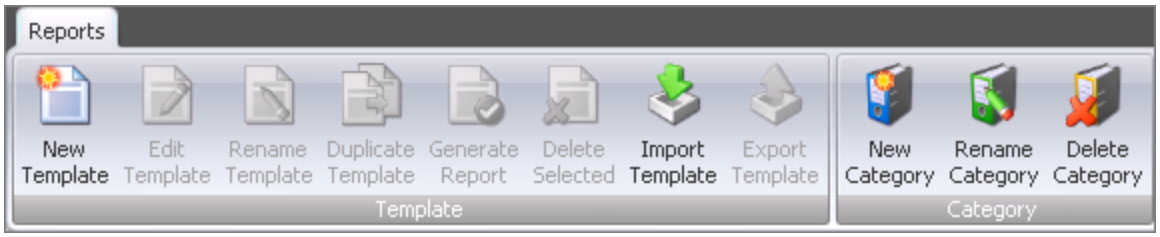
Reports View

In the **Reports** view, all the folders (categories) and reports (templates) are created and stored in the **Categories and Reports** tree. You can create and save as many report templates as needed, and organize them in your own categories.

The **Report Preview** area displays the report generated from a template. You can print the report or save the reported project information into several file formats including PDF, RTF, and XLS. For more information, see "Create Reports" on page 584.



Reports Ribbon Tab

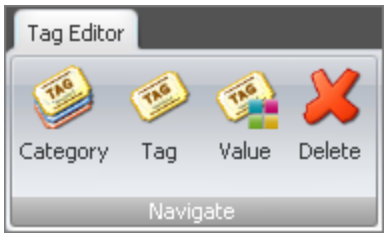


Ribbon Item	Description
New Template	Add a new template to the project. After adding a new template, you can customize the template content inside the Report Editor. New templates can only be added to a selected category. If there are no report categories in your project, first create one.
Edit Template	Open the Report Editor where you can select any of the available data fields to populate your report with.
Rename Template	Rename an existing template.
Duplicate Template	Use an existing report template for a new report template. You can edit the new template by clicking **Edit Template**.
Generate Report	Use the defined template with the data in your project. You can preview the generated report in the **Report Preview** Area.
Delete Selected	Delete the active template definition.
New Category	Create a new category for a report template. Report templates are categorized, so you must create a category if none exist yet.
Rename Category	Rename an existing category.

Tag Editor View

In the **Tag Editor** view, you can edit existing (system) tags and define new tags and tag values, which can be used to further specify assemblies and components in the **Plan Cost** task. For more information, see "Edit Tags" on page 97.

Tag Editor Ribbon Tab



Ribbon Item	Description
Category	Add a new category of tags to the project. By default, the **System** category is included in Vico Office. This category contains all the tags that are used by Vico Office functions and cannot be deleted.
Tag	Add a new tag to the project. Tags can be assigned to cost estimating content (assemblies and components) and displayed in the **Plan Cost** view as a column.
Value	Add new values to a tag system. Values are predefined entries that can be selected for components and assemblies.
Delete	Delete a selected category, tag, or tag value. **Note:** Tags in the **System** category cannot be deleted.

Takeoff Manager View

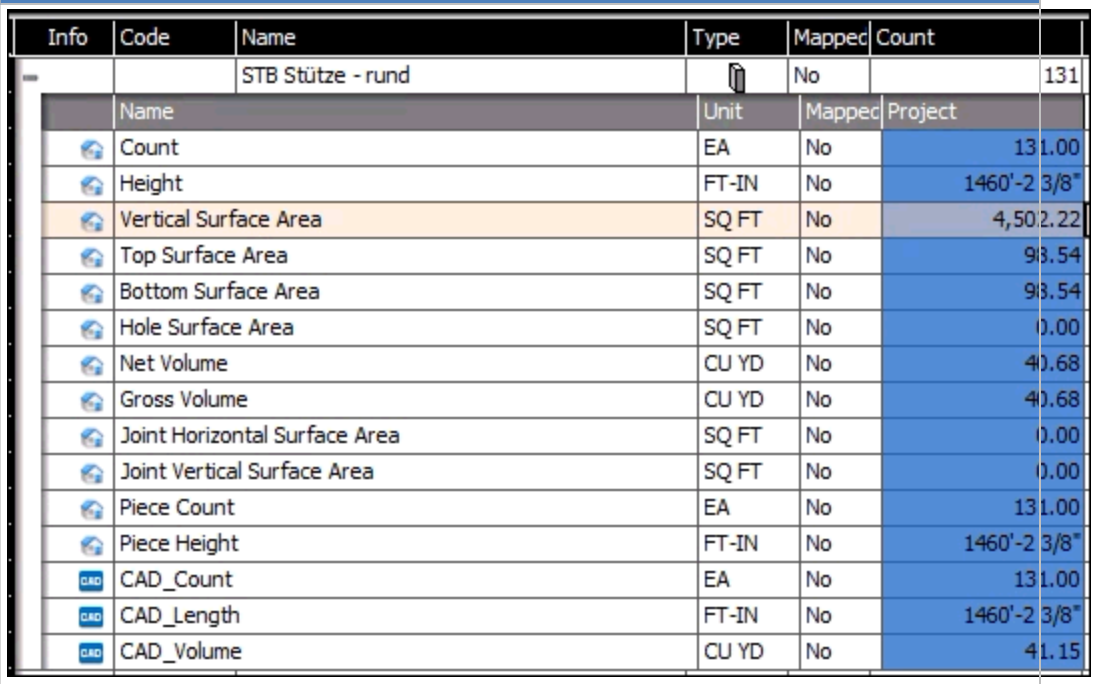
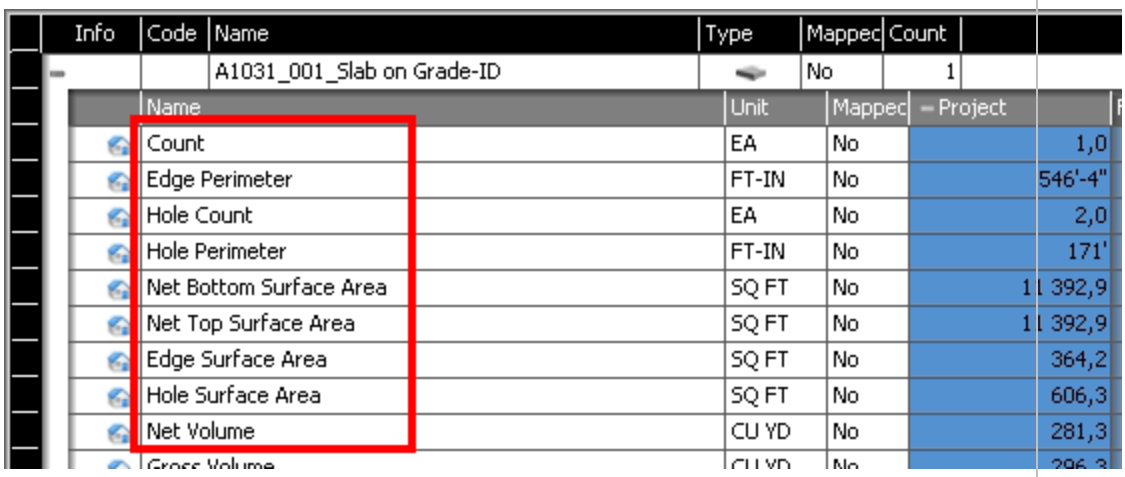
In the **Takeoff Manager** view, you can manage takeoff quantities by location. For more information, see "Manage Takeoff" on page 276.

Columns

Column	Description
TOI Info	Column for information and warning icons that provide additional information on each item. Click on the heading to filter the list by icon type Info ▼. (Custom) filter: Allows you to customize the list of takeoff items to be displayed. (Clear all Filters): Removes any applied filter.

Column	Description
TOI Code	A blank field where you can assign unique classification codes to your takeoff items as needed.

Column	Description
TOI Name	Defined automatically by the creation of takeoff items as specified in the TOI Builder, where elements are grouped based on the selected model element properties from the original CAD application. The TOI description can be changed as needed inside Mini TOM and Takeoff Manager. Info | Code | Name | Type | Mappec | Count A1031_001_Slab on Grade-ID | No | 1 A1012_003_Pile Cap-ID | No | 52 A1021_001_CIP RC Pile-ID | Yes | 208 B1012_005_CIP RC Slab-ID | No | 9 B1012_046_CIP RC Column-ID | No | 168 B1012_069_CIP RC Beam-ID | No | 196 B2022_010_Ext Glazing System, clear-ID | No | 4 Takeoff items that are italicized have not been quantified and will only have the Basic CAD quantities. Info | Code | Name | Type | Mappec | Count *STB Stütze - rund* | No | 131 Name | Unit | Mappec | Project *CAD_Count* | EA | No | 131.00 *CAD_Length* | FT-IN | No | 1460'-2 3/8" *CAD_Volume* | CU YD | No | 41.15 Once they have been quantified based on Vico's algorithms and locations, a list of Premium quantities are available.

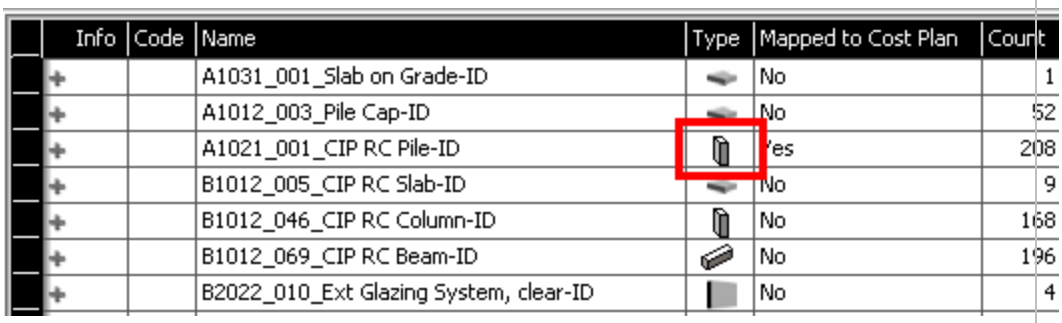
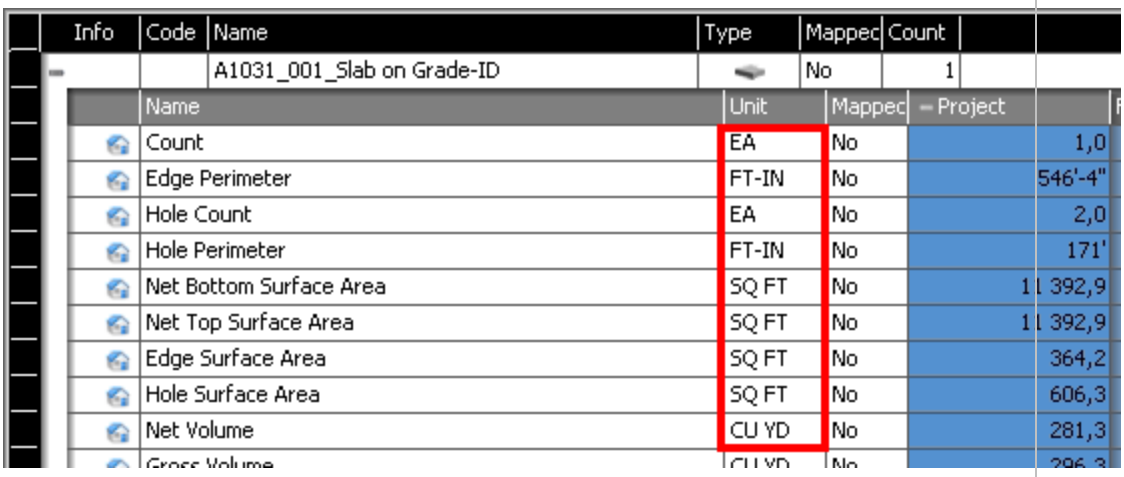
Column	Description
	
TOQ Name	Indicates the name of the quantity that is calculated in the value column. Each quantity has a unit and value assigned. The group of selected quantities under a TOI is driven by the selected TOI type. 

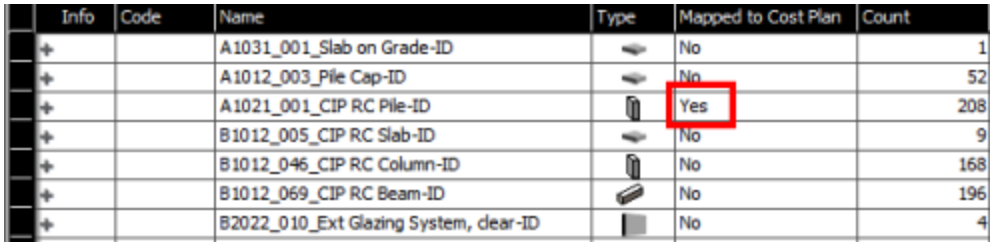
Info	Code	Name	Type	Mappec	Count
		STB Stütze - rund		No	131

Name	Unit	Mappec	Project
Count	EA	No	131.00
Height	FT-IN	No	1460'-2 3/8"
Vertical Surface Area	SQ FT	No	4,502.22
Top Surface Area	SQ FT	No	93.54
Bottom Surface Area	SQ FT	No	93.54
Hole Surface Area	SQ FT	No	0.00
Net Volume	CU YD	No	40.68
Gross Volume	CU YD	No	40.68
Joint Horizontal Surface Area	SQ FT	No	0.00
Joint Vertical Surface Area	SQ FT	No	0.00
Piece Count	EA	No	131.00
Piece Height	FT-IN	No	1460'-2 3/8"
CAD_Count	EA	No	131.00
CAD_Length	FT-IN	No	1460'-2 3/8"
CAD_Volume	CU YD	No	41.15

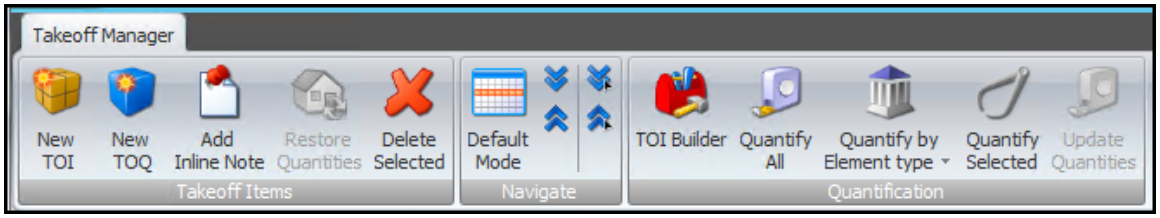
Info	Code	Name	Type	Mappec	Count
		A1031_001_Slab on Grade-ID		No	1

Name	Unit	Mappec	Project
Count	EA	No	1,0
Edge Perimeter	FT-IN	No	546'-4"
Hole Count	EA	No	2,0
Hole Perimeter	FT-IN	No	171'
Net Bottom Surface Area	SQ FT	No	11 392,9
Net Top Surface Area	SQ FT	No	11 392,9
Edge Surface Area	SQ FT	No	364,2
Hole Surface Area	SQ FT	No	606,3
Net Volume	CU YD	No	281,3
Gross Volume	CU YD	No	296,3

Column	Description
Element Type	A list of available Vico Office element types that you can assign to a TOI. From the selected element type, the takeoff quantity properties that are needed to be calculated is determined for the takeoff item. View the available quantities available per element type in the Quantities and Units section of the help menu.  Info | Code | Name | Type | Mapped to Cost Plan | Count A1031_001_Slab on Grade-ID | No | 1 A1012_003_Pile Cap-ID | No | 52 A1021_001_CIP RC Pile-ID | Yes | 208 B1012_005_CIP RC Slab-ID | No | 9 B1012_046_CIP RC Column-ID | No | 168 B1012_069_CIP RC Beam-ID | No | 196 B2022_010_Ext Glazing System, clear-ID | No | 4
Unit	The units assigned to a quantity value. These units are derived from the units of measurement, as defined in the Project Settings view.  Info | Code | Name | Type | Mapped | Count A1031_001_Slab on Grade-ID | No | 1 Name | Unit | Mapped | Project Count | EA | No | 1,0 Edge Perimeter | FT-IN | No | 546'-4" Hole Count | EA | No | 2,0 Hole Perimeter | FT-IN | No | 171' Net Bottom Surface Area | SQ FT | No | 11 392,9 Net Top Surface Area | SQ FT | No | 11 392,9 Edge Surface Area | SQ FT | No | 364,2 Hole Surface Area | SQ FT | No | 606,3 Net Volume | CU YD | No | 281,3

Column	Description
Cost Mapped	Displays whether a count is available for an element. In the following example, only the CIP RC Pile has a count, so it appears in the takeoff model.  Info | Code | Name | Type | Mapped to Cost Plan | Count A1031_001_Slab on Grade-ID | No | 1 A1012_003_Pile Cap-ID | No | 52 A1021_001_CIP RC Pile-ID | Yes | 208 B1012_005_CIP RC Slab-ID | No | 9 B1012_046_CIP RC Column-ID | No | 168 B1012_069_CIP RC Beam-ID | No | 196 B2022_010_Ext Glazing System, clear-ID | No | 4
Task Mapped	Indicates whether a TOQ/TOI has been mapped to a task.
Location Total	Based on the locations defined in your project with the LBS Manager. The model-based quantities per location for a takeoff item (TOI) is determined automatically. Any quantity updates in these fields will update the Project Quantity field and the totals in the Mini TOM view.
Project Total	The sum of all quantities for a takeoff quantity (TOQ) for all project locations. The totals manually edited in these fields will be identical with the Mini TOM view and vice versa.

Takeoff Manager Ribbon Tab



Ribbon Item	Description
New TOI	Add a new takeoff item (TOI) in the Takeoff Manager spreadsheet. You can create manual takeoff items and assign elements to them.
New TOQ	Adds a new takeoff quantity (TOQ) item under the selected TOI, so you can enter a quantity that is not currently calculated by any of the element properties.

Ribbon Item	Description
Add Inline Note	Post a note regarding a particular TOQ or TOI. Notes are only readable when the Mini TOM content is set to be displayed in the Default mode.
Restore Quantities	Restore the model-based quantities of a takeoff quantity that was edited by applying a manual override. Manual overrides are maintained when a model is updated, and the **Restore Quantities** function will let you go back to model-based quantities.
Delete Selected	Remove the selected TOI or TOQ in the Mini TOM. Any removed items are no longer shown in the Takeoff Manager view. You can also right-click on a TOI and select **Delete.** A new TOI is created for unassigned elements with the following name format: 'Unassigned-ElementType'
Default Mode	Restore the original order of the Takeoff items, including empty rows and notes that you may have inserted. The Default mode must be active to insert notes.
Navigate Group	Quickly expand and collapse the data in the n-tiered spreadsheet. Click the **+** button to expand to the next hierarchy level or the **-** button to collapse the lowest hierarchy level. The double arrows on the ribbon collapse or expand all levels at once. Point to each button to view a tooltip that describes what each will do.
TOI Builder	Launches the TOI Builder dialog box.
Quantify All	Quantifies all the Takeoff items on this list. This may be a lengthy process; therefore, it is highly recommended that you quantify only selected items.
Quantify by Element type	Only quantifies Takeoff items with the selected element type.
Quantify Selected	Quantifies only the selected Takeoff items.
Update Quantities	Re-quantifies Takeoff items that are out-of-date.

Indicators

Indicators	Description
Model Quantity Indicator	Displayed beside a takeoff quantity to show that a quantity is derived from a currently active model.
Missing Quantity Indicator	Displayed beside a takeoff item and takeoff quantity if one or more takeoff quantities could not be calculated correctly or if a quantity is missing.
Manual Quantity Indicator	Displayed beside a takeoff quantity to indicate that a quantity has either been modified manually or that a newly inputted takeoff quantity has been created using non-model based quantity data.
CAD Indicator	Displayed beside a takeoff quantity to indicate that this is a CAD quantity obtained from the CAD tool from which it was published.
Re-activate model	Displayed beside a takeoff item to indicate that the model from which this TOI was generated should be re-activated to ensure that the quantities are still up-to-date..
Re-quantify Takeoff item	Displayed beside a takeoff item to indicate that the takeoff item should be re-quantified.
Information	Displayed beside a takeoff item to indicate that it has elements with manual quantities.

Takeoff Pad View

In the Takeoff Pad view, you can view and manage individual takeoff components. For more information, see "Takeoff Pad" on page 290.

Columns

Table Items	Description
Show 2D	Show or hide takeoff items that were created by onscreen takeoff functions.

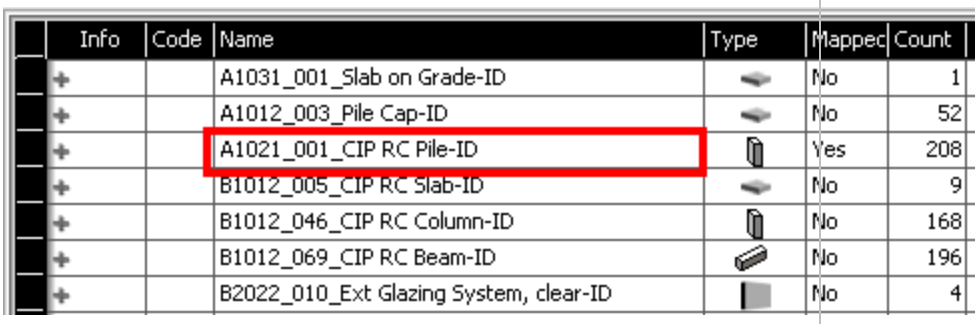
Table Items	Description
Info	Column for information and warning icons that provide additional information on each item. Each icon indicates that there is a problem with the quantities, which typically requires a model reactivation. Reactivating the model will push all of the 2D/3D quantities through the project locations. Click on the heading to filter the list by icon type  . (Custom) filter: Allows you to customize the list of takeoff items to be displayed. (Clear all Filters): Removes any applied filter.
Code	A blank field where you can assign unique classification codes to your takeoff items as needed.
Name	Defined automatically by the creation of takeoff items as specified in the Model Manager view, where elements are grouped based on the selected model element properties from the original CAD application. The TOI Description can be changed as needed inside the Takeoff Model and the Takeoff Manager. 
Pad Template	Define the type of created takeoff item. Then the type of TOI automatically changes, and the needed takeoff quantities are automatically added under the takeoff item.
Count	The default takeoff quantity that is assigned to the takeoff item.

Table Items	Description
Type	A list of available Vico Office element types that you can assign to a TOI.

Info	Code	Name	Type	Mapped to Cost Plan	Count
+		A1031_001_Slab on Grade-ID		No	1
+		A1012_003_Pile Cap-ID		No	52
+		A1021_001_CIP RC Pile-ID		Yes	208
+		B1012_005_CIP RC Slab-ID		No	9
+		B1012_046_CIP RC Column-ID		No	168
+		B1012_069_CIP RC Beam-ID		No	196
+		B2022_010_Ext Glazing System, clear-ID		No	4

Takeoff Pad Ribbon Tab

Button	Description
New TOI	Create a takeoff item (TOI), and add a new line item to the quantity takeoff. You can assign or re-assign model elements to the TOI. When you select a takeoff item, the Painting mode is activated, which allows you to add or remove elements to or from a selected TOI. The Takeoff Manager dynamically adds or removes quantities from the original TOI and reassigns the quantities from one takeoff item to another. If desired, new takeoff items can also be used to account for manual takeoff quantities.
New TOI Component	Add components to the manually created takeoff item.

Button	Description
New TOQ	Create a takeoff quantity (TOQ) and add a new line item to the Mini TOM spreadsheet under the selected TOI. You can assign or reassign model geometry for automatic quantity takeoff or enter manual quantity information. Assigning or removing geometry from a TOQ involves use of the paint brush.
Delete Selected	Remove the selected TOI or TOQ in the Mini TOM. Any removed items are no longer shown in the Takeoff Manager view.
Linear	Define the linear takeoff. You can choose whether the area is defined by snapping points to picking lines from the model or drawing.
Area	Define the area takeoff. You can choose whether the area is defined by snapping points to picking lines from the model or drawing.
Deduct	Create holes inside of the defined area.
Get Perimeter	Extract linear values from the perimeter of shapes that are created using the area takeoff tool.
Count	Derive unit-based quantities from the documents or modules.
Manage TO Pads	Rename or delete the selected takeoff items, or add a comment to it.
Navigate Group	Quickly expand and collapse the data in the n-tiered spreadsheet. Click the **+** button to expand to the next hierarchy level or the **-** button to collapse the lowest hierarchy level. The double arrows on the ribbon collapse or expand all levels at once. Point to each button to view a tooltip that describes what each will do.
Quantify All	Quantifies all the Takeoff items on this list. This may be a lengthy process; therefore, it is highly recommended that you quantify only selected items.

Quantify by Element type	Only quantifies Takeoff items with the selected element type.
Quantify Selected	Quantifies only the selected Takeoff items.
Update Quantities	Re-quantifies Takeoff items that are out-of-date.

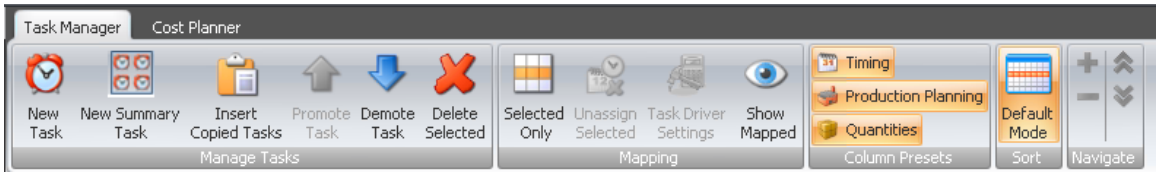
Task Manager View

In the **Task Manager** view, you can map cost assemblies and components to defined tasks. For more information, see "Manage Tasks" on page 386.

Task List

The task list is a data grid in which the collection of tasks and summary tasks for the project can be defined. Components and assemblies are mapped to tasks by drag-and-drop operations. The 'hours of work' for a task are calculated by defining a production rate for relevant assemblies and/or components.

Task Manager Ribbon Tab



Ribbon Item	Description
New Task	Add a task definition and populate the collection of tasks for the project. All projects start with an empty task list.

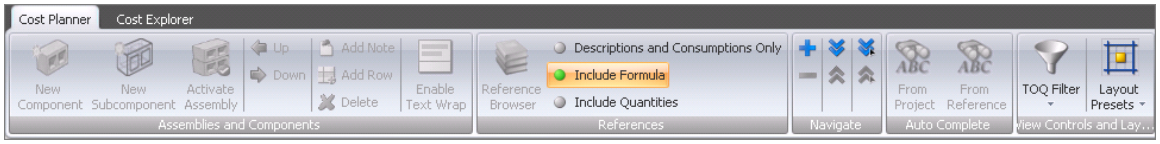
Ribbon Item	Description
New Summary Task	Add a new summary task, which contains a set of tasks and can be used to define the Work Breakdown Structure (WBS) for the project. Tasks can be assigned by dragging and dropping. Tasks selected when creating the new summary task are automatically included in it.
Insert Copied Tasks	Copy task definitions from an existing schedule or from a spreadsheet to quickly start for a new Vico Office schedule. After copying task content into the Windows clipboard, click the **Insert Copied Tasks** button to insert it in the project's task list.
Promote Task	Move a task or summary task to a higher level in the work breakdown structure. A task or summary task can be promoted until it reaches the 'Project' level.
Demote Task	Move a task or summary task to a lower level in the work breakdown structure. When demoting a task from the highest level, it is automatically included in the task above it, which at that point is turned into a summary task.
Delete Selected	Delete the currently selected tasks and/or summary tasks.
Selected Only	Map only the selected assembly to the target task when this mode is activated. Any included components are excluded.
Unassign Selected	Manage Tasks: Remove the selected assemblies and components from a task and move them back to the **Cost Planner** view. Plan Tasks: Remove the selected takeoff quantity from a task and moves it back to the **Takeoff Manager** view.
Task Driver Settings	Insert the task drivers for the selected assemblies and components. If the consumption rates were added to the labor cost items in the cost plan, you should enter 1 for each of them as the task driver to calculate with them in the Schedule Planner.

Ribbon Item	Description
Show Mapped	Show the assemblies and components in their original location in the Cost Planner with a gray font to indicate that these items have been mapped to a task. The n-tiered assembly and component cost structure in the Cost Planner can provide useful context for assemblies and components that have been mapped to tasks.
Column Presets Group	Use predefined settings that turn column visibility on or off.
Default Mode	Restore the original column order. All columns in the Task Manager view are sortable.
Navigate Group	Expand or collapse the task list by WBS level (by the **+** and **-** buttons). You can also expand or collapse the entire list using the double arrow buttons.

View Cost Plan

View Cost Plan is a read-only view of the **Cost Planner** view. Content is stored per cost plan version. For more information, see "Cost Planner View" on page 29.

Cost Planner Ribbon Tab



Ribbon Item	Description
Quantity Copy Options	For all copy operations in the **Cost Planner** view, determine how quantity information is included in the target location: • **Descriptions and Consumptions Only:** Keep the default value for the target quantity. • **Include Formula:** Copy the defined formula from the source and, if possible, reuse the takeoff items and takeoff quantities in the current project. This is the default option. • **Include Quantities:** Only copy the formula's results from the source.
Navigate Group	Quickly expand and collapse the data in the n-tiered spreadsheet. Click the **+** button to expand to the next hierarchy level or the **-** button to collapse the lowest hierarchy level. The double arrows on the ribbon collapse or expand all levels at once. Point to each button to view a tooltip that describes what each will do.
TOQ Filter	Filter the cost line items in the following ways: • Show Components with Model-based Quantities • Show Components with Manual Takeoff Quantities • Show Components with Manually Inserted Quantity Data • Show Components with Mixed Quantity Data
Layout Presets	Quickly turn on or off the desired set of columns for the task that you want to work on. • **Quantity** • **Cost** • **Variance** • **Margins** • **Cost Range** • **Bid** • **Reset System Presets** • **Manage**

Work Package Manager View

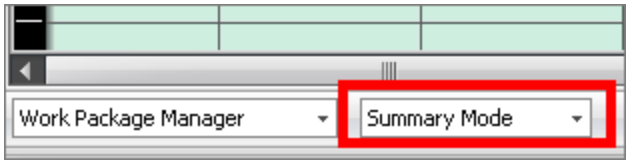
In the **Work Package Manager** view, you can create work packages. For more information, see "Work Packages" on page 540.

View Modes

In the **Work Package Manager** view, you can choose from the following view modes:

- Detailed Mode
- Summary Mode

Note: To switch between view modes, select a view on the taskbar at the bottom of the screen.



DETAILED MODE

When you open the **Work Package Manager** view, the view mode is set to **Detailed Mode** by default. This view mode displays the work packages including the mapped buyout items in a hierarchical structure.

Summary Mode

The **Summary Mode** displays a table of the values for the default Target, Estimate, and Planned pre-award states, if selected, as well as Bid, Contract, and any user-defined award states. A set of summary values for monitoring quantity, cost, and labor hours appear under the work package that includes a subset of columns showing cost type based totals. Mapped buyout items are not visible in **Summary Mode**.

Note: The state list in the **Summary Mode** is based on the Approval State tag value. To add an additional state, add a value in this tag.

In the **Summary Mode**, the following information is displayed:

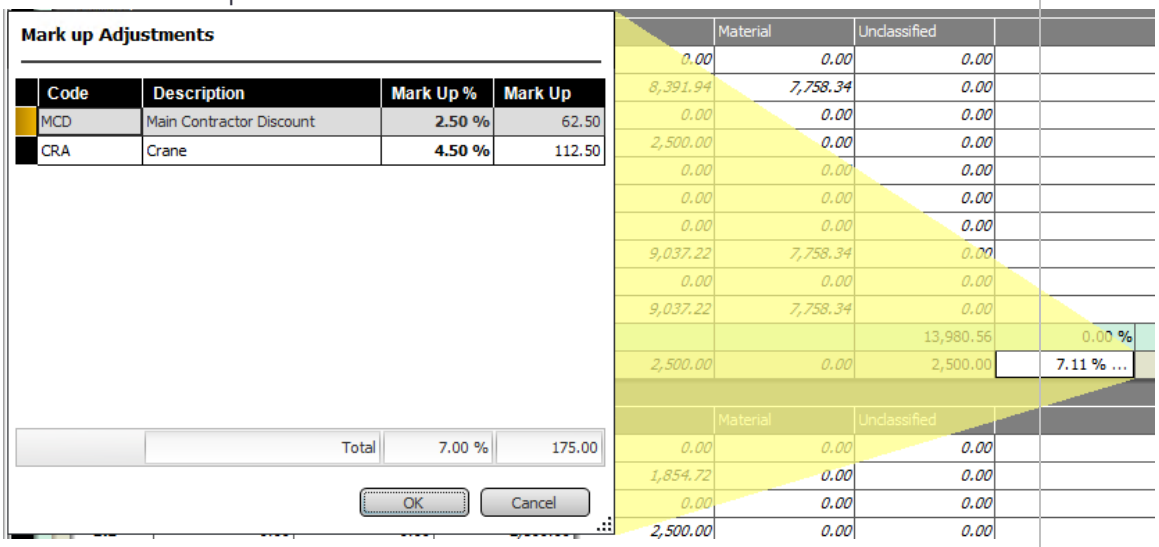
Summary

Description	Monitoring Quantity	Hours	Cost	Unclassified
Target		0,0	0,00	0,00
Estimate		865,0	2 103 146,59	793 906,61
Planned		0,0	518 856,77	518 856,77
Bid		0,0	1 206 300,00	6 300,00
Contracted		0,0	1 200 000,00	0,00
Differen...		0,0	-681 143,23	518 856,77
Adjustm...		0,0	0,00	0,00
Total Un...		0,0	793 906,61	793 906,61
Total Aw...		0,0	1 200 000,00	0,00
Total		0,0	1 993 906,61	793 906,61

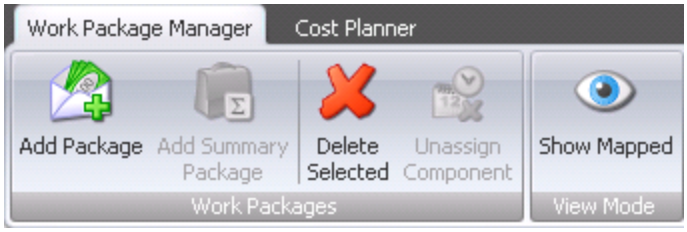
Row	Description
Target	Values are calculated based on the target costs that were defined in Define Target view.
Estimate	Values are calculated based on the current state of the cost plan; an approval state is selected and will be then be saved at that point.
Planned	Values are calculated based on the included cost plan items that belong to the current work package. Planned value appears when the state was changed to 'Planned'.
Bid	System default Approval State. Values are calculated based on the selected bidder. This value stays visible after you award a subsequent bid stage.
Contracted	System default Approval State. Values are calculated based on the selected bidder. After you select a bidder as 'Contracted', the corresponding work package cannot be edited any longer without changing the 'Hard Lock 'Contracted' Work Packages in Project Settings.
Difference	Calculates the difference between the Planned and the Contracted values.
Total	Shows the total value of the packages.

Columns

Column	Description
Code	The code that is added automatically after you create a work package. This code can be modified anytime in the future.
Description	The description of the work package.
Monitoring Quantity	The values that belong to the defined unit. This cell is filled automatically after you select the monitoring unit.
Monitoring Unit	The units that were used in the project. This is available for the work packages but not for the whole project.
Total	The estimated total package cost, which is the sum of the Committed and Plugged values.
Committed	The total of values submitted by the chosen subcontractor.
Plugged	The plug value applied to a cost assembly or component.
# Quotes	The number of contractors that submitted a bid for the current work package.
Bidder	The bidder selected by assigning an award approval state in the Bid Manager.

Column	Description
Mark Up %	The mark up percentage calculated by the mark up or a percentage mark ups/downs that can be entered to adjust the package value. This column appears only in Summary mode. Double-click on the cell and then click on the ellipsis button (...). A table displays details on how this Markup % was calculated. 
Mark Up	The mark up actual value calculated by the percentage or a numerical value that can be entered to adjust the package value. This column appears only in Summary mode. Double-click on the cell to display the ellipsis button (...) and then click on the ellipsis. A table displays details on how this Markup value was calculated.
Bid Total	The sum of the Total and Mark Up values.
Type	The type of work package. This can be user defined using tags.
Approval State	The level of selection. In the Summary mode, values based are calculated based on the defined Approval State. For more information, see View Modes.
Color	The defined color in the Work Package Manager & 3D viewset that highlights the elements belonging to the selected cost component or assembly. The color can be defined in the Color column of any viewset. A random color is added by default when a new work package is created.

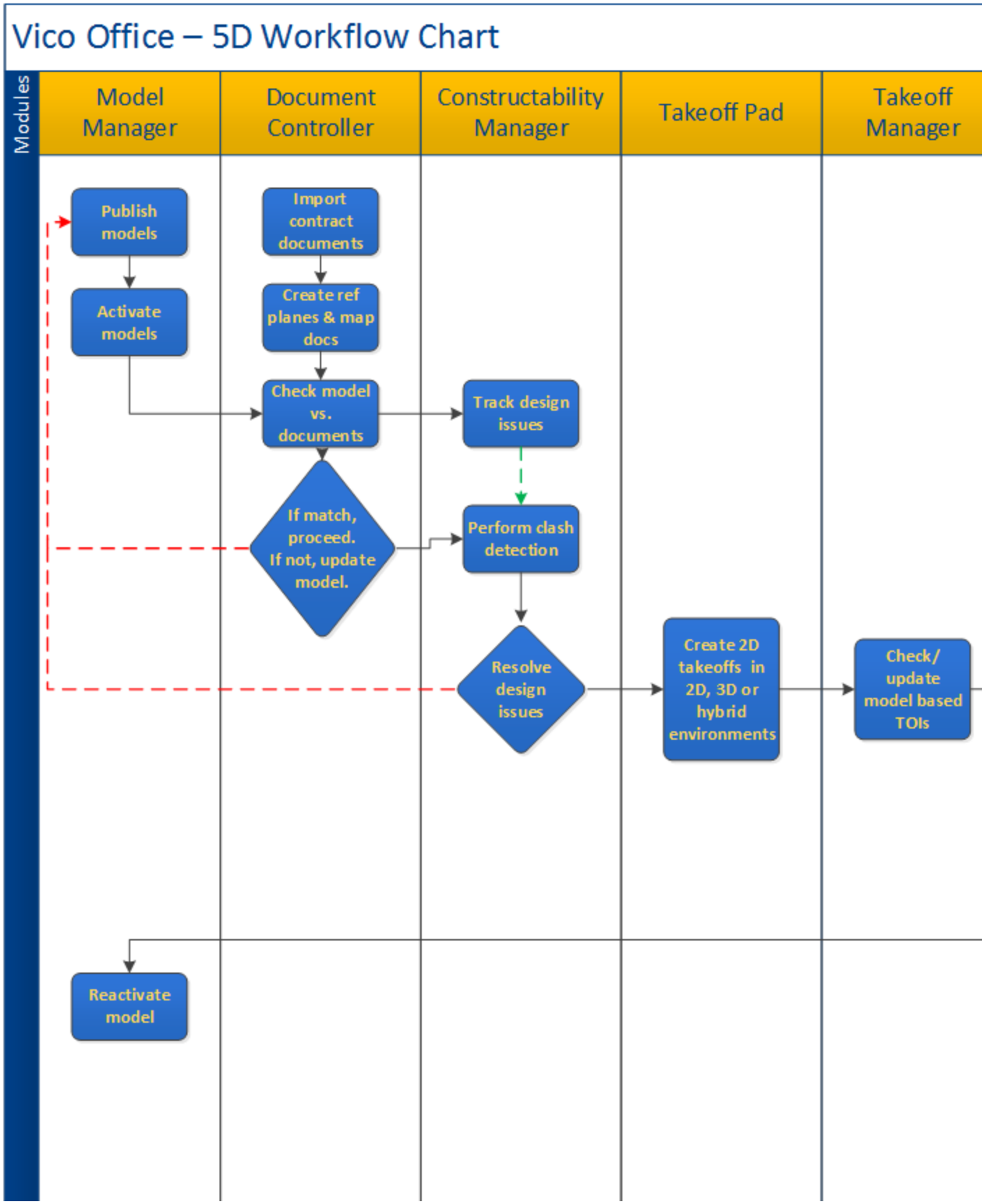
Work Package Manager Ribbon Tab



Ribbon Item	Description
Add Package	Populate the collection of packages for the project. All projects start with an empty work package list.
Add Summary Package	Group packages together in the summary package. Press **Ctrl** and select them, and then click **Add Summary Package**. You can also assign them by dragging them into the summary package.
Delete Selected	Delete the currently selected work package and/or summary package and automatically unassign all components.
Unassign Component	Remove the selected assemblies and components from a work package and move them back to the cost planner view.
Show Mapped	Show the assemblies and components in their original location in the Cost Planner. The gray font indicates that these items have been mapped to a work package. The n-tiered assembly and component cost structure in Cost Planner can provide useful context for assemblies and components that` have been mapped to work packages. By default, they are hidden in the **Cost Planner** view.
Labor Hours  	Based on the selected unit, the Work Package Manager calculates the number of hours of the work items that were defined with the selected units. **Note:** The **Labor Hours** list only includes units that belong to any of the mapped work items. For more information, see "Pre-Award Stages" on page 566 and "Awarding a Bid" on page 571.

5D Workflow

Click each step for more information.


Vico Office – 5D Workflow Chart
Modules
Model Manager
Document Controller
Constructability Manager
Takeoff Pad
Takeoff Manager
Publish models
Activate models
Import contract documents
Create ref planes & map docs
Check model vs. documents
If match, proceed. If not, update model.
Track design issues
Perform clash detection
Resolve design issues
Create 2D takeoffs in 2D, 3D or hybrid environments
Check/ update model based TOIs
Reactivate model

View Dashboard

Use the **View Dashboard** task to launch the **My Dashboard** view. From My Dashboard, you can manage your projects, pack and unpack projects, and preview project information.

You can think of the Dashboard as a project control center that allows you to easily switch between projects and project-specific information via the tasks in the Workflow Panel. The tasks available in the Workflow Panel depend on the active project.

The **View Dashboard** task automatically appears when you open Vico Office.

To open My Dashboard

- In the **Project Setup** workflow group, click **View Dashboard**.

  Note: The **Project Setup** workflow group is available in every module.

Creating a New Project

On the Dashboard, manage your projects, pack and unpack projects, and preview project information.

You can think of the Dashboard as a project control center that allows you to easily switch between projects and project specific information available via the Workflow Panel.

The information available in views, via all the workflow items, is dependent on the currently opened project on your Dashboard.

To create a new project

1. Open the View Dashboard task.
2. On the ribbon, click **New Project**.

   The new project is added as a new line in the **Project List** area.
3. In the **Project Name** field, type the project name.

   A time stamp is generated in the **Created** and **Last Edited** fields.
4. *Optional:* In the **Code** field, type a code for the project.

   Tip: Use the code to categorize your projects numerically.
5. *Optional:* In the **Type** field, enter the type.

   Tip: Use the type to sort by similar projects.
6. Define your project settings in the Define Settings workflow item.

Closing a Project

Because only one project can be opened at a time, you must close a project before opening a new one.

After closing a project, the model is not visible anymore, and you cannot edit the project until you open it again.

To close a project

1. Open the View Dashboard task.
2. On the Dashboard, click the currently opened project.
3. On the ribbon, click **Close Project**.

Note: To open another project, select the project on the Dashboard, and then click **Open Project**. If you open another project, the previously opened one is automatically closed.

Packing a Project

You can copy and share projects with other members of the project team, or you can archive the projects.

The process of copying, sharing, or archiving Vico projects is referred to as packing and unpacking projects. Packing a project creates a copy of the selected project in an archive file. The packed Vico project data is stored in a file with a .vico file extension. When you unpack a project, the project data is extracted, and you can open the project from the Dashboard.

The following options are available for packing projects:

- **Compatible Pack** - The project can be unpacked on any operating system (32 bit or 64 bit) and on the same Vico Office version or higher. A project archived using Compatible Pack can be upgraded with a higher version of the software.
- **Quick Pack** - Less time is required to pack a project, but the same version of Vico Office and of the operating system (32 bit or 64 bit) must be used to unpack it later.

Important: Other operations cannot be performed in Vico Office while a project is packed.

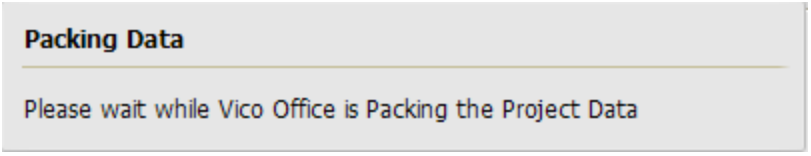
To pack a project

1. Open the View Dashboard task.
2. From the project list, select the project to be packed.
3. On the ribbon, click **Pack Project**.
4. Select **Compatible Pack**.

A standard window browser where you can define a file name and specify a folder location for the project appears.

5. Type the name for the .vico file, and then click **Save**.

   The packing process begins. The 'Packing Data' message appears and is removed when your project is successfully packed.



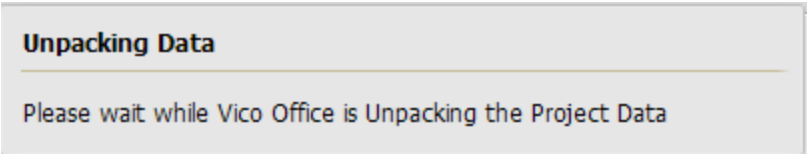
Unpacking a Project

Vico Office projects can be shared between users. After you receive the project file, identified with a file extension of .vico, unpack the project to enable it in your installation.

To unpack a project

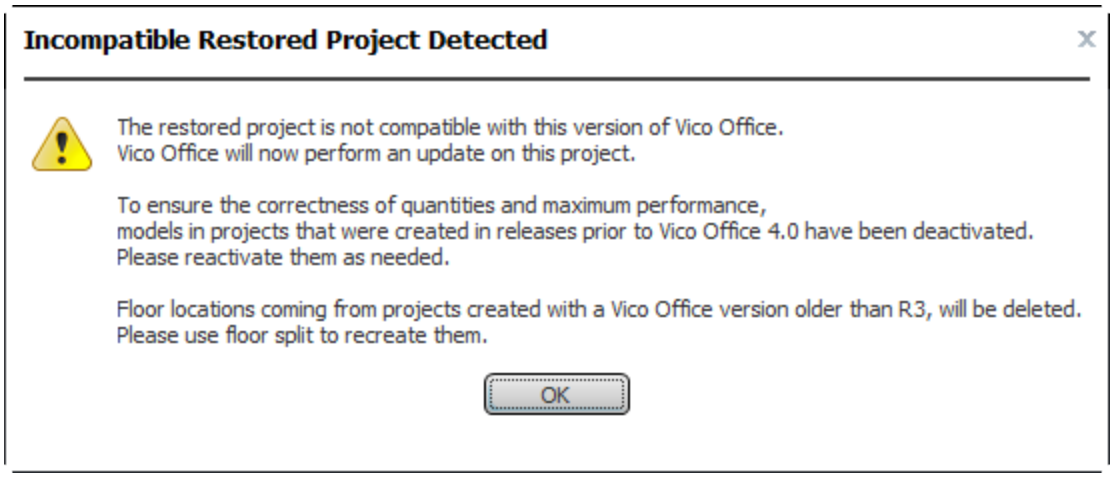
1. Open the View Dashboard task.
2. On the ribbon, click **Unpack Project**.
3. Browse to the .vico file.
4. Click **Open**.

   The software processes the file. The **Unpacking Data** message appears and is removed when the project is successfully unpacked.

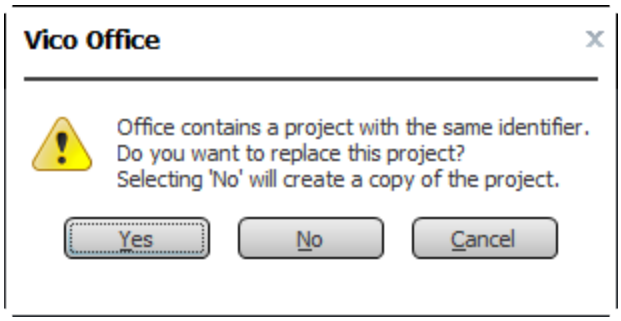


Note:

- If the project was created in an older version of Vico Office, a message may appear to identify this. Click **OK** to continue unpacking the project.



- If you attempt to unpack a project that has the same project identifier as an existing project on the Dashboard, you are asked to overwrite the project or create a new project.
  - **Yes**: Overwrite the existing project on the Dashboard.
  - **No**: Create a new project. This is the safer option.



5. On the Dashboard, select the project you wish to work in, and then click **Open Project**.

   The currently opened project is identified by the green dot to the left of its name in the **Project List** area of the Dashboard.

   Note: The color of the dot to the left of the project code indicates the status of the project.

   - Gray: The project is not active.
   - Orange: The project has not been upgraded / opened with the new Vico Office version.

Deleting a Project

Deleting a project removes the project from your Dashboard, and all stored project information is permanently discarded from your database.

Important: This operation cannot be undone.

To delete a project

1. Open the View Dashboard task.
2. On the Dashboard, select the project to be deleted by clicking that row.
3. On the ribbon, click **Delete Project**.
4. In the **Delete Project** dialog box, click **Delete Anyway**.

   The project is removed from the Dashboard.

Selecting a Vico Project Server

Switch project databases from the default database created on your computer to another machine in your network.

To change to a network database

1. Open the View Dashboard task.
2. Click **Select Server** next to **Vico Project Server**.
3. In the **Select Host** dialog, select **Network Host**, and then select the computer that contains the database that you want to connect to.

   The database is switched from a local to a network host location.

   You and your project team can now work off the same network location designated to store the latest project database and information.

Selecting a VLM Server

To select a VLM server

1. Open the View Dashboard task.
2. Click **Select Server** next to **VLM Server**.
3. In the **Select Host** dialog, click **Network Host**.
4. From the list of available computers under **Network Host**, select the computer that hosts the license server, and then click **OK**.

   Vico Office checks the VLM Server for available licenses for the module or modules that you activate in the Module Selector.

Define Settings

In the **Define Settings** task, you can customize project information such as:

- Project Details
- WinEst Project Link (when integrating with WinEst. Note that the WinEst-Vico plugin is required.)
- Customer Information
- Units of Measurement

  Note: This setting is applied to takeoff quantities when a model is activated and takeoff items are generated. The units selected in this view are then automatically assigned to new takeoff quantities.
- Decimal Places
- Color Scheme and Reference
- 3D View Background Color
- Project Image
- Work Packages

The information entered in the **Define Settings** task is available for reporting purposes. For example, you can include a company logo in your reports.

To open the Define Settings task

- In the **Project Setup** workflow group, click **Define Settings**.

  Note: The **Project Setup** workflow group is available in every module.

  The default viewset includes the Project Settings view.

Defining Units of Measurement

Important: Before activating your first project model in Vico Office, you must define your units of measurement in the **Project Settings** view. Any changes made after the first model activation do not affect any of the content in the project.

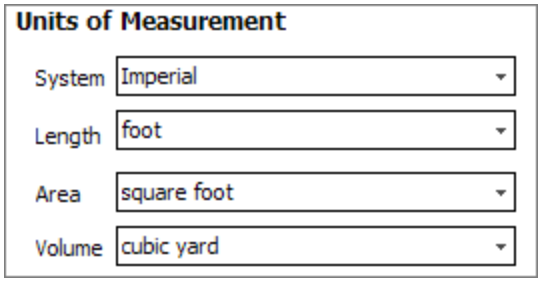
To define units of measurement

1. Open the Define Settings task.
2. From the **System** list in the **Units of Measurement** area, select the desired system, **Imperial** or **Metric**.

Your selection determines which units are displayed for the other lists in this area.

3. From the **Length**, **Area**, and **Volume** lists, select the units of measurement.

   Note: The selected units of measurement are used in the **Takeoff Manager** view for takeoff quantities in takeoff items.



After defining your preferred **Units of Measurement**, you can begin the process of publishing and activating models. Note that the available takeoff quantities (TOQs) are specified per element type. To see the available TOQs per element type, see "Quantities and Units " on page 2.

Selecting a Reference

A reference is a powerful way to reuse information from an earlier project or to copy cost assemblies and components from a standard set of data.

In the **Project Reference** area in the **Project Settings** view, you can specify the project or standard dataset in your database.

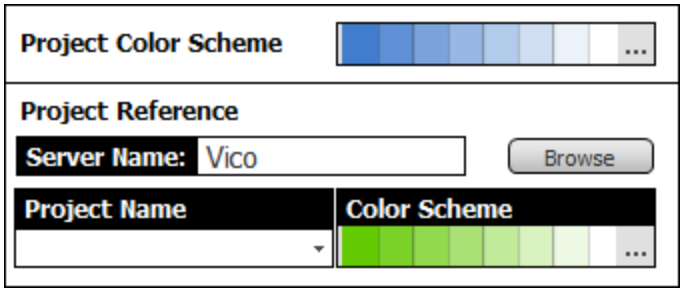
To select a default reference for your project

1. Open the Define Settings task.
2. In the **Color Scheme and Reference** area, click **Browse** to select the server that contains the database with the cost data you want to use.

   By default, this is set to your own computer.
3. From the list of projects that exist in the selected database, select the project from the **Project Name** combo.
4. To help you recognize reference data in the user interface, select a color scheme.

   The selected color scheme is used in the **Reference Browser** and **Project & Reference** view-

sets.



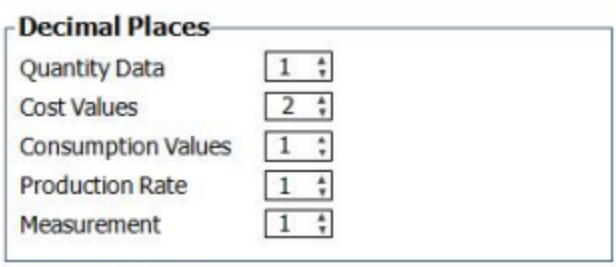
Note: At any time you can select a project from another database to copy data to your current project after specifying the default reference and while working on your project.

Defining Number of Decimals

You can define how different numerical values are represented in Vico Office.

To define the number of digits after the decimal

1. Open the Define Settings task.
2. In the **Decimal Places** area, specify the number of decimal places for each numerical value type by clicking the up and down arrows.



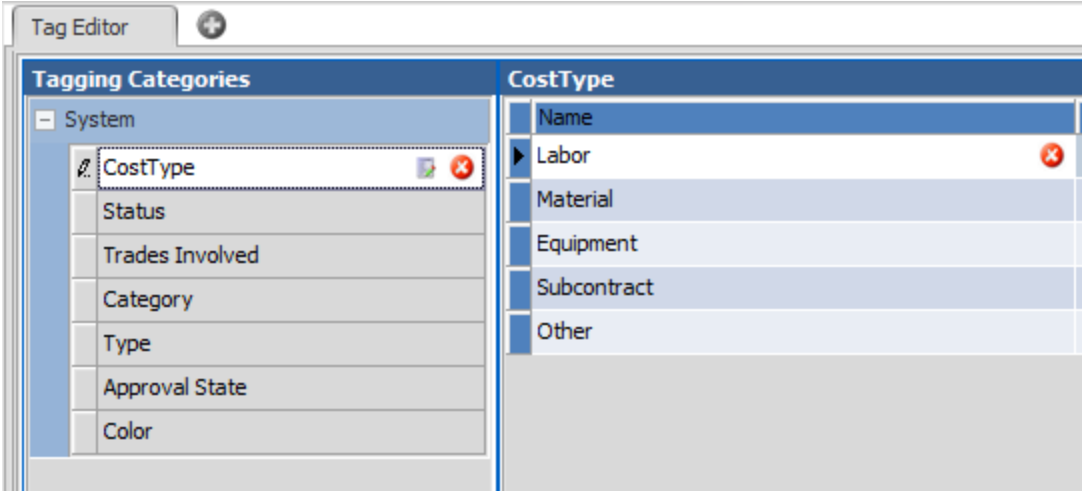
Cost and quantity data appear with the new settings when you switch to a view that holds this type of information.

Edit Tags

Tags are attributes of cost items (components and assemblies) that can be used for categorizing and filtering estimation information. They are not specific to any view but are typically used in spreadsheet views where they can be displayed as columns.

Tags store properties that are needed in addition to the standard data fields. Each tag has a list of possible values and a default value.

Important: Some tags and tag values cannot be edited or removed because they are required for Vico Office functionality. For example, the **Cost Type** tag is used for determining the default markup percentage for components and is therefore part of the **System** tag category.



To open the Edit Tags task

- In the **Project Setup** workflow group, click **Edit Tag**.

  Note: The **Project Setup** workflow group is available in every module.

  The default viewset includes in the Tag Editor view.

Defining a New Tag with Tag Values

Tag values are the variables that can be predefined for tags. A tag can have an unlimited number of predefined tag values, which can also be extended 'on the fly' by entering custom values in the Plan Cost view.

To add a new tag and define its tag values

1. Open the Edit Tags task.
2. In the **Tagging Categories** section, select the category to which you would like to add the new tag.
3. On the ribbon, click **Tag**.

   The new tag is added to the selected category, and a default name is assigned to it.
4. To change the name, click the new tag, and then type the name.

5. Add the default set of values that you would like to have available when you define the property of this tag.
6. On the ribbon, click **Value**.

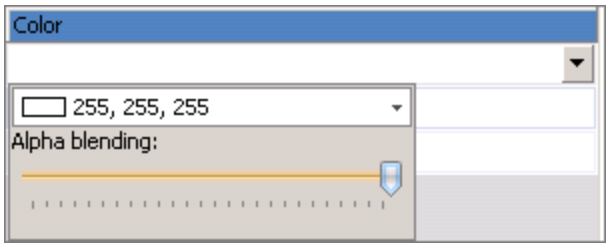
   –Or–

   Right-click the tag value area, and then click **Insert New Value**.

   Note: A tag or tag value must be selected before you insert the new value.

   The new value is added to the list of predefined tag values for the selected tag.
7. To change the value name, click the **Value** cell.

   If desired, you can also enter information in the **Description** cell.
8. Click the **Color** cell, and then select the color.



9. Repeat these steps for each value that you want to add.

   These values will be available when assigning the property to your Vico Office data.

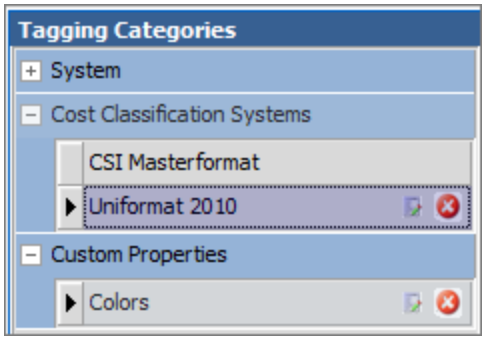
Defining a Hierarchical Tag Structure

Hierarchical tag structures are helpful for defining tag values for a tag that has several layers of classification values, such as the Uniformat 2010 or CSI Masterformat cost classification systems.

You can create parent - child relationships between tag values, in which the parent value is located on the higher hierarchy level and the child value on the lower hierarchy level. Working from level to level, nesting classification values with parent - child relationships, you can define your hierarchical classification structure, which can later be used for sorting, filtering, and comparison purposes.

To define a hierarchical tag structure

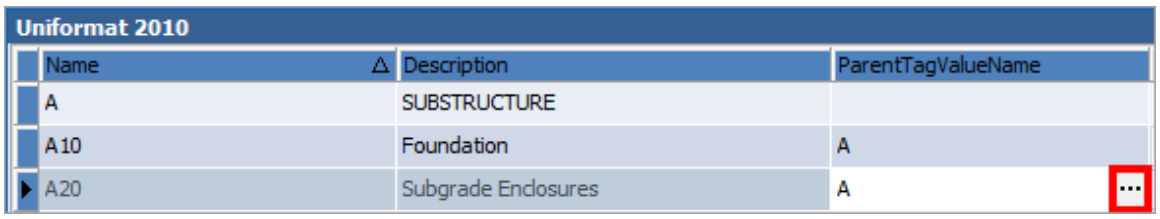
1. Open the Edit Tags task.
2. In the **Tagging Categories** list, select the category to which you would like add the new tag.



3. To add tag values to the first level of your tag structure, click **Tag Value** on the ribbon.

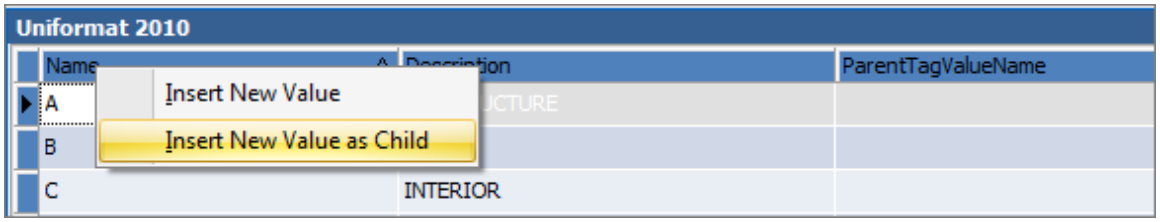
   –Or–

   Right-click the tag value area, and then select **Insert New Value** from the context menu.
4. In the **Description** column, add a description for each tag value.
5. On the ribbon, click **Tag Value**, and then click the **Select Parent** button ... in the **ParentTagValueName** cell to select its parent tag value.



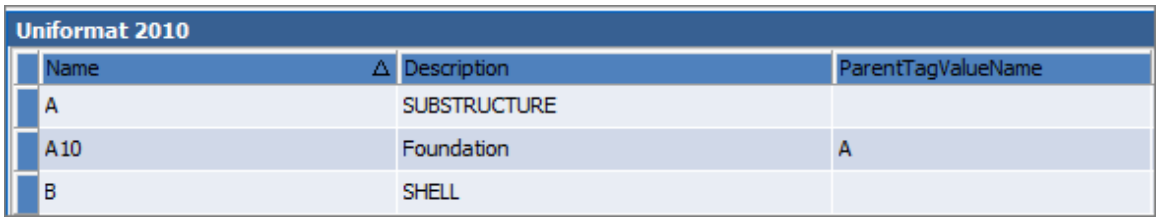
–Or–

Right-click a value, and then select **Insert New Value as Child** from the context menu.



A new tag value is inserted inside the selected tag value.

6. To change the name of the new tag value, click it, and type the new name.



Specifying the Use of a Tag

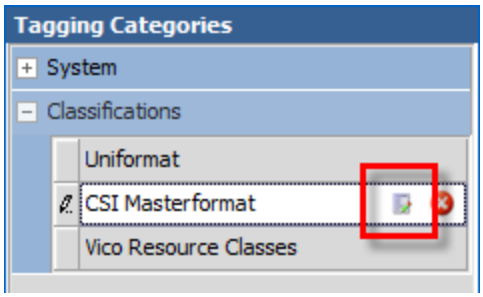
Specify the data source for which a defined tag can be used, so you can limit the tags that are available in all selection dialogs.

Note:

- To ensure that a tag works correctly, it must be mapped to the correct data source.
- The data sources for default tags cannot be changed.

To specify the type of content

1. Open the Edit Tags task.
2. In the **Tagging Categories** list, select the tag.
3. Click the **Edit** button next to the tag.



The **Edit Tag** dialog appears.

4. In the **Apply to** section, select the content for which you want the selected tag to be available.

   For example, selecting **Components** makes the tag available as a **Column** in the **Plan Cost** spreadsheet view.

   Note: Target costs, tasks, locations, take-off items, and models are not currently tag-enabled.

5. Click **OK**.

Defining a New Tag Category

Tag categories organize the collection of tags in your project. New tag categories can be created and edited at any time in the **Tag Editor** view.

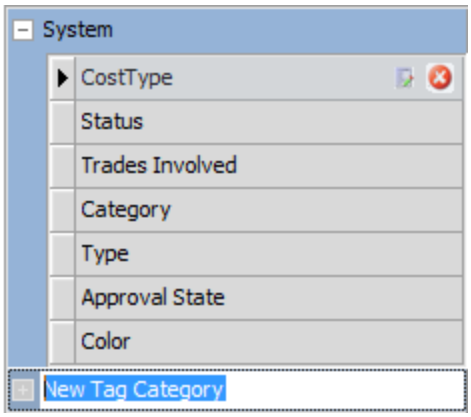
Note: The **System** tag category contains tags that cannot be edited or deleted because they are needed for Vico Office functionality.

To add a tag category to your project

1. Open the Edit Tags task.
2. To add a tag category to your project, click **Category**.

   Vico Office adds the new category and assigns a temporary name.

3. To change the category name, click it.



You have now created an empty tag category. To start adding tags and tag values to the category, click Add Tag.

Import from Excel

Take advantage of existing project information by importing it into Vico Office. You can open an Excel spreadsheet and then select the columns and cells that contain the data that you want to reuse.

Excel data can be imported into the following views:

- Cost Planner
- Takeoff Manager
- Tag Editor
- Issue Manager
- Work Packages

To import data from Excel:

1. Select the content view.

   –Or–

   If you are using a custom layout, select the viewport that will display the content view.
2. Open the Excel file.
3. Select the data to be imported. You can also import hierarchical data.
4. Validate the data.
5. Copy the data into the project.

To open the Import from Excel task

- In the **Project Settings** workflow group, click **Import from Excel**.

  Note: The **Project Setup** workflow group is available in every module.

The default viewset includes the following views:

- **Content view**: Contains the data that you select from the cells and columns in the **Excel Importer** view.

  The data types that can be imported depend on the selected view.
- **Excel Importer view**: Displays the content of the opened Excel file.

  For more information, see "Excel Importer View" on page 44.

Selecting the Content View

When you import data from Excel, the content view determines which data types can be imported into your project. After you open the Excel spreadsheet, you can select the data types that represent the content of each column.

To select the content view

1. Open the Import from Excel task.

   The top window of the default **Excel Import** viewset is empty.

2. On the ribbon, click **Pick View**, and then click the desired view.

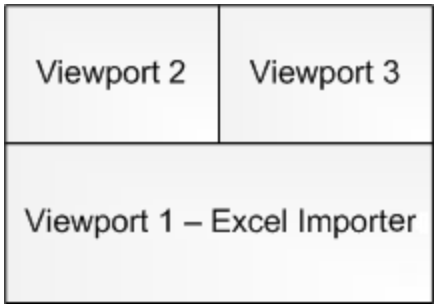
   The empty view appears. You can open open an Excel file and select the data to import into the project.

Selecting a Viewport for the Content View

If you use a custom layout (a layout created by adding a new custom viewset) that contains more than two viewports, you must select the viewport (window) that displays the content view.

Example:

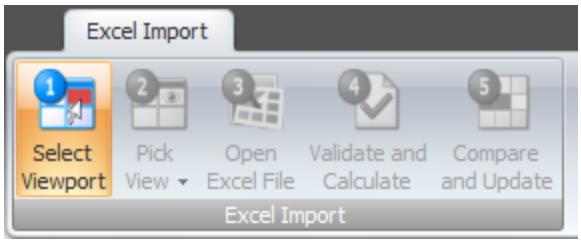
In the following layout, Viewport 1 is the **Excel Importer** view. You can select Viewport 2 or Viewport 3 for the content view.



To select the view for the content view

1. Open the Import from Excel task.
2. On the ribbon, click **Select Viewport**.

   The Viewport Selection mode is activated.



3. Click the viewport that will display the content view.
4. To select a content view, click **Pick View** on the ribbon, and then click the desired view.

   The empty view appears. You can open an Excel file and select the data to import into the project.

Opening the Excel File

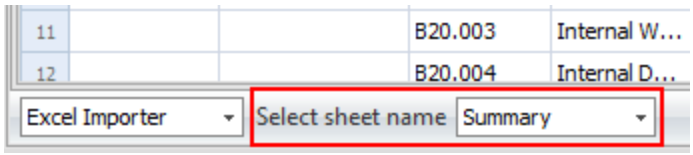
Open the file with the data that you want to import into your Vico Office project. The selected file opens in the **Excel Importer** view.

To open the Excel file

1. After you selected the content view in the Import from Excel task, click **Open Excel File** on the ribbon.
2. In the **Open** dialog, select the Excel file.

   You can open Microsoft Excel 1997-2003 or Microsoft Excel 2007 files.

   The first sheet of the file is displayed in the **Excel Importer** view.
3. To switch to a different sheet in the file, select the sheet from the **Select sheet name** list on the taskbar.



   You can select the data to import into the project.

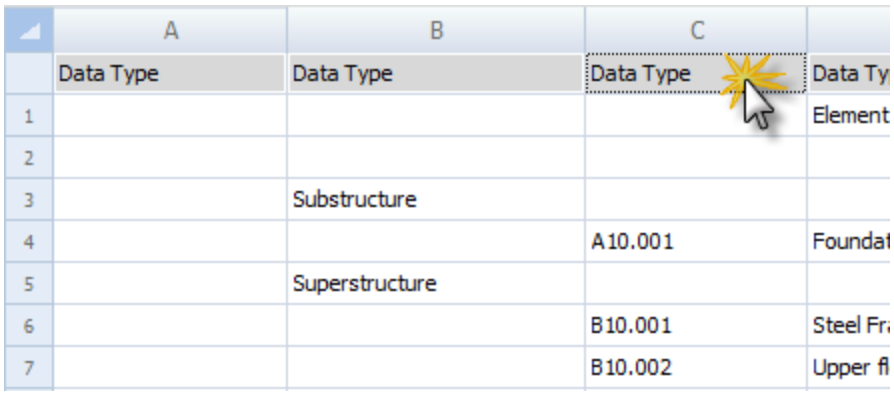
Selecting the Data to Import

In the Excel file, you can select the columns and cells that contain the data that you want to copy into the Vico Office project.

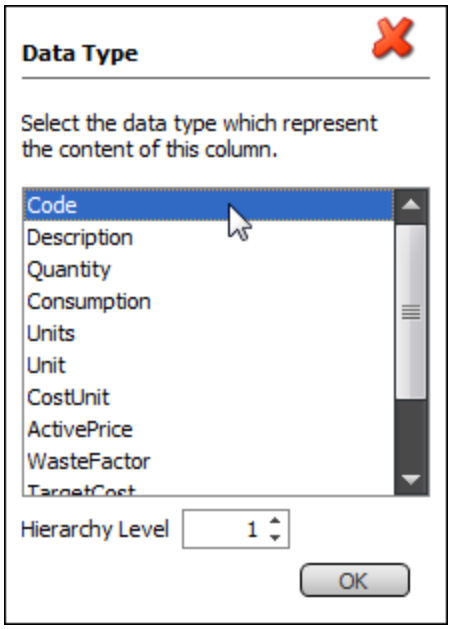
Note: For best results when importing data from Excel, it is recommended that each column in the spreadsheet has one type of data.

To select the data to import into the Vico Office project

1. After you opened the excel file in the Import from Excel task, click the **Data Type** cell of the column.



2. In the **Data Type** dialog, select the data type that represents the content of the column.



Note: When you import to the **Cost Planner** view, always start with a column that contains codes because the codes makes cost items unique in the project.

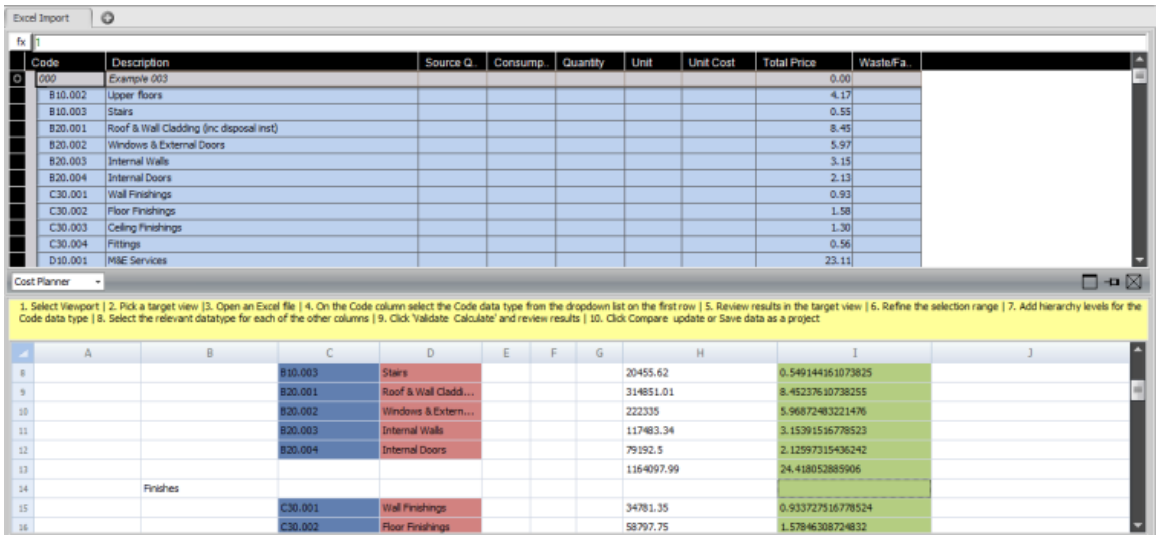
3. Add data from the column or individual cells to the content view.

- To include all the values in a column, click the column header.
- To include the value in a cell, click the cell.

The data immediately appears in the content view. Empty cells are skipped.

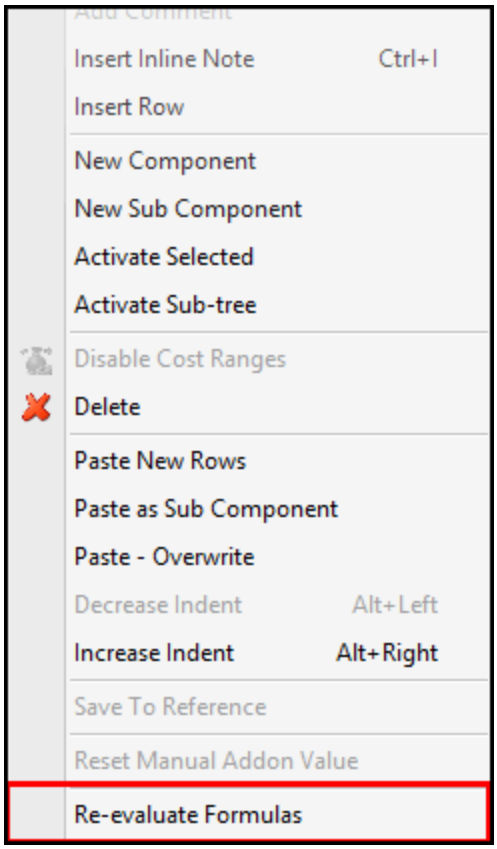
4. Repeat these steps until the content view includes all the desired data from the Excel spreadsheet.

   The selections are color-coded as in the following example.



You can validate the data before copying it into the project.

Note: Importing a localized Excel file into a project that does not already contain the TOIs will result in TOIs created with invalid formulas and zero quantities in the Cost Plan. To re-run the formulas, right-click on the TOI and select 'Re-evaluate Formulas'



Selecting Hierarchical Data to Import

Excel data can be organized into groups of data with a common 'parent' code. You can import this data into your Vico Office project, so the hierarchy is maintained. The data is displayed in tree structures that can be collapsed and expanded as needed.

Note: For best results when importing hierarchical data from Excel, it is recommended that the spreadsheet is organized so that the codes from each level are stored in a dedicated column. When a hierarchical data structure is organized in this way, you can easily select all the code values for a specific hierarchy level during import. Other data types do not need to be organized or selected by hierarchy level because the codes automatically determine the level at which the data is placed within the hierarchy.

Example:

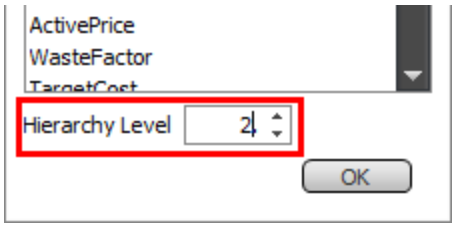
Each code level is in a separate column.

	A	B	C
1	Code Level 1	Code Level 2	Code Level 3
2			
3			
4			
5			

To select hierarchical data from Excel

1. Open the Import from Excel task.
2. Open the spreadsheet that contains the data.
3. In the column that contains the first code level, click the **Data Type** cell, and then select **Code**.
4. From the **Hierarchy Level** list, select **1**.
5. Click **OK**.
6. To select all the values in the column, click the column header.

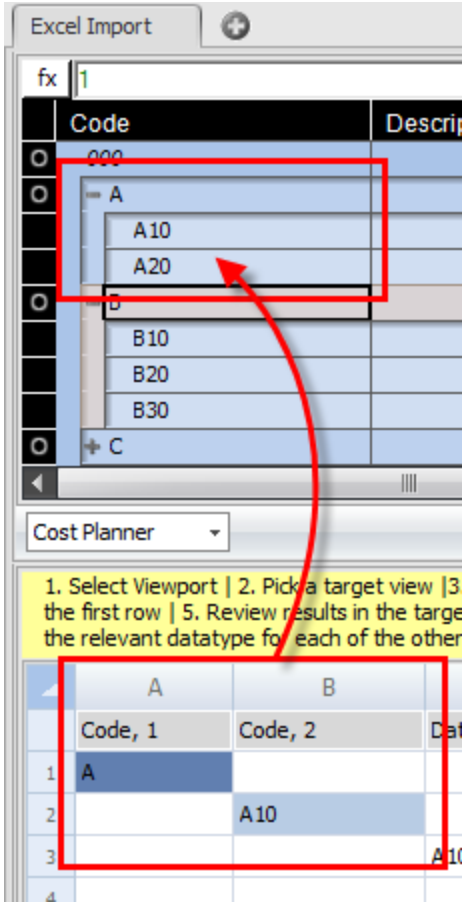
   The data immediately appears in the content view.
7. Add the other code levels.
   a. In the column that contains the code level, click the **Data Type** cell, and then select **Code**.
   b. From the **Hierarchy Level** list, select the hierarchy level, and then click **OK**.



   c. Click the column header.

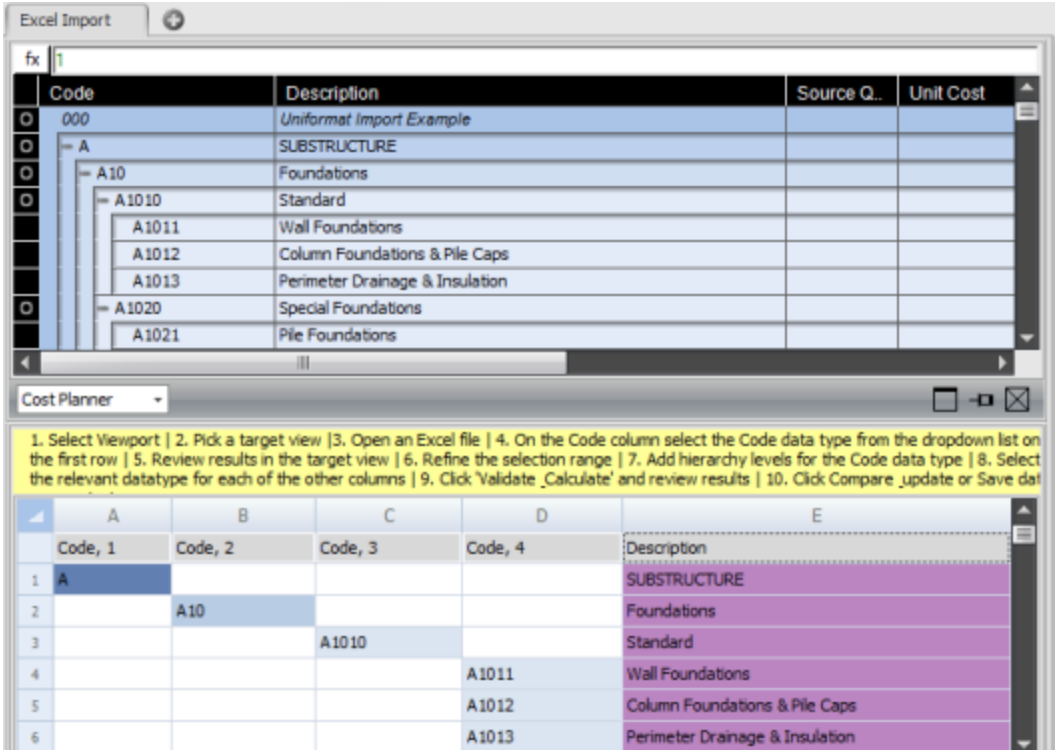
      The data immediately appears in the content view. The codes are automatically nested in the correct place within the hierarchy. For example, in the following image, the codes in the

second level are nested underneath the codes in the first level.



8. Select the other data types that you want to import.

   You do not have to select the other data types by hierarchy level because the codes automatically determine their place within the hierarchy.



You can validate the data before copying it into the project.

Validating the Data

The Excel spreadsheet may not include all the data that can be associated with a component, assembly, takeoff item, or other type of Vico Office data. After you select the columns and cells that you want to import from the spreadsheet, the selections appear in the content view. Data fields without corresponding selections are empty.

However, Vico Office does require a value in each available data field. To ensure that the data in the content view is ready to be copied into the project, the validation step completes the dataset by adding default values in the empty fields.

To complete the dataset to match requirements of selected content view

1. After you selected the hierarchical data to import in the Import from Excel task, click **Validate and Calculate** on the ribbon.

   Default values are inserted in the empty data fields.

Excel Import

fx 1

Code	Description	Source Q..	Consump..	Waste/Fa..	Quantity	Unit	Unit Cost	Total Price
000	Example 003	1.0	1.0	1.0	1.0		0.00	0.00
A10.001	Foundation	1.0	1.0	1.0	1.0	-	2.45	2.45
B10.001	Steel Frame	1.0	1.0	1.0	1.0	-	6.83	6.83
B10.002	Upper floors	1.0	1.0	1.0	1.0	-	4.17	4.17
B10.003	Stairs	1.0	1.0	1.0	1.0	-	0.55	0.55
B20.001	Roof & Wall Cladding (inc disposal inst)	1.0	1.0	1.0	1.0	-	8.45	8.45
B20.002	Windows & External Doors	1.0	1.0	1.0	1.0	-	5.97	5.97
B20.003	Internal Walls	1.0	1.0	1.0	1.0	-	3.15	3.15
B20.004	Internal Doors	1.0	1.0	1.0	1.0	-	2.13	2.13
C30.001	Wall Finishings	1.0	1.0	1.0	1.0	-	0.93	0.93
C30.002	Floor Finishings	1.0	1.0	1.0	1.0	-	1.58	1.58
C30.003	Ceiling Finishings	1.0	1.0	1.0	1.0	-	1.30	1.30

Then copy the data into the project.

Copying the Data into the Project

After validating the data in the content view, the data is ready to be included in the active project.

To copy the Excel data into your project

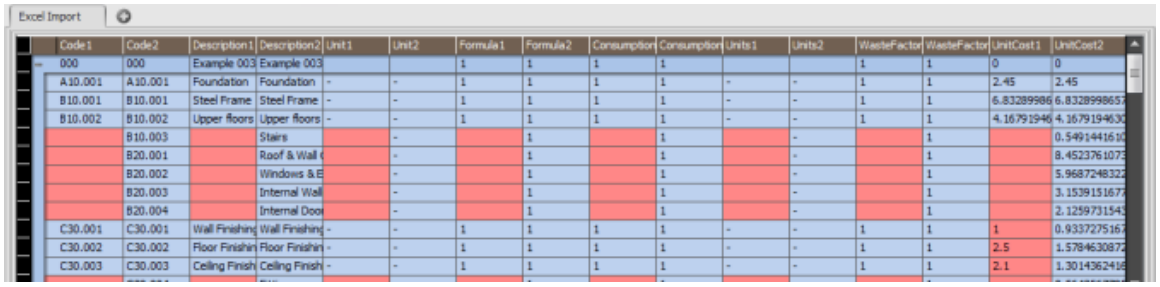
1. After you validated the data in the Import from Excel task, on the ribbon, click **Compare and Update** on the ribbon.

   The Compare & Update view is displayed. The content from the content view is automatically compared against the content of the project. The left column ('1') represents the content of the project, the right column ('2') represents the selected data from Excel.

Excel Import

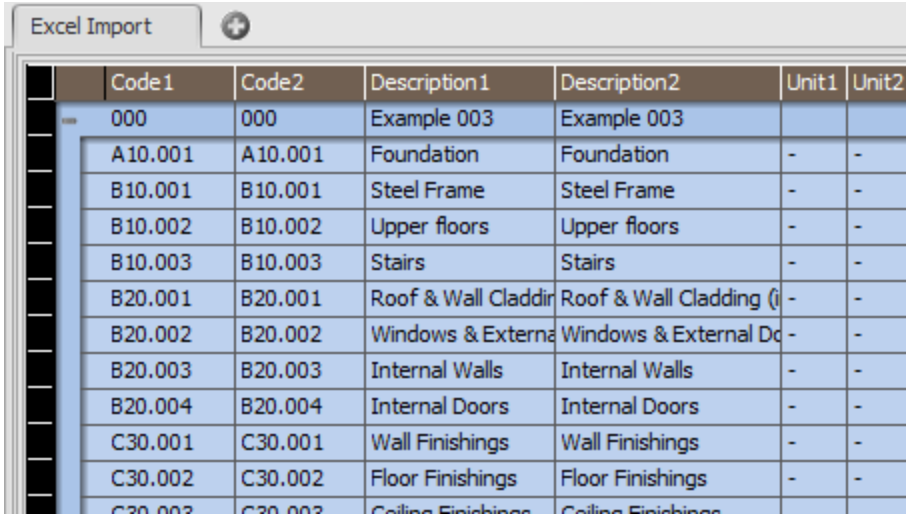
Code1	Code2	Description1	Description2	Unit1	Unit2	Formula1	Formula2	Cons
000	000	Example 003	Example 003			1	1	1
	A10.001		Foundation		-		1	
	B10.001		Steel Frame		-		1	
	B10.002		Upper floors		-		1	
	B10.003		Stairs		-		1	
	B20.001		Roof & Wall Claddi		-		1	
	B20.002		Windows & Extern		-		1	
	B20.003		Internal Walls		-		1	
	B20.004		Internal Doors		-		1	
	C30.001		Wall Finishings		-		1	
	C30.002		Floor Finishings		-		1	
	C30.003		Ceiling Finishings		-		1	
	C30.004		Fittings		-		1	

Note: When you perform the **Import from Excel** task in an empty project, all the cells in the second version are empty. However, when you use the function in a project that already contains items with the same code or name, they are displayed side-by-side as in the following example.



2. To copy all the new data from the Excel file into the active project, click the **Compare & Update** tab > **Update All**.

   The data is copied into the project, and the content view is the same as the current project.



Code1	Code2	Description1	Description2	Unit1	Unit2
000	000	Example 003	Example 003		
A10.001	A10.001	Foundation	Foundation	-	-
B10.001	B10.001	Steel Frame	Steel Frame	-	-
B10.002	B10.002	Upper floors	Upper floors	-	-
B10.003	B10.003	Stairs	Stairs	-	-
B20.001	B20.001	Roof & Wall Claddir	Roof & Wall Cladding (i	-	-
B20.002	B20.002	Windows & Externa	Windows & External Do	-	-
B20.003	B20.003	Internal Walls	Internal Walls	-	-
B20.004	B20.004	Internal Doors	Internal Doors	-	-
C30.001	C30.001	Wall Finishings	Wall Finishings	-	-
C30.002	C30.002	Floor Finishings	Floor Finishings	-	-

Publishing a Model to Vico Office

The **Publish to Vico** process is a key part of the Vico Office workflow. The first step to publishing a Building Information Model (BIM) into Vico Office is to open a BIM file in a supported CAD application.

Important: The modeling applications must be installed **before** Vico Office. During the Vico Office installation, you can then choose which publisher add-ons you wish to include.

The following publishers are currently supported:

- Autodesk Revit 2016, 2017 and 2018 (Architecture, MEP and Structure)
- Tekla Structures* 2016i and 2017
- ArchiCAD 19 and 20
- AutoCAD 2016 and 2017 (Architecture and MEP)
- Bentley AECOsim Designer 8.11.09.593 and 8.11.09.747**

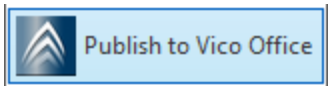
* The Tekla ribbon may need to be customized to manually add the 'Publish to Vico' button. Simply add a custom 'User-defined command' to the ribbon using the following filenames for each version:

- 2016i: **C:\Program Files\Tekla Structures\2016i**nt\bin\plugins\VicoExportPlugin\VicoTeklaAddon2016i.exe
- 2017**: C:\Program Files\Tekla Structures\2017**nt\bin\VicoExportPlugin\VicoTeklaAddon2017.exe

  Note: The bolded folder names represent the default installation path. The steps on how to customize your ribbon is shown in this Tekla video.

** Bentley is not supported in Vico R6.1 or later. To use Bentley, you must use Vico R6 or earlier.

For each BIM application, Vico Office installs an add-on that introduces a Publish to Vico button to the application's user interface.



When selected, the Publish Data dialog appears. You can then specify the project and model location, as well as select the elements and parameters to publish.

The Vico Add-On application extracts the specified model element geometry data, including the quantities from each CAD, and stores it in the Vico Office database. When the publishing process is completed, you can activate the model in the **Document Controller** module or in the Model Register task. During the model activation process, an initial set of takeoff items and takeoff quantities are generated based on model element geometry and properties stored in the project during the publish operation.

Note: Only the active model feeds quantities to the **Takeoff Pad** and the **Cost Plan** tasks.

Vico Office Publishing Rules

Complex geometries increase the duration of the publishing process. Therefore, it is recommended that you use the Advanced section of the Publish Data dialog box to select only the elements that are absolutely necessary for your project. For example, exclude items such as microscopes or curtains as they don't provide any value to your project's cost estimate.

Other publishing rules that will decrease duration:

- Use the simplest geometry.
- Use solid elements.
- Use boxes to represent elements that are needed only for counting.
- Hide unnecessary objects to include in the estimates.
- Publish links separately if possible.

Publish from Revit

Autodesk Revit is building information modeling software for architects, structural engineers, MEP engineers, designers and contractors. Users can design a building and structure and its components in 3D, annotate the model with 2D drafting elements, and access building information from the building models database. Revit is 4D BIM capable with tools to plan and track various stages in the building's lifecycle, from concept to construction and later demolition.

After you create a building information model in Revit, you can easily publish it to Vico Office and use it in your Vico Office workflow.

Setting up Models

For easier and faster use later, break down the models by trades/systems or other smaller chunks. These trade models or ‘system files’ must originate from the ‘base model’.

Example:

To publish to Vico Office

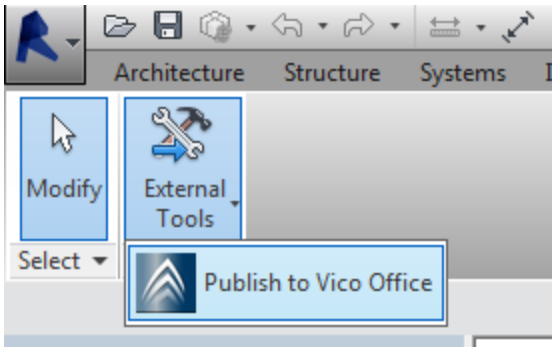
A system breakdown has the following structure:

1. Open the BIM model that was created in a Revit version that is compatible with your current version of Vico Office.
2. Switch to the 3D view.
3. Hide the worksets and elements that you do not want to publish to Vico Office. Only visible elements are published to Vico. This allows you to hide high polygon elements like bicycles, which do not serve any construction purposes, from the architectural model. For a complete list of

- **Substructure model:** Contains all the structural members that ‘touch the earth’ such as foundations, basement walls, slabs on grade, and pits.
- **Superstructure model:** Contains all the structural members excluding the ones that were modeled under ‘Substructure’.
- **Exterior model:** Contains the shell of building such as exterior walls, roofing, and canopies. This is a single model that contains all levels of the project.
- **Interior model:** Contains the rest of the architectural elements plus fixtures that are modeled in the architectural context such as interior walls, ceilings, flooring, and lighting and plumbing fixtures.

For each BIM application, Vico Office installs an add-on that adds a **Publish to Vico Office** item to the application's user interface.

4. From the **Add-Ins** menu, click **External Tools > Publish to Vico Office**.



5. In the **Publish Data** dialog, browse to the **Vico Project Server** in your network to which your project information will be published.

   By default, this is set to the Vico Office database that is running on your computer. However, you can publish to a project that is stored in a database on another computer in the network.

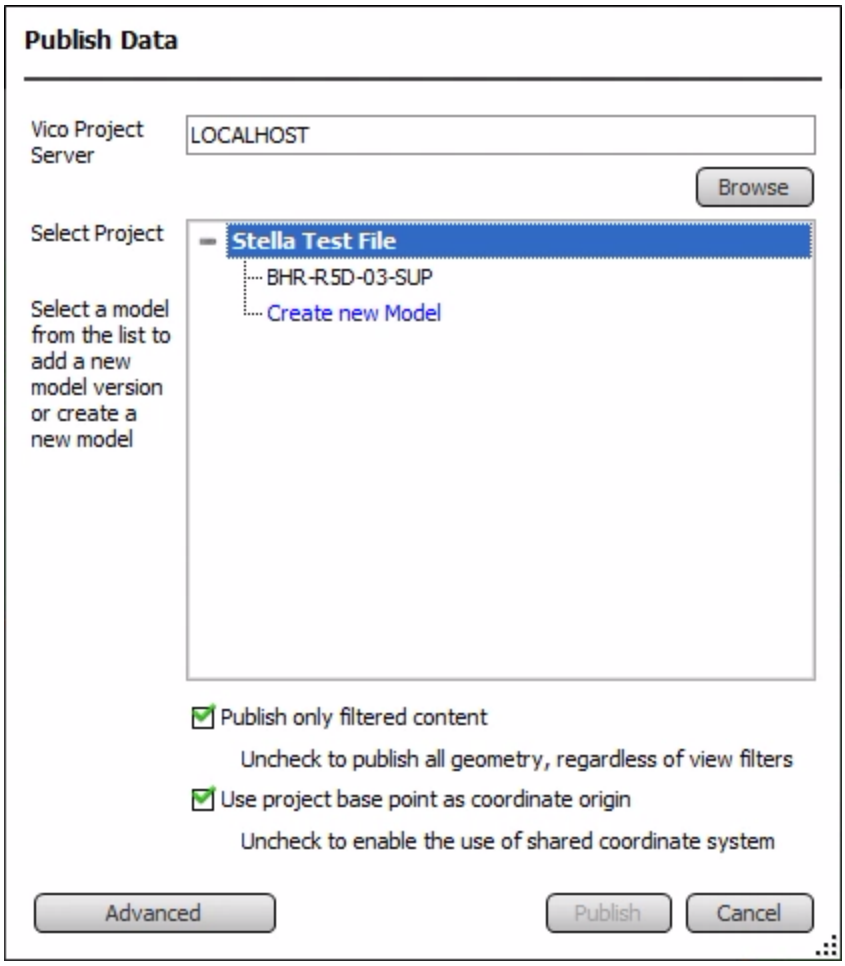
6. In the **Select Project** list, expand the node to find your project. The **Project** list is sorted by project and then by existing models within each project.

7. To publish a new version of a previously published model, select the model. After it's published, the previous version is not replaced and a new version will appear in Vico Office's Model Manager.

   –Or–

   Click **Create New Model**. If this is the first model that will be published to Vico Office, only the **Create New Model** option is available.

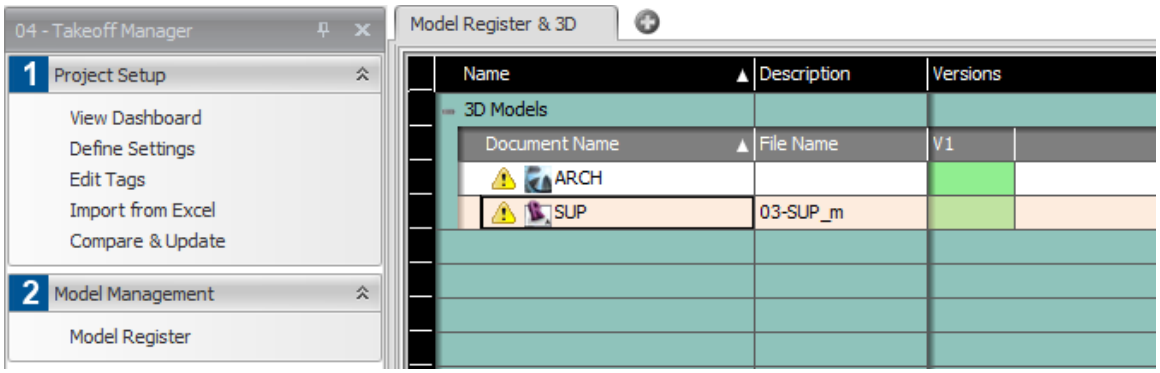
   Note: Models that were created in other supporting application are not displayed in the project list.



8. *Optional:* Select any of the following options:
   - **Publish only filtered content**
     - Clear this option to publish all geometry, regardless of view filters.
   - **Use Project Base Point as Coordinate Origin**
     - If this option is cleared, the shared coordinate settings in Revit are used.
     - If this option is selected, the base point is the coordinate origin. This overrides any shared coordinate systems and places the Vico project base point at 0,0,0 in the 3D space.
9. Optional - **Advanced**: By default, a default list of element types and standard parameters are published to Vico Office. If you wish to specify which elements and parameters you wish to publish to Vico Office, use the Advanced section of the publisher.
10. To begin the publishing process, click **Publish**.

Vico Office processes and stores the model information via the extraction of element geometry and properties. The Exporting Model Information progress bar indicates the publishing status and closes when the process is completed.

11. In Vico Office, activate the published model in the **Model Register** task or the **Document Control** task.



Note: The application indicator in the **Document Name** cell shows which supporting application the model was created in.

Best Practice: Setting Up Revit for Publishing to Vico Office

It is recommended that you create system views such as substructure, superstructure, and exterior. Additionally, other logical model breakdowns can be applied. For example, an estimator is responsible for only the doors. You publish only the doors to a Vico Project and complete the estimate for them. When the estimate is completed, it can be merged into a central project file and added to the project estimate.

If you prepare the filtered views in a viewer version of Revit, the settings are lost after Revit is closed. You must recreate the settings if you need them for publishing again. To avoid repeating this work, it is recommended that you set up these filtered views in the central Revit file or in the original Revit files.

Setting up Revit for publishing purposes can be time-consuming, and the same work is required for each model release. To help ensure that the same filter settings are applied in the new model files, it is recommended that you document all the settings from the beginning.

For more information, refer to the PDF.

Troubleshooting:

With some Revit models, a dialog with an “Inconsistency detected” message appears during publishing of new model versions. Click the “No” button to bypass this message and complete the activation process. The new version will be published to Vico Office as intended.

Modeling Guidelines for Revit

The following document provides guidelines for creating 3D construction models, which allow users to fully utilize the capabilities of Vico Office. The document is NOT a Revit user guide and it shares best practices for developing construction caliber quantities with a 3D model or with modifying data in Vico Office.

View as PDF

Supported Parameters and CAD Quantities - Revit

The following CAD quantities from your Revit model are published to Vico:

Note: Note: All custom numerical parameters will also be added as CAD quantities.

CAD Quantities

- Actual Number of Risers
- Actual Number of Treads
- Actual Riser Height
- Actual Run Width
- Actual Tread Depth
- Area
- Count
- Cut
- Cut Length
- Cut Overall Length
- Depth
- Diameter
- Exterior Surface Area
- Fill
- Floor Area
- Floor Perimeter
- Floor Volume
- Gross Floor Area
- Gross Surface Area

- Gross Volume
- Head Height
- Heel Length
- Height
- Length
- Mass Interior Wall Area
- Net cut/fill
- Outside Diameter
- Overall Length
- Perimeter
- Projected Area
- Quantity
- Rough Height
- Rough Width
- Surface Area
- Thickness
- Toe Length
- Tread Thickness
- Volume
- Width

Using the Publish Data dialog when importing or publishing a model allows you to hide high polygon elements like bicycles, which do not serve any construction purposes, from the architectural model. You can publish either filtered elements (visible in the current view) or all existing elements. Note that all custom numerical parameters will be added to as CAD quantities.

Supported Elements

The following table lists the supported categories of Revit elements.

- Areas
- Cable Tray
- Cable Tray Fitting
- Casework

- Ceilings
- Columns
- Communication Devices
- Conduit
- Conduit Fitting
- Cornices
- Curtain Systems
- Curtain Wall Mullions
- Curtain Wall Panels
- CurtaSystem
- Data Devices
- Doors
- Duct Accessory
- Duct Curves
- Duct Fitting
- Duct Terminal
- Electrical Equipment
- Electrical Fixtures
- Entourage
- Extrusions
- Fascia
- Fire Alarm Devices
- Fixtures
- Flex Duct Curves
- Flex Pipe Curves
- Floors
- Furniture
- Furniture Systems
- Generic Model
- Girder

- Gutter
- Horizontal Bracing
- Joist
- Lighting Devices
- Lighting Fixtures
- Lights
- Mass
- Massing
- Mechanical Equipment
- Nurse Call Devices
- Parking
- Pipe Accessory
- Pipe Curves
- Pipe Fitting
- Planting
- Plumbing Fixtures
- Purlin
- Railings
- Ramps
- Roads
- Roofs
- Roof Soffit
- Rooms
- SecurityDevices
- Sewer
- ShaftOpening
- Site
- Site Surface
- SpecialityEquipment
- Sprinklers

- Stairs
- StairsRailings
- StructConnections
- Structural Columns
- Structural Truss
- StructuralFoundations
- StructuralFraming
- StructuralFramingOther
- TelephoneDevices
- Topography
- Truss
- VerticalBracing
- Walls
- Windows

Standard Parameters

- Assembly Code
- Assembly Description
- Catagory
- Comments
- Description
- Family
- Family and Type
- Keynote
- Mark
- Model
- Type
- Vico 01
- Vico 02
- Vico 03

Advanced Parameters

The list of advanced parameters are categorized into a Primary and Secondary group. Use the Display filters on the Publish Data (Advanced) dialog to view the parameters in each group. Note that the Advanced Parameters section also includes user-defined (custom) parameters .

Primary

- Abbreviation
- Area Type
- Bar Diameter
- Bar Length
- Base Finish
- Base Level
- Base Offset
- Base Offset From Level
- Beam Type
- Bearing
- Bottom Elevation
- Building Story
- Ceiling Finish
- Circuit Number
- Condition Type
- Construction
- Construction Type
- Cost
- Diameter(Trade Size)
- Distance
- Electrical Data
- Elevation
- Elevation at Bottom
- Elevation Base
- Excluded
- Feed

- Finish
- Fire Rating
- Fixture Units
- Floor Finish
- Frame Material
- Frame Type
- Function
- Height Offset From Level
- IfcGUID
- Insulation Thickness
- Insulation Type
- Invert Elevation
- Landing Type
- Level
- Lining Thickness
- Lining Type
- Location
- Mains
- Mains Type
- Manufacturer
- Material
- Maximum Riser Height
- MEP System
- Minimum Tread Depth
- Modifications
- Name
- Naming Category
- Number
- Number of Elements
- Number of studs

- Occupancy
- Occupant
- Offset
- OmniClass Number
- OmniClass Title
- Operation
- Original Category
- Original Family
- Original Type
- Overall Width
- Panel
- Panel Name
- Phase Created
- Phase Demolished
- Pipe Size
- Pressure Class
- Profile
- Radius
- Railing Height
- Reference Level
- Reinforcement Volume
- Service Type
- Shape
- Shape is modified
- Slab
- Slope
- Space Type
- Spacing
- Standard
- Style

- Subcategory of Walls
- Summary
- System Abbreviation
- System Classification
- System Equipment
- System Name
- System Type
- Top Elevation
- Top Level
- Top Offset
- Type Comments
- Type IfcGUID
- Type Mark
- URL
- Usage
- Voltage
- Wall Finish
- Wattage
- Zone

Secondary

- A
- Absorptance
- Additional Flow
- Apparent Load
- Apparent Load Phase A
- Apparent Load Phase B
- Apparent Load Phase C
- Ballast Loss
- Beam Type (No Family Name)
- Bend Diameter

- Bend or Fitting
- Bend Radius
- Bend Radius Multiplier
- Bussing
- Camber Size
- Centerline Spacing
- Coefficient of Utilization
- Column Location Mark
- Connection Type
- Coverage
- Cross-Section Rotation
- CW Connection
- CWFU
- Default Thickness
- Deformation
- Department
- Drain
- E/W
- Efficacy
- Enclosure
- Engineering Type
- Equivalent Diameter
- Estimated Reinforcement Volume
- Fabric Sheet
- Flow State
- Fluid Density
- Fluid Temperature
- Fluid Type
- Fluid Viscosity
- Foundation Thickness

- Friction
- Friction Factor
- Graphical Appearance
- Ground Bus
- Hand Clearance
- Heat Transfer Coefficient (U)
- Hook At End
- Hook At Start
- HW Connection
- HWFU
- Hydraulic Diameter
- Illuminance
- Initial Color Temperature
- Inside Diameter
- K-Factor
- L/R
- Left Support Type
- Loss Coefficient
- Major Lap Splice Length
- Middle Support Type
- Minor Lap Splice Length
- Monolithic Thickness
- Multistory Top Level
- N/S
- Orifice
- Orifice Size
- Pressure Drop
- Relative Roughness
- Response
- Reynolds Number

- Right Support Type
- Roughness
- Run Height
- Run Type
- Schedule Mark
- Schedule/Type
- Scope Box
- Section
- Segment Description
- Shade Depth
- Sill Height
- Size Lock
- Solar Heat Gain Coefficient
- Static Pressure
- Story Above
- Structural
- Structural Depth
- Structural Depth On Landing
- Structural Depth On Run
- Structural Material
- Structural Usage
- Supply Fitting
- Supply Pipe
- Switch ID
- Target Percentage Glazing
- Target Sill Height
- Temperature Loss
- Temperature Rating
- Thermal mass
- Thermal Resistance (R)

- Total Bar Length
- Total Depth
- Total Light Loss Factor
- Total Sheet Mass
- Trap
- Tread/Stringer Offset
- Upper Limit
- Velocity
- Vent Connection
- Visual Light Transmittance
- Voltage Loss
- Waste Connection
- Wattage Comments
- WFU

Supported IFC Classes

The following IFC classes are supported:

- IfcBeam
- IfcBuildingElement
- IfcBuildingElementComponent
- IfcBuildingElementProxy
- IfcColumn
- IfcCovering
- IfcCurtainwal
- IfcDistributionChamberElement
- IfcDistributionControlElement
- IfcDistributionFlowElement
- IfcDoor
- IfcElectricalElement
- IfcEnergyConversionDevice

- IfcEquipmentElement
- IfcEquipmentElement
- IfcFlowController
- IfcFlowFitting
- IfcFlowMovingDevice
- IfcFlowSegment
- IfcFlowStorageDevice
- IfcFlowTerminal
- IfcFlowTreatmentDevice
- IfcFooting
- IfcFurnishingElement
- IfcMember
- IfcPile
- IfcPlate
- IfcRailing
- IfcRamp
- IfcRampFlight
- IfcRoof
- IfcSite
- IfcSlab
- IfcSpace
- IfcStair
- IfcStairFlight
- IfcTransportElement
- IfcTransportElement
- IfcWall
- IfcWallstandardcase
- IfcWindow

Publish from Tekla

Tekla Structures, a Trimble product, is a building information modeling software that is able to model structures that incorporate different kinds of building materials, including steel and concrete.

After you create a building information model in Tekla, you can easily publish it to Vico Office and use it in your Vico Office workflow.

To publish to Vico Office

1. Open the BIM model that was created in a Tekla version that is compatible with your current version of Vico Office.
2. On the toolbar, click Publish to Vico.

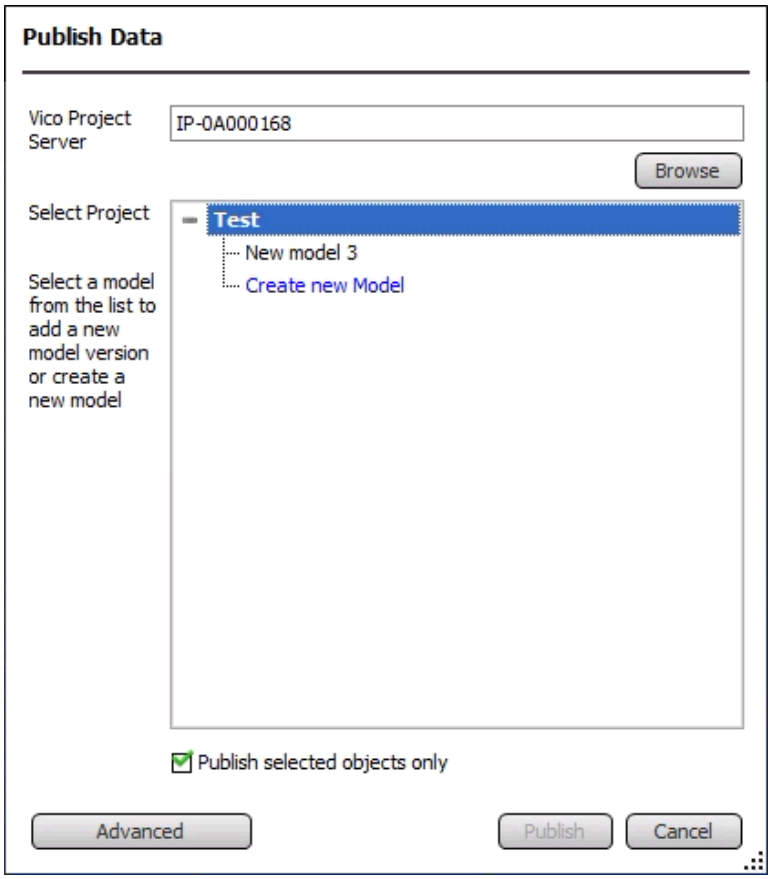
3. In the **Publish Data** dialog, browse to the **Vico Project Server** in your network to which your project information will be published.

   By default, this is set to the Vico Office database that is running on your computer. However, you can publish to a project that is stored in a database on another computer in the network.
4. In the **Select Project** list, expand the node to find your project. The **Project** list is sorted by project and then by existing models within each project.
5. To publish a new version of a previously published model, select the model. After it's published, the previous version is not replaced and a new version will appear in Vico Office's Model Manager.

   –Or–

   Click **Create New Model**. If this is the first model that will be published to Vico Office, only the **Create New Model** option is available.

   Note: Models that were created in other supporting application are not displayed in the project list.



6. Optionally clear the **Publish selected objects only** check box to publish all objects in the model.
7. Optional - **Advanced**: By default, a default list of element types and standard parameters are published to Vico Office. If you wish to specify which elements and parameters you wish to publish to Vico Office, use the Advanced section of the publisher.
8. To begin the publishing process, click **Publish**.

   Vico Office processes and stores the model information via the extraction of element geometry and properties. The Exporting Model Information progress bar indicates the publishing status and closes when the process is completed.
9. In Vico Office, activate the published model in the **Model Register** task or the **Document Control** task.

Supported Parameters and CAD Quantities - Tekla

The following CAD quantities from your Tekla model are published to Vico:

CAD Quantities

- AREA

- AREA_GROSS
- AREA_NET
- ASSEMBLY.AREA
- CAST_UNIT.AREA
- CAST_UNIT.AREA_FORM_BOTTOM
- CAST_UNIT.AREA_FORM_SIDE
- CAST_UNIT.AREA_FORM_TOP
- PROFILE.COVER_AREA
- PROFILE.CROSS_SECTION_AREA
- HEIGHT
- LENGTH
- LENGTH_GROSS
- LENGTH_NET
- CAST_UNIT.LENGTH
- CAST_UNIT.LENGTH_GROSS
- CAST_UNIT.LENGTH_NET
- PROFILE.DIAMETER
- PROFILE.DIAMETER_1
- PROFILE.DIAMETER_2
- PROFILE.HEIGHT
- PROFILE.WIDTH
- WIDTH
- INNER_DIAMETER
- PERIMETER
- PROFILE.PLATE_THICKNESS
- CAST_UNIT.VOLUME
- CAST_UNIT.VOLUME_ONLY_CONCRETE_PARTS
- VOLUME
- VOLUME_GROSS
- VOLUME_NET

- CAST_UNIT.WEIGHT
- CAST_UNIT.WEIGHT_GROSS
- CAST_UNIT.WEIGHT_NET
- CAST_UNIT.WEIGHT_ONLY_CONCRETE_PARTS
- PROFILE_WEIGHT
- PROFILE_WEIGHT_NET
- WEIGHT
- WEIGHT_GROSS
- WEIGHT_M
- WEIGHT_NET
- PROFILE.WEIGHT_PER_UNIT_LENGTH

Using the Publish Data dialog when publishing a model from Tekla, you can hide high polygon elements like bicycles, which do not serve any construction purposes, from the architectural model. The following elements and their parameters can be published to Vico Office.

Supported Element Types

All geometrical elements from Tekla are supported. Examples of these elements include:

- BEAM
- BOLT
- COLUMN
- PAD_FOOTING
- PANEL
- PLATE
- SLAB
- STRIP_FOOTING

Supported Standard Parameters

- ASSEMBLY.ASSEMBLY_NAME
- ASSEMBLY.ASSEMBLY_PREFIX
- ASSEMBLY_NAME
- CAST_UNIT_TYPE
- CLASS

- COMMENT
- FINISH
- MAINPART.NAME
- MATERIAL
- NAME
- PART_PREFIX
- PROFILE

Supported Advanced Parameters

The Advanced Parameters section consists of Primary, Secondary and UDA (User-Defined attributes).

Primary

- ACN
- ASSEMBLY_POS
- ASSEMBLY_POSITION_CODE
- ASSEMBLY.AREA
- ASSEMBLY.ASSEMBLY_POS
- ASSEMBLY.ASSEMBLY_POSITION_CODE
- ASSEMBLY.GUID
- ASSEMBLY.LOCATION_BREAKDOWN_STRUCTURE.LBS_FLOOR
- ASSEMBLY.LOCATION_BREAKDOWN_STRUCTURE.LBS_SECTION
- ASSEMBLY.LOT_NAME
- ASSEMBLY.MATERIAL_TYPE
- BOLT.MATERIAL
- BOLT.NAME
- BOTTOM_LEVEL
- BOTTOM_LEVEL_GLOBAL_UNFORMATTED (from Assembly)
- BOUNDING_BOX_MAX_Z
- CAST_UNIT_LENGTH_ONLY_CONCRETE_PARTS
- CAST_UNIT_NAME
- CAST_UNIT_POS
- CAST_UNIT_POSITION_CODE

- CAST_UNIT_PREFIX
- CAST_UNIT_REBAR_WEIGHT
- CAST_UNIT_WIDTH_ONLY_CONCRETE_PARTS
- CAST_UNIT.AREA
- CAST_UNIT.AREA_FORM_BOTTOM
- CAST_UNIT.AREA_FORM_SIDE
- CAST_UNIT.AREA_FORM_TOP
- CAST_UNIT.CAST_UNIT_NAME
- CAST_UNIT.CAST_UNIT_POS
- CAST_UNIT.CAST_UNIT_POSITION_CODE
- CAST_UNIT.CONTENTTYPE
- CAST_UNIT.GUID
- CAST_UNIT.LOCATION_BREAKDOWN_STRUCTURE.LBS_FLOOR
- CAST_UNIT.LOCATION_BREAKDOWN_STRUCTURE.LBS_SECTION
- COG_Y
- COG_Z
- CONCRETE_MIXTURE
- CONTENTTYPE
- FINISH
- GRADE
- GUID
- HEIGHT
- ID
- LOCATION_BREAKDOWN_STRUCTURE.LBS_FLOOR
- LOCATION_BREAKDOWN_STRUCTURE.LBS_SECTION
- LOT_NAME
- LOT_NUMBER
- MAINPART.NAME
- MAINPART.ACN
- MAINPART.MATERIAL

- MAINPART.MATERIAL_TYPE
- MAINPART.PROFILE
- MAINPART.TOP_LEVEL_UNFORMATTED
- MAINPART.WIDTH
- MATERIAL_TYPE
- MODEL_TOTAL
- NUMBER
- NUT.NAME
- OBJECT_TYPE
- PART_POS
- PART.CAST_UNIT.LOCATION_BREAKDOWN_STRUCTURE.LBS_FLOOR
- PART.CAST_UNIT.LOCATION_BREAKDOWN_STRUCTURE.LBS_SECTION
- PHASE
- PHASE.NAME
- PLANNED_END_D
- PLANNED_END_E
- PLANNED_END_F
- PLANNED_START_D
- PLANNED_START_E
- PLANNED_START_F
- POUR_NUMBER
- POUR_TYPE
- PREFIX
- PROFILE
- PROFILE_WEIGHT
- PROFILE_WEIGHT_NET
- PROFILE.PLATE_THICKNESS
- PROJECT.NAME
- START_X
- START_Y

- START_Z
- TOP_LEVEL
- TOP_LEVEL_GLOBAL
- TOP_LEVEL_GLOBAL_UNFORMATTED (from Assembly)
- TOP_LEVEL_UNFORMATTED
- TOP_LEVEL_UNFORMATTED

Secondary

- ACTUAL_END_D
- ACTUAL_END_E
- ACTUAL_END_F
- ACTUAL_START_D
- ACTUAL_START_E
- ACTUAL_START_F
- AREA
- AREA_FORM_BOTTOM
- AREA_FORM_SIDE
- AREA_FORM_TOP
- AREA_NGX
- AREA_NGY
- AREA_NGZ
- AREA_NX
- AREA_NY
- AREA_NZ
- AREA_PGX
- AREA_PGY
- AREA_PGZ
- AREA_PLAN
- AREA_PROJECTION_GXY_GROSS
- AREA_PROJECTION_GXY_NET
- AREA_PROJECTION_GXZ_GROSS

- AREA_PROJECTION_GXZ_NET
- AREA_PROJECTION_GYZ_GROSS
- AREA_PROJECTION_GYZ_NET
- AREA_PROJECTION_XY_GROSS
- AREA_PROJECTION_XY_NET
- AREA_PROJECTION_XZ_GROSS
- AREA_PROJECTION_XZ_NET
- AREA_PROJECTION_YZ_GROSS
- AREA_PROJECTION_YZ_NET
- AREA_PX
- AREA_PY
- AREA_PZ
- ASSEMBLY_BOTTOM_LEVEL
- ASSEMBLY_BOTTOM_LEVEL_GLOBAL
- ASSEMBLY_BOTTOM_LEVEL_UNFORMATTED
- ASSEMBLY_DEFAULT_PREFIX
- ASSEMBLY_PLWEIGHT
- ASSEMBLY_PREFIX
- ASSEMBLY_SERIAL_NUMBER
- ASSEMBLY_START_NUMBER
- ASSEMBLY_TOP_LEVEL
- ASSEMBLY_TOP_LEVEL_GLOBAL
- ASSEMBLY_TOP_LEVEL_GLOBAL_UNFORMATTED
- ASSEMBLY_TOP_LEVEL_UNFORMATTED
- ASSEMBLY.AREA_FORM_BOTTOM
- ASSEMBLY.AREA_FORM_SIDE
- ASSEMBLY.AREA_FORM_TOP
- ASSEMBLY.AREA_NGX
- ASSEMBLY.AREA_NGY
- ASSEMBLY.AREA_NGZ

- ASSEMBLY.AREA_NX
- ASSEMBLY.AREA_NY
- ASSEMBLY.AREA_NZ
- ASSEMBLY.AREA_PGX
- ASSEMBLY.AREA_PGY
- ASSEMBLY.AREA_PGZ
- ASSEMBLY.AREA_PLAN
- ASSEMBLY.AREA_PROJECTION_GXY_GROSS
- ASSEMBLY.AREA_PROJECTION_GXY_NET
- ASSEMBLY.AREA_PROJECTION_GXZ_GROSS
- ASSEMBLY.AREA_PROJECTION_GXZ_NET
- ASSEMBLY.AREA_PROJECTION_GYZ_GROSS
- ASSEMBLY.AREA_PROJECTION_GYZ_NET
- ASSEMBLY.AREA_PROJECTION_XY_GROSS
- ASSEMBLY.AREA_PROJECTION_XY_NET
- ASSEMBLY.AREA_PROJECTION_XZ_GROSS
- ASSEMBLY.AREA_PROJECTION_XZ_NET
- ASSEMBLY.AREA_PROJECTION_YZ_GROSS
- ASSEMBLY.AREA_PROJECTION_YZ_NET
- ASSEMBLY.AREA_PX
- ASSEMBLY.AREA_PY
- ASSEMBLY.AREA_PZ
- ASSEMBLY.ASSEMBLY_BOTTOM_LEVEL_GLOBAL
- ASSEMBLY.ASSEMBLY_BOTTOM_LEVEL_UNFORMATTED
- ASSEMBLY.ASSEMBLY_PLWEIGHT
- ASSEMBLY.ASSEMBLY_SERIAL_NUMBER
- ASSEMBLY.ASSEMBLY_START_NUMBER
- ASSEMBLY.ASSEMBLY_TOP_LEVEL
- ASSEMBLY.ASSEMBLY_TOP_LEVEL_GLOBAL
- ASSEMBLY.ASSEMBLY_TOP_LEVEL_GLOBAL_UNFORMATTED

- ASSEMBLY.ASSEMBLY_TOP_LEVEL_UNFORMATTED
- ASSEMBLY.BOTTOM_LEVEL_GLOBAL
- ASSEMBLY.BOTTOM_LEVEL_UNFORMATTED
- ASSEMBLY.COG_X
- ASSEMBLY.COG_Y
- ASSEMBLY.COG_Z
- ASSEMBLY.HEIGHT
- ASSEMBLY.HIERARCHY_LEVEL
- ASSEMBLY.ID
- ASSEMBLY.LENGTH
- ASSEMBLY.LENGTH_GROSS
- ASSEMBLY.LENGTH_NET
- ASSEMBLY.LOCATION_BREAKDOWN_STRUCTURE.GUID
- ASSEMBLY.LOCATION_BREAKDOWN_STRUCTURE.LBS_BUILDING
- ASSEMBLY.LOCATION_BREAKDOWN_STRUCTURE.LBS_FLOOR_ELEVATION
- ASSEMBLY.LOCATION_BREAKDOWN_STRUCTURE.LBS_HIERARCHY
- ASSEMBLY.LOCATION_BREAKDOWN_STRUCTURE.LBS_HIERARCHY_LEVEL_NUMBER
- ASSEMBLY.LOCATION_BREAKDOWN_STRUCTURE.LBS_PROJECT
- ASSEMBLY.LOCATION_BREAKDOWN_STRUCTURE.LBS_SITE
- ASSEMBLY.LOCATION_BREAKDOWN_STRUCTURE.NAME
- ASSEMBLY.LOT_NUMBER
- ASSEMBLY.MAINPART.AREA
- ASSEMBLY.MAINPART.AREA_GROSS
- ASSEMBLY.MAINPART.AREA_NET
- ASSEMBLY.MAINPART.AREA_NGX
- ASSEMBLY.MAINPART.AREA_NGY
- ASSEMBLY.MAINPART.AREA_NGZ
- ASSEMBLY.MAINPART.AREA_NX
- ASSEMBLY.MAINPART.AREA_NY
- ASSEMBLY.MAINPART.AREA_NZ

- ASSEMBLY.MAINPART.AREA_PER_TONS
- ASSEMBLY.MAINPART.AREA_PGX
- ASSEMBLY.MAINPART.AREA_PGY
- ASSEMBLY.MAINPART.AREA_PGZ
- ASSEMBLY.MAINPART.AREA_PLAN
- ASSEMBLY.MAINPART.AREA_PROJECTION_GXY_GROSS
- ASSEMBLY.MAINPART.AREA_PROJECTION_GXY_NET
- ASSEMBLY.MAINPART.AREA_PROJECTION_GXZ_GROSS
- ASSEMBLY.MAINPART.AREA_PROJECTION_GXZ_NET
- ASSEMBLY.MAINPART.AREA_PROJECTION_GYZ_GROSS
- ASSEMBLY.MAINPART.AREA_PROJECTION_GYZ_NET
- ASSEMBLY.MAINPART.AREA_PROJECTION_XY_GROSS
- ASSEMBLY.MAINPART.AREA_PROJECTION_XY_NET
- ASSEMBLY.MAINPART.AREA_PROJECTION_XZ_GROSS
- ASSEMBLY.MAINPART.AREA_PROJECTION_XZ_NET
- ASSEMBLY.MAINPART.AREA_PROJECTION_YZ_GROSS
- ASSEMBLY.MAINPART.AREA_PROJECTION_YZ_NET
- ASSEMBLY.MAINPART.AREA_PX
- ASSEMBLY.MAINPART.AREA_PY
- ASSEMBLY.MAINPART.AREA_PZ
- ASSEMBLY.MAINPART.ASSEMBLY_DEFAULT_PREFIX
- ASSEMBLY.MAINPART.ASSEMBLY_START_NUMBER
- ASSEMBLY.MAINPART.BOTTOM_LEVEL
- ASSEMBLY.MAINPART.BOTTOM_LEVEL_GLOBAL
- ASSEMBLY.MAINPART.BOTTOM_LEVEL_GLOBAL_UNFORMATTED
- ASSEMBLY.MAINPART.BOTTOM_LEVEL_UNFORMATTED
- ASSEMBLY.MAINPART.CLASS_ATTR
- ASSEMBLY.MAINPART.COG_X
- ASSEMBLY.MAINPART.COG_Y
- ASSEMBLY.MAINPART.COG_Z

- ASSEMBLY.MAINPART.CURVED_SEGMENTS
- ASSEMBLY.MAINPART.END_X
- ASSEMBLY.MAINPART.END_X_IN_WORK_PLANE
- ASSEMBLY.MAINPART.END_Y
- ASSEMBLY.MAINPART.END_Y_IN_WORK_PLANE
- ASSEMBLY.MAINPART.END_Z
- ASSEMBLY.MAINPART.END_Z_IN_WORK_PLANE
- ASSEMBLY.MAINPART.END1_ANGLE_Y
- ASSEMBLY.MAINPART.END1_ANGLE_Z
- ASSEMBLY.MAINPART.END1_CODE
- ASSEMBLY.MAINPART.END1_CUT_ANGLE_Y
- ASSEMBLY.MAINPART.END1_CUT_ANGLE_Z
- ASSEMBLY.MAINPART.END1_SKEW
- ASSEMBLY.MAINPART.END2_ANGLE_Y
- ASSEMBLY.MAINPART.END2_ANGLE_Z
- ASSEMBLY.MAINPART.END2_CODE
- ASSEMBLY.MAINPART.END2_CUT_ANGLE_Y
- ASSEMBLY.MAINPART.END2_CUT_ANGLE_Z
- ASSEMBLY.MAINPART.END2_SKEW
- ASSEMBLY.MAINPART.FINISH
- ASSEMBLY.MAINPART.FLANGE_LENGTH_B
- ASSEMBLY.MAINPART.FLANGE_LENGTH_U
- ASSEMBLY.MAINPART.HAS_CONNECTIONS
- ASSEMBLY.MAINPART.HAS_HOLES
- ASSEMBLY.MAINPART.HEIGHT
- ASSEMBLY.MAINPART.ID
- ASSEMBLY.MAINPART.IS_ITEM
- ASSEMBLY.MAINPART.IS_POLYBEAM
- ASSEMBLY.MAINPART.LENGTH
- ASSEMBLY.MAINPART.LENGTH_GROSS

- ASSEMBLY.MAINPART.LENGTH_NET
- ASSEMBLY.MAINPART.MATERIAL
- ASSEMBLY.MAINPART.MATERIAL.ACTIVE_DESIGN_CODE
- ASSEMBLY.MAINPART.MATERIAL.ALIAS_NAME1
- ASSEMBLY.MAINPART.MATERIAL.ALIAS_NAME2
- ASSEMBLY.MAINPART.MATERIAL.ALIAS_NAME3
- ASSEMBLY.MAINPART.MATERIAL.MODULUS_OF_ELASTICITY
- ASSEMBLY.MAINPART.MATERIAL.PLATE_DENSITY
- ASSEMBLY.MAINPART.MATERIAL.POISSONS_RATIO
- ASSEMBLY.MAINPART.MATERIAL.PROFILE_DENSITY
- ASSEMBLY.MAINPART.MATERIAL.THERMAL_DILATATION
- ASSEMBLY.MAINPART.MODEL_TOTAL
- ASSEMBLY.MAINPART.NAME
- ASSEMBLY.MAINPART.NUMBER_IN_PHASE(X)
- ASSEMBLY.MAINPART.NUMBER#1
- ASSEMBLY.MAINPART.OBJECT_DESCRIPTION
- ASSEMBLY.MAINPART.OBJECT_LOCKED
- ASSEMBLY.MAINPART.OBJECT_TYPE
- ASSEMBLY.MAINPART.OWNER
- ASSEMBLY.MAINPART.PART_POS
- ASSEMBLY.MAINPART.PART_PREFIX
- ASSEMBLY.MAINPART.PART_SERIAL_NUMBER
- ASSEMBLY.MAINPART.PART_START_NUMBER
- ASSEMBLY.MAINPART.PERIMETER
- ASSEMBLY.MAINPART.PHASE
- ASSEMBLY.MAINPART.PHASE.COMMENT
- ASSEMBLY.MAINPART.PHASE.NAME
- ASSEMBLY.MAINPART.PRELIM_MARK
- ASSEMBLY.MAINPART.PROFILE
- ASSEMBLY.MAINPART.PROFILE_TYPE

- ASSEMBLY.MAINPART.PROFILE_WEIGHT
- ASSEMBLY.MAINPART.PROFILE_WEIGHT_NET
- ASSEMBLY.MAINPART.PROFILE.ANGLE
- ASSEMBLY.MAINPART.PROFILE.CANTILEVER
- ASSEMBLY.MAINPART.PROFILE.COVER_AREA
- ASSEMBLY.MAINPART.PROFILE.CROSS_SECTION_AREA
- ASSEMBLY.MAINPART.PROFILE.DIAMETER
- ASSEMBLY.MAINPART.PROFILE.DIAMETER_1
- ASSEMBLY.MAINPART.PROFILE.DIAMETER_2
- ASSEMBLY.MAINPART.PROFILE.ECCENTRICITY_X
- ASSEMBLY.MAINPART.PROFILE.ECCENTRICITY_Y
- ASSEMBLY.MAINPART.PROFILE.EDGE_FOLD
- ASSEMBLY.MAINPART.PROFILE.EDGE_FOLD_1
- ASSEMBLY.MAINPART.PROFILE.EDGE_FOLD_2
- ASSEMBLY.MAINPART.PROFILE.FLANGE_SLOPE_RATIO
- ASSEMBLY.MAINPART.PROFILE.FLANGE_THICKNESS
- ASSEMBLY.MAINPART.PROFILE.FLANGE_THICKNESS_1
- ASSEMBLY.MAINPART.PROFILE.FLANGE_THICKNESS_2
- ASSEMBLY.MAINPART.PROFILE.FLANGE_THICKNESS_B
- ASSEMBLY.MAINPART.PROFILE.FLANGE_THICKNESS_U
- ASSEMBLY.MAINPART.PROFILE.FLANGE_WIDTH
- ASSEMBLY.MAINPART.PROFILE.FLANGE_WIDTH_1
- ASSEMBLY.MAINPART.PROFILE.FLANGE_WIDTH_2
- ASSEMBLY.MAINPART.PROFILE.FLANGE_WIDTH_B
- ASSEMBLY.MAINPART.PROFILE.FLANGE_WIDTH_U
- ASSEMBLY.MAINPART.PROFILE.HEIGHT
- ASSEMBLY.MAINPART.PROFILE.HEIGHT_1
- ASSEMBLY.MAINPART.PROFILE.HEIGHT_2
- ASSEMBLY.MAINPART.PROFILE.HEIGHT_3
- ASSEMBLY.MAINPART.PROFILE.HEIGHT_4

- ASSEMBLY.MAINPART.PROFILE.MAJOR_AXIS_LENGTH_1
- ASSEMBLY.MAINPART.PROFILE.MAJOR_AXIS_LENGTH_2
- ASSEMBLY.MAINPART.PROFILE.MINOR_AXIS_LENGTH_1
- ASSEMBLY.MAINPART.PROFILE.MINOR_AXIS_LENGTH_2
- ASSEMBLY.MAINPART.PROFILE.MOMENT_OF_INERTIA_X
- ASSEMBLY.MAINPART.PROFILE.MOMENT_OF_INERTIA_Y
- ASSEMBLY.MAINPART.PROFILE.NEUTRAL_AXIS_LOCATION_ELASTIC_X
- ASSEMBLY.MAINPART.PROFILE.NEUTRAL_AXIS_LOCATION_ELASTIC_Y
- ASSEMBLY.MAINPART.PROFILE.NEUTRAL_AXIS_LOCATION_PLASTIC_X
- ASSEMBLY.MAINPART.PROFILE.NEUTRAL_AXIS_LOCATION_PLASTIC_Y
- ASSEMBLY.MAINPART.PROFILE.NORMALIZED_WARPING_CONSTANT
- ASSEMBLY.MAINPART.PROFILE.PLASTIC_MODULUS_X
- ASSEMBLY.MAINPART.PROFILE.PLASTIC_MODULUS_Y
- ASSEMBLY.MAINPART.PROFILE.PLATE_THICKNESS
- ASSEMBLY.MAINPART.PROFILE.POLAR_RADIUS_OF_GYRATION
- ASSEMBLY.MAINPART.PROFILE.RADIUS_OF_GYRATION_X
- ASSEMBLY.MAINPART.PROFILE.RADIUS_OF_GYRATION_Y
- ASSEMBLY.MAINPART.PROFILE.ROUNDING_RADIUS
- ASSEMBLY.MAINPART.PROFILE.ROUNDING_RADIUS_1
- ASSEMBLY.MAINPART.PROFILE.ROUNDING_RADIUS_2
- ASSEMBLY.MAINPART.PROFILE.SECTION_MODULUS_X
- ASSEMBLY.MAINPART.PROFILE.SECTION_MODULUS_Y
- ASSEMBLY.MAINPART.PROFILE.SHEAR_CENTER_LOCATION
- ASSEMBLY.MAINPART.PROFILE.SORT_OF_E_x_Cw_PER_G_x_J
- ASSEMBLY.MAINPART.PROFILE.STATICAL_MOMENT_Qf
- ASSEMBLY.MAINPART.PROFILE.STATICAL_MOMENT_Qw
- ASSEMBLY.MAINPART.PROFILE.STIFFENER_DIMENSION
- ASSEMBLY.MAINPART.PROFILE.STIFFENER_DIMENSION_1
- ASSEMBLY.MAINPART.PROFILE.STIFFENER_DIMENSION_2
- ASSEMBLY.MAINPART.PROFILE.STIFFENER_DIMENSION_3

- ASSEMBLY.MAINPART.PROFILE.SUBTYPE
- ASSEMBLY.MAINPART.PROFILE.TANGENT_OF_PRINCIPAL_AXIS_ANGLE
- ASSEMBLY.MAINPART.PROFILE.TORSIONAL_CONSTANT
- ASSEMBLY.MAINPART.PROFILE.WARPING_CONSTANT
- ASSEMBLY.MAINPART.PROFILE.WARPING_STATICAL_MOMENT
- ASSEMBLY.MAINPART.PROFILE.WEB_THICKNESS
- ASSEMBLY.MAINPART.PROFILE.WEB_THICKNESS_1
- ASSEMBLY.MAINPART.PROFILE.WEB_THICKNESS_2
- ASSEMBLY.MAINPART.PROFILE.WEIGHT_PER_UNIT_LENGTH
- ASSEMBLY.MAINPART.PROFILE.WIDTH
- ASSEMBLY.MAINPART.PROFILE.WIDTH_1
- ASSEMBLY.MAINPART.PROFILE.WIDTH_2
- ASSEMBLY.MAINPART.RADIUS
- ASSEMBLY.MAINPART.SAWING_ITEM
- ASSEMBLY.MAINPART.START_X
- ASSEMBLY.MAINPART.START_X_IN_WORK_PLANE
- ASSEMBLY.MAINPART.START_Y
- ASSEMBLY.MAINPART.START_Y_IN_WORK_PLANE
- ASSEMBLY.MAINPART.START_Z
- ASSEMBLY.MAINPART.START_Z_IN_WORK_PLANE
- ASSEMBLY.MAINPART.SUPPLEMENT_PART_WEIGHT
- ASSEMBLY.MAINPART.TOP_LEVEL
- ASSEMBLY.MAINPART.TOP_LEVEL_GLOBAL
- ASSEMBLY.MAINPART.TOP_LEVEL_GLOBAL_UNFORMATTED
- ASSEMBLY.MAINPART.TOP_LEVEL_UNFORMATTED
- ASSEMBLY.MAINPART.VOLUME
- ASSEMBLY.MAINPART.VOLUME_GROSS
- ASSEMBLY.MAINPART.VOLUME_NET
- ASSEMBLY.MAINPART.WEB_LENGTH
- ASSEMBLY.MAINPART.WEIGHT

- ASSEMBLY.MAINPART.WEIGHT_GROSS
- ASSEMBLY.MAINPART.WEIGHT_M
- ASSEMBLY.MAINPART.WEIGHT_NET
- ASSEMBLY.MAINPART.WIDTH
- ASSEMBLY.MODEL_TOTAL
- ASSEMBLY.NUMBER_IN_PHASE(X)
- ASSEMBLY.NUMBER#1
- ASSEMBLY.PHASE
- ASSEMBLY.PHASE.COMMENT
- ASSEMBLY.PHASE.NAME
- ASSEMBLY.PRELIM_ASSEM_MARK
- ASSEMBLY.SUPPLEMENT_PART_WEIGHT
- ASSEMBLY.TOP_LEVEL
- ASSEMBLY.TOP_LEVEL_GLOBAL
- ASSEMBLY.TOP_LEVEL_GLOBAL_UNFORMATTED
- ASSEMBLY.TOP_LEVEL_UNFORMATTED
- ASSEMBLY.VOLUME
- ASSEMBLY.WEIGHT
- ASSEMBLY.WEIGHT_GROSS
- ASSEMBLY.WEIGHT_NET
- ASSEMBLY.WIDTH
- BOTTOM_LEVEL_GLOBAL
- BOTTOM_LEVEL_UNFORMATTED
- BOUNDING_BOX_MAX_X
- BOUNDING_BOX_MAX_Y
- BOUNDING_BOX_MIN_X
- BOUNDING_BOX_MIN_Y
- BOUNDING_BOX_MIN_Z
- CAST_UNIT.AREA_NGX
- CAST_UNIT.AREA_NGY

- CAST_UNIT.AREA_NGZ
- CAST_UNIT.AREA_NX
- CAST_UNIT.AREA_NY
- CAST_UNIT.AREA_NZ
- CAST_UNIT.AREA_PGX
- CAST_UNIT.AREA_PGY
- CAST_UNIT.AREA_PGZ
- CAST_UNIT.AREA_PLAN
- CAST_UNIT.AREA_PROJECTION_GXY_GROSS
- CAST_UNIT.AREA_PROJECTION_GXY_NET
- CAST_UNIT.AREA_PROJECTION_GXZ_GROSS
- CAST_UNIT.AREA_PROJECTION_GXZ_NET
- CAST_UNIT.AREA_PROJECTION_GYZ_GROSS
- CAST_UNIT.AREA_PROJECTION_GYZ_NET
- CAST_UNIT.AREA_PROJECTION_XY_GROSS
- CAST_UNIT.AREA_PROJECTION_XY_NET
- CAST_UNIT.AREA_PROJECTION_XZ_GROSS
- CAST_UNIT.AREA_PROJECTION_XZ_NET
- CAST_UNIT.AREA_PROJECTION_YZ_GROSS
- CAST_UNIT.AREA_PROJECTION_YZ_NET
- CAST_UNIT.AREA_PX
- CAST_UNIT.AREA_PY
- CAST_UNIT.AREA_PZ
- CAST_UNIT.BOTTOM_LEVEL_GLOBAL
- CAST_UNIT.BOTTOM_LEVEL_GLOBAL_UNFORMATTED
- CAST_UNIT.BOTTOM_LEVEL_UNFORMATTED
- CAST_UNIT.CAST_UNIT_HEIGHT_ONLY_CONCRETE_PARTS
- CAST_UNIT.CAST_UNIT_HEIGHT_ONLY_PARTS
- CAST_UNIT.CAST_UNIT_HEIGHT_TOTAL
- CAST_UNIT.CAST_UNIT_LENGTH_ONLY_PARTS

- CAST_UNIT.CAST_UNIT_LENGTH_TOTAL
- CAST_UNIT.CAST_UNIT_SERIAL_NUMBER
- CAST_UNIT.CAST_UNIT_VERTICAL_POSITION_CODE
- CAST_UNIT.CAST_UNIT_WIDTH_ONLY_PARTS
- CAST_UNIT.CAST_UNIT_WIDTH_TOTAL
- CAST_UNIT.COG_X
- CAST_UNIT.COG_Y
- CAST_UNIT.COG_Z
- CAST_UNIT.ID
- CAST_UNIT.LENGTH
- CAST_UNIT.LENGTH_GROSS
- CAST_UNIT.LENGTH_NET
- CAST_UNIT.LOCATION_BREAKDOWN_STRUCTURE.GUID
- CAST_UNIT.LOCATION_BREAKDOWN_STRUCTURE.LBS_BUILDING
- CAST_UNIT.LOCATION_BREAKDOWN_STRUCTURE.LBS_FLOOR_ELEVATION
- CAST_UNIT.LOCATION_BREAKDOWN_STRUCTURE.LBS_HIERARCHY
- CAST_UNIT.LOCATION_BREAKDOWN_STRUCTURE.LBS_HIERARCHY_LEVEL_NUMBER
- CAST_UNIT.LOCATION_BREAKDOWN_STRUCTURE.LBS_PROJECT
- CAST_UNIT.LOCATION_BREAKDOWN_STRUCTURE.LBS_SITE
- CAST_UNIT.LOCATION_BREAKDOWN_STRUCTURE.NAME
- CAST_UNIT.LOT_NUMBER
- CAST_UNIT.MAINPART.ACN
- CAST_UNIT.MAINPART.AREA
- CAST_UNIT.MAINPART.AREA_GROSS
- CAST_UNIT.MAINPART.AREA_NET
- CAST_UNIT.MAINPART.AREA_NGX
- CAST_UNIT.MAINPART.AREA_NGY
- CAST_UNIT.MAINPART.AREA_NGZ
- CAST_UNIT.MAINPART.AREA_NX
- CAST_UNIT.MAINPART.AREA_NY

- CAST_UNIT.MAINPART.AREA_NZ
- CAST_UNIT.MAINPART.AREA_PER_TONS
- CAST_UNIT.MAINPART.AREA_PGX
- CAST_UNIT.MAINPART.AREA_PGY
- CAST_UNIT.MAINPART.AREA_PGZ
- CAST_UNIT.MAINPART.AREA_PLAN
- CAST_UNIT.MAINPART.AREA_PROJECTION_GXY_GROSS
- CAST_UNIT.MAINPART.AREA_PROJECTION_GXY_NET
- CAST_UNIT.MAINPART.AREA_PROJECTION_GXZ_GROSS
- CAST_UNIT.MAINPART.AREA_PROJECTION_GXZ_NET
- CAST_UNIT.MAINPART.AREA_PROJECTION_GYZ_GROSS
- CAST_UNIT.MAINPART.AREA_PROJECTION_GYZ_NET
- CAST_UNIT.MAINPART.AREA_PROJECTION_XY_GROSS
- CAST_UNIT.MAINPART.AREA_PROJECTION_XY_NET
- CAST_UNIT.MAINPART.AREA_PROJECTION_XZ_GROSS
- CAST_UNIT.MAINPART.AREA_PROJECTION_XZ_NET
- CAST_UNIT.MAINPART.AREA_PROJECTION_YZ_GROSS
- CAST_UNIT.MAINPART.AREA_PROJECTION_YZ_NET
- CAST_UNIT.MAINPART.AREA_PX
- CAST_UNIT.MAINPART.AREA_PY
- CAST_UNIT.MAINPART.AREA_PZ
- CAST_UNIT.MAINPART.ASSEMBLY_DEFAULT_PREFIX
- CAST_UNIT.MAINPART.BOTTOM_LEVEL
- CAST_UNIT.MAINPART.BOTTOM_LEVEL_GLOBAL
- CAST_UNIT.MAINPART.BOTTOM_LEVEL_GLOBAL_UNFORMATTED
- CAST_UNIT.MAINPART.BOTTOM_LEVEL_UNFORMATTED
- CAST_UNIT.MAINPART.CLASS_ATTR
- CAST_UNIT.MAINPART.COG_X
- CAST_UNIT.MAINPART.COG_Y
- CAST_UNIT.MAINPART.COG_Z

- CAST_UNIT.MAINPART.END_X
- CAST_UNIT.MAINPART.END_X_IN_WORK_PLANE
- CAST_UNIT.MAINPART.END_Y
- CAST_UNIT.MAINPART.END_Y_IN_WORK_PLANE
- CAST_UNIT.MAINPART.END_Z
- CAST_UNIT.MAINPART.END_Z_IN_WORK_PLANE
- CAST_UNIT.MAINPART.END1_ANGLE_Y
- CAST_UNIT.MAINPART.END1_ANGLE_Z
- CAST_UNIT.MAINPART.END1_CODE
- CAST_UNIT.MAINPART.END1_CUT_ANGLE_Y
- CAST_UNIT.MAINPART.END1_CUT_ANGLE_Z
- CAST_UNIT.MAINPART.END1_SKEW
- CAST_UNIT.MAINPART.END2_ANGLE_Y
- CAST_UNIT.MAINPART.END2_ANGLE_Z
- CAST_UNIT.MAINPART.END2_CODE
- CAST_UNIT.MAINPART.END2_CUT_ANGLE_Y
- CAST_UNIT.MAINPART.END2_CUT_ANGLE_Z
- CAST_UNIT.MAINPART.END2_SKEW
- CAST_UNIT.MAINPART.FINISH
- CAST_UNIT.MAINPART.FLANGE_LENGTH_B
- CAST_UNIT.MAINPART.FLANGE_LENGTH_U
- CAST_UNIT.MAINPART.HAS_CONNECTIONS
- CAST_UNIT.MAINPART.HAS_HOLES
- CAST_UNIT.MAINPART.HEIGHT
- CAST_UNIT.MAINPART.ID
- CAST_UNIT.MAINPART.IS_ITEM
- CAST_UNIT.MAINPART.IS_POLYBEAM
- CAST_UNIT.MAINPART.LENGTH
- CAST_UNIT.MAINPART.LENGTH_GROSS
- CAST_UNIT.MAINPART.LENGTH_NET

- CAST_UNIT.MAINPART.MATERIAL
- CAST_UNIT.MAINPART.MATERIAL.ACTIVE_DESIGN_CODE
- CAST_UNIT.MAINPART.MODEL_TOTAL
- CAST_UNIT.MAINPART.NAME
- CAST_UNIT.MAINPART.OBJECT_DESCRIPTION
- CAST_UNIT.MAINPART.OBJECT_LOCKED
- CAST_UNIT.MAINPART.OBJECT_TYPE
- CAST_UNIT.MAINPART.OWNER
- CAST_UNIT.MAINPART.PART_POS
- CAST_UNIT.MAINPART.PART_PREFIX
- CAST_UNIT.MAINPART.PART_SERIAL_NUMBER
- CAST_UNIT.MAINPART.PART_START_NUMBER
- CAST_UNIT.MAINPART.PHASE
- CAST_UNIT.MAINPART.PRELIM_MARK
- CAST_UNIT.MAINPART.PROFILE
- CAST_UNIT.MAINPART.PROFILE_TYPE
- CAST_UNIT.MAINPART.PROFILE_WEIGHT
- CAST_UNIT.MAINPART.PROFILE_WEIGHT_NET
- CAST_UNIT.MAINPART.START_X
- CAST_UNIT.MAINPART.START_X_IN_WORK_PLANE
- CAST_UNIT.MAINPART.START_Y
- CAST_UNIT.MAINPART.START_Y_IN_WORK_PLANE
- CAST_UNIT.MAINPART.START_Z
- CAST_UNIT.MAINPART.START_Z_IN_WORK_PLANE
- CAST_UNIT.MAINPART.SUPPLEMENT_PART_WEIGHT
- CAST_UNIT.MAINPART.TOP_LEVEL
- CAST_UNIT.MAINPART.TOP_LEVEL_GLOBAL
- CAST_UNIT.MAINPART.TOP_LEVEL_GLOBAL_UNFORMATTED
- CAST_UNIT.MAINPART.TOP_LEVEL_UNFORMATTED
- CAST_UNIT.MAINPART.VOLUME

- CAST_UNIT.MAINPART.VOLUME_GROSS
- CAST_UNIT.MAINPART.VOLUME_NET
- CAST_UNIT.MAINPART.WEB_LENGTH
- CAST_UNIT.MAINPART.WEIGHT
- CAST_UNIT.MAINPART.WEIGHT_GROSS
- CAST_UNIT.MAINPART.WEIGHT_M
- CAST_UNIT.MAINPART.WEIGHT_NET
- CAST_UNIT.MAINPART.WIDTH
- CAST_UNIT.MATERIAL
- CAST_UNIT.MODEL_TOTAL
- CAST_UNIT.OBJECT_DESCRIPTION
- CAST_UNIT.OBJECT_LOCKED
- CAST_UNIT.OBJECT_TYPE
- CAST_UNIT.OWNER
- CAST_UNIT.PHASE
- CAST_UNIT.TOP_LEVEL
- CAST_UNIT.TOP_LEVEL_GLOBAL
- CAST_UNIT.TOP_LEVEL_GLOBAL_UNFORMATTED
- CAST_UNIT.TOP_LEVEL_UNFORMATTED
- CAST_UNIT.VOLUME
- CAST_UNIT.VOLUME_NET_ONLY_CONCRETE_PARTS
- CAST_UNIT.VOLUME_ONLY_CONCRETE_PARTS
- CAST_UNIT.WEIGHT
- CAST_UNIT.WEIGHT_GROSS
- CAST_UNIT.WEIGHT_NET
- CAST_UNIT.WEIGHT_NET_ONLY_CONCRETE_PARTS
- CAST_UNIT.WEIGHT_ONLY_CONCRETE_PARTS
- CASTUNIT.MAINPART.PROFILE.ANGLE
- CASTUNIT.MAINPART.PROFILE.CANTILEVER
- CASTUNIT.MAINPART.PROFILE.COVER_AREA

- CASTUNIT.MAINPART.PROFILE.CROSS_SECTION_AREA
- CASTUNIT.MAINPART.PROFILE.DIAMETER
- CASTUNIT.MAINPART.PROFILE.DIAMETER_1
- CASTUNIT.MAINPART.PROFILE.DIAMETER_2
- CASTUNIT.MAINPART.PROFILE.ECCENTRICITY_X
- CASTUNIT.MAINPART.PROFILE.ECCENTRICITY_Y
- CASTUNIT.MAINPART.PROFILE.EDGE_FOLD
- CASTUNIT.MAINPART.PROFILE.EDGE_FOLD_1
- CASTUNIT.MAINPART.PROFILE.EDGE_FOLD_2
- CASTUNIT.MAINPART.PROFILE.FLANGE_SLOPE_RATIO
- CASTUNIT.MAINPART.PROFILE.FLANGE_THICKNESS
- CASTUNIT.MAINPART.PROFILE.FLANGE_THICKNESS_1
- CASTUNIT.MAINPART.PROFILE.FLANGE_THICKNESS_2
- CASTUNIT.MAINPART.PROFILE.FLANGE_THICKNESS_B
- CASTUNIT.MAINPART.PROFILE.FLANGE_THICKNESS_U
- CASTUNIT.MAINPART.PROFILE.FLANGE_WIDTH
- CASTUNIT.MAINPART.PROFILE.FLANGE_WIDTH_1
- CASTUNIT.MAINPART.PROFILE.FLANGE_WIDTH_2
- CASTUNIT.MAINPART.PROFILE.FLANGE_WIDTH_B
- CASTUNIT.MAINPART.PROFILE.FLANGE_WIDTH_U
- CASTUNIT.MAINPART.PROFILE.HEIGHT
- CASTUNIT.MAINPART.PROFILE.HEIGHT_1
- CASTUNIT.MAINPART.PROFILE.HEIGHT_2
- CASTUNIT.MAINPART.PROFILE.HEIGHT_3
- CASTUNIT.MAINPART.PROFILE.HEIGHT_4
- CASTUNIT.MAINPART.PROFILE.MAJOR_AXIS_LENGTH_1
- CASTUNIT.MAINPART.PROFILE.MAJOR_AXIS_LENGTH_2
- CASTUNIT.MAINPART.PROFILE.MINOR_AXIS_LENGTH_1
- CASTUNIT.MAINPART.PROFILE.MINOR_AXIS_LENGTH_2
- CASTUNIT.MAINPART.PROFILE.MOMENT_OF_INERTIA_X

- CASTUNIT.MAINPART.PROFILE.MOMENT_OF_INERTIA_Y
- CASTUNIT.MAINPART.PROFILE.NEUTRAL_AXIS_LOCATION_ELASTIC_X
- CASTUNIT.MAINPART.PROFILE.NEUTRAL_AXIS_LOCATION_ELASTIC_Y
- CASTUNIT.MAINPART.PROFILE.NEUTRAL_AXIS_LOCATION_PLASTIC_X
- CASTUNIT.MAINPART.PROFILE.NEUTRAL_AXIS_LOCATION_PLASTIC_Y
- CASTUNIT.MAINPART.PROFILE.NORMALIZED_WARPING_CONSTANT
- CASTUNIT.MAINPART.PROFILE.PLASTIC_MODULUS_X
- CASTUNIT.MAINPART.PROFILE.PLASTIC_MODULUS_Y
- CASTUNIT.MAINPART.PROFILE.PLATE_THICKNESS
- CASTUNIT.MAINPART.PROFILE.POLAR_RADIUS_OF_GYRATION
- CASTUNIT.MAINPART.PROFILE.RADIUS_OF_GYRATION_X
- CASTUNIT.MAINPART.PROFILE.RADIUS_OF_GYRATION_Y
- CASTUNIT.MAINPART.PROFILE.ROUNDING_RADIUS
- CASTUNIT.MAINPART.PROFILE.ROUNDING_RADIUS_1
- CASTUNIT.MAINPART.PROFILE.ROUNDING_RADIUS_2
- CASTUNIT.MAINPART.PROFILE.SECTION_MODULUS_X
- CASTUNIT.MAINPART.PROFILE.SECTION_MODULUS_Y
- CASTUNIT.MAINPART.PROFILE.SHEAR_CENTER_LOCATION
- CASTUNIT.MAINPART.PROFILE.SORT_OF_E_x_Cw_PER_G_x_J
- CASTUNIT.MAINPART.PROFILE.STATICAL_MOMENT_Qf
- CASTUNIT.MAINPART.PROFILE.STATICAL_MOMENT_Qw
- CASTUNIT.MAINPART.PROFILE.STIFFENER_DIMENSION
- CASTUNIT.MAINPART.PROFILE.STIFFENER_DIMENSION_1
- CASTUNIT.MAINPART.PROFILE.STIFFENER_DIMENSION_2
- CASTUNIT.MAINPART.PROFILE.STIFFENER_DIMENSION_3
- CASTUNIT.MAINPART.PROFILE.SUBTYPE
- CASTUNIT.MAINPART.PROFILE.TANGENT_OF_PRINCIPAL_AXIS_ANGLE
- CASTUNIT.MAINPART.PROFILE.TORSIONAL_CONSTANT
- CASTUNIT.MAINPART.PROFILE.WARPING_CONSTANT
- CASTUNIT.MAINPART.PROFILE.WARPING_STATICAL_MOMENT

- CASTUNIT.MAINPART.PROFILE.WEB_THICKNESS
- CASTUNIT.MAINPART.PROFILE.WEB_THICKNESS_1
- CASTUNIT.MAINPART.PROFILE.WEB_THICKNESS_2
- CASTUNIT.MAINPART.PROFILE.WEIGHT_PER_UNIT_LENGTH
- CASTUNIT.MAINPART.PROFILE.WIDTH
- CASTUNIT.MAINPART.PROFILE.WIDTH_1
- CASTUNIT.MAINPART.PROFILE.WIDTH_2
- CASTUNIT.MAINPART.SAWING_ITEM
- CIP_STATUS
- COG_X
- COG_Y
- COG_Z
- COLOR
- CURRENT_PHASE
- CURVED_SEGMENTS
- DATE
- DELIVERY_NUMBER
- DESIGN_ASSIGNED_TO
- DESIGN_CHECK_DATE
- DESIGN_CHECKED_BY
- DESIGN_CODE
- DESIGN_COMMENT
- DIMENSION_A
- DIMENSION_B
- END_X
- END_X_IN_WORK_PLANE
- END_Y
- END_Y_IN_WORK_PLANE
- END_Z
- END_Z_IN_WORK_PLANE

- END1_ANGLE_Y
- END1_ANGLE_Z
- END1_CODE
- END1_CUT_ANGLE_Y
- END1_CUT_ANGLE_Z
- END1_SKEW
- END2_ANGLE_Y
- END2_ANGLE_Z
- END2_CODE
- END2_CUT_ANGLE_Y
- END2_CUT_ANGLE_Z
- END2_SKEW
- ERECTION_CODE
- ERECTION_COMMENT
- ERECTION_STATUS
- FABRICATION_CODE
- FABRICATION_STATUS
- HAS_CONNECTIONS
- HAS_HOLES
- HIERARCHY_LEVEL
- HISTORY.OWNER
- IS_ITEM
- IS_POLYBEAM
- LENGTH
- LENGTH_GROSS
- LENGTH_NET
- LOCATION_BREAKDOWN_STRUCTURE.GUID
- LOCATION_BREAKDOWN_STRUCTURE.LBS_BUILDING
- LOCATION_BREAKDOWN_STRUCTURE.LBS_FLOOR_ELEVATION
- LOCATION_BREAKDOWN_STRUCTURE.LBS_HIERARCHY

- LOCATION_BREAKDOWN_STRUCTURE.LBS_HIERARCHY_LEVEL_NUMBER
- LOCATION_BREAKDOWN_STRUCTURE.LBS_PROJECT
- LOCATION_BREAKDOWN_STRUCTURE.LBS_SITE
- LOCATION_BREAKDOWN_STRUCTURE.NAME
- LOT_NUMBER
- MAIN_PART
- MAINPART.ACN
- MAINPART.AREA
- MAINPART.AREA_GROSS
- MAINPART.AREA_NET
- MAINPART.AREA_NGX
- MAINPART.AREA_NGY
- MAINPART.AREA_NGZ
- MAINPART.AREA_NX
- MAINPART.AREA_NY
- MAINPART.AREA_NZ
- MAINPART.AREA_PER_TONS
- MAINPART.AREA_PGX
- MAINPART.AREA_PGY
- MAINPART.AREA_PGZ
- MAINPART.AREA_PLAN
- MAINPART.AREA_PROJECTION_GXY_GROSS
- MAINPART.AREA_PROJECTION_GXY_NET
- MAINPART.AREA_PROJECTION_GXZ_GROSS
- MAINPART.AREA_PROJECTION_GXZ_NET
- MAINPART.AREA_PROJECTION_GYZ_GROSS
- MAINPART.AREA_PROJECTION_GYZ_NET
- MAINPART.AREA_PROJECTION_XY_GROSS
- MAINPART.AREA_PROJECTION_XY_NET
- MAINPART.AREA_PROJECTION_XZ_GROSS

- MAINPART.AREA_PROJECTION_XZ_NET
- MAINPART.AREA_PROJECTION_YZ_GROSS
- MAINPART.AREA_PROJECTION_YZ_NET
- MAINPART.AREA_PX
- MAINPART.AREA_PY
- MAINPART.AREA_PZ
- MAINPART.ASSEMBLY_DEFAULT_PREFIX
- MAINPART.ASSEMBLY_START_NUMBER
- MAINPART.BOTTOM_LEVEL
- MAINPART.BOTTOM_LEVEL_GLOBAL
- MAINPART.BOTTOM_LEVEL_GLOBAL_UNFORMATTED
- MAINPART.BOTTOM_LEVEL_UNFORMATTED
- MAINPART.CLASS_ATTR
- MAINPART.COG_X
- MAINPART.COG_Y
- MAINPART.COG_Z
- MAINPART.CURVED_SEGMENTS
- MAINPART.END_X
- MAINPART.END_X_IN_WORK_PLANE
- MAINPART.END_Y
- MAINPART.END_Y_IN_WORK_PLANE
- MAINPART.END_Z
- MAINPART.END_Z_IN_WORK_PLANE
- MAINPART.END1_ANGLE_Y
- MAINPART.END1_ANGLE_Z
- MAINPART.END1_CODE
- MAINPART.END1_CUT_ANGLE_Y
- MAINPART.END1_CUT_ANGLE_Z
- MAINPART.END1_SKEW
- MAINPART.END2_ANGLE_Y

- MAINPART.END2_ANGLE_Z
- MAINPART.END2_CODE
- MAINPART.END2_CUT_ANGLE_Y
- MAINPART.END2_CUT_ANGLE_Z
- MAINPART.END2_SKEW
- MAINPART.FINISH
- MAINPART.FLANGE_LENGTH_B
- MAINPART.FLANGE_LENGTH_U
- MAINPART.HAS_CONNECTIONS
- MAINPART.HAS_HOLES
- MAINPART.HEIGHT
- MAINPART.ID
- MAINPART.IS_ITEM
- MAINPART.IS_POLYBEAM
- MAINPART.LENGTH
- MAINPART.LENGTH_GROSS
- MAINPART.LENGTH_NET
- MAINPART.MATERIAL.ACTIVE_DESIGN_CODE
- MAINPART.MATERIAL.ALIAS_NAME1
- MAINPART.MATERIAL.ALIAS_NAME2
- MAINPART.MATERIAL.ALIAS_NAME3
- MAINPART.MATERIAL.MODULUS_OF_ELASTICITY
- MAINPART.MATERIAL.PLATE_DENSITY
- MAINPART.MATERIAL.POISSONS_RATIO
- MAINPART.MATERIAL.PROFILE_DENSITY
- MAINPART.MATERIAL.THERMAL_DILATATION
- MAINPART.MODEL_TOTAL
- MAINPART.NUMBER_IN_PHASE(X)
- MAINPART.NUMBER#1
- MAINPART.OBJECT_DESCRIPTION

- MAINPART.OBJECT_LOCKED
- MAINPART.OWNER
- MAINPART.PART_PREFIX
- MAINPART.PART_SERIAL_NUMBER
- MAINPART.PART_START_NUMBER
- MAINPART.PERIMETER
- MAINPART.PHASE
- MAINPART.PHASE.COMMENT
- MAINPART.PHASE.NAME
- MAINPART.PRELIM_MARK
- MAINPART.PROFILE_TYPE
- MAINPART.PROFILE_WEIGHT
- MAINPART.PROFILE_WEIGHT_NET
- MAINPART.PROFILE.ANGLE
- MAINPART.PROFILE.CANTILEVER
- MAINPART.PROFILE.COVER_AREA
- MAINPART.PROFILE.CROSS_SECTION_AREA
- MAINPART.PROFILE.DIAMETER_1
- MAINPART.PROFILE.DIAMETER_2
- MAINPART.PROFILE.ECCENTRICITY_X
- MAINPART.PROFILE.ECCENTRICITY_Y
- MAINPART.PROFILE.EDGE_FOLD
- MAINPART.PROFILE.EDGE_FOLD_1
- MAINPART.PROFILE.EDGE_FOLD_2
- MAINPART.PROFILE.FLANGE_SLOPE_RATIO
- MAINPART.PROFILE.FLANGE_THICKNESS
- MAINPART.PROFILE.FLANGE_THICKNESS_1
- MAINPART.PROFILE.FLANGE_THICKNESS_2
- MAINPART.PROFILE.FLANGE_THICKNESS_B
- MAINPART.PROFILE.FLANGE_THICKNESS_U

- MAINPART.PROFILE.FLANGE_WIDTH
- MAINPART.PROFILE.FLANGE_WIDTH_1
- MAINPART.PROFILE.FLANGE_WIDTH_2
- MAINPART.PROFILE.FLANGE_WIDTH_B
- MAINPART.PROFILE.FLANGE_WIDTH_U
- MAINPART.PROFILE.HEIGHT
- MAINPART.PROFILE.HEIGHT_1
- MAINPART.PROFILE.HEIGHT_2
- MAINPART.PROFILE.HEIGHT_3
- MAINPART.PROFILE.HEIGHT_4
- MAINPART.PROFILE.MAJOR_AXIS_LENGTH_1
- MAINPART.PROFILE.MAJOR_AXIS_LENGTH_2
- MAINPART.PROFILE.MINOR_AXIS_LENGTH_1
- MAINPART.PROFILE.MINOR_AXIS_LENGTH_2
- MAINPART.PROFILE.MOMENT_OF_INERTIA_X
- MAINPART.PROFILE.MOMENT_OF_INERTIA_Y
- MAINPART.PROFILE.NEUTRAL_AXIS_LOCATION_ELASTIC_X
- MAINPART.PROFILE.NEUTRAL_AXIS_LOCATION_ELASTIC_Y
- MAINPART.PROFILE.NEUTRAL_AXIS_LOCATION_PLASTIC_X
- MAINPART.PROFILE.NEUTRAL_AXIS_LOCATION_PLASTIC_Y
- MAINPART.PROFILE.NORMALIZED_WARPING_CONSTANT
- MAINPART.PROFILE.PLASTIC_MODULUS_X
- MAINPART.PROFILE.PLASTIC_MODULUS_Y
- MAINPART.PROFILE.PLATE_THICKNESS
- MAINPART.PROFILE.POLAR_RADIUS_OF_GYRATION
- MAINPART.PROFILE.RADIUS_OF_GYRATION_X
- MAINPART.PROFILE.RADIUS_OF_GYRATION_Y
- MAINPART.PROFILE.ROUNDING_RADIUS
- MAINPART.PROFILE.ROUNDING_RADIUS_1
- MAINPART.PROFILE.ROUNDING_RADIUS_2

- MAINPART.PROFILE.SECTION_MODULUS_X
- MAINPART.PROFILE.SECTION_MODULUS_Y
- MAINPART.PROFILE.SHEAR_CENTER_LOCATION
- MAINPART.PROFILE.SORT_OF_E_x_Cw_PER_G_x_J
- MAINPART.PROFILE.STATICAL_MOMENT_Qf
- MAINPART.PROFILE.STATICAL_MOMENT_Qw
- MAINPART.PROFILE.STIFFENER_DIMENSION
- MAINPART.PROFILE.STIFFENER_DIMENSION_1
- MAINPART.PROFILE.STIFFENER_DIMENSION_2
- MAINPART.PROFILE.STIFFENER_DIMENSION_3
- MAINPART.PROFILE.SUBTYPE
- MAINPART.PROFILE.TANGENT_OF_PRINCIPAL_AXIS_ANGLE
- MAINPART.PROFILE.TORSIONAL_CONSTANT
- MAINPART.PROFILE.WARPING_CONSTANT
- MAINPART.PROFILE.WARPING_STATICAL_MOMENT
- MAINPART.PROFILE.WEB_THICKNESS
- MAINPART.PROFILE.WEB_THICKNESS_1
- MAINPART.PROFILE.WEB_THICKNESS_2
- MAINPART.PROFILE.WEIGHT_PER_UNIT_LENGTH
- MAINPART.PROFILE.WIDTH
- MAINPART.PROFILE.WIDTH_1
- MAINPART.PROFILE.WIDTH_2
- MAINPART.RADIUS
- MAINPART.SAWING_ITEM
- MAINPART.START_X
- MAINPART.START_X_IN_WORK_PLANE
- MAINPART.START_Y
- MAINPART.START_Y_IN_WORK_PLANE
- MAINPART.START_Z
- MAINPART.START_Z_IN_WORK_PLANE

- MAINPART.SUPPLEMENT_PART_WEIGHT
- MAINPART.TOP_LEVEL
- MAINPART.TOP_LEVEL_GLOBAL
- MAINPART.TOP_LEVEL_GLOBAL_UNFORMATTED
- MAINPART.VOLUME
- MAINPART.VOLUME_GROSS
- MAINPART.VOLUME_NET
- MAINPART.WEB_LENGTH
- MAINPART.WEIGHT
- MAINPART.WEIGHT_GROSS
- MAINPART.WEIGHT_M
- MAINPART.WEIGHT_NET
- MATERIAL.ACTIVE_DESIGN_CODE
- MATERIAL.ALIAS_NAME1
- MATERIAL.ALIAS_NAME2
- MATERIAL.ALIAS_NAME3
- MATERIAL.MODULUS_OF_ELASTICITY
- MATERIAL.PLATE_DENSITY
- MATERIAL.POISSONS_RATIO
- MATERIAL.PROFILE_DENSITY
- MATERIAL.THERMAL_DILATATION
- NUMBER_IN_PHASE(X)
- NUMBER#1
- OBJECT_DESCRIPTION
- OBJECT_LOCKED
- OWNER
- PACKAGE_NUMBER
- PAGE
- PART_SERIAL_NUMBER
- PART_START_NUMBER

- PERIMETER
- PHASE.COMMENT
- PLANNED_END_D
- PLANNED_END_E
- PLANNED_END_F
- PLANNED_START_D
- PLANNED_START_E
- PLANNED_START_F
- PLANS_STATUS
- PRELIM_ASSEM_MARK
- PRELIM_MARK
- PRODUCT_NAME
- PROFILE_TYPE
- PROFILE_WEIGHT
- PROFILE_WEIGHT_NET
- PROFILE.ANGLE
- PROFILE.CANTILEVER
- PROFILE.COVER_AREA
- PROFILE.CROSS_SECTION_AREA
- PROFILE.CROSS_SECTION_AREA_END
- PROFILE.CROSS_SECTION_AREA_START
- PROFILE.DIAMETER_1
- PROFILE.DIAMETER_2
- PROFILE.ECCENTRICITY_X
- PROFILE.ECCENTRICITY_Y
- PROFILE.EDGE_FOLD
- PROFILE.EDGE_FOLD_1
- PROFILE.EDGE_FOLD_2
- PROFILE.FLANGE_SLOPE_RATIO
- PROFILE.FLANGE_THICKNESS

- PROFILE.FLANGE_THICKNESS_1
- PROFILE.FLANGE_THICKNESS_2
- PROFILE.FLANGE_THICKNESS_B
- PROFILE.FLANGE_THICKNESS_U
- PROFILE.FLANGE_WIDTH
- PROFILE.FLANGE_WIDTH_1
- PROFILE.FLANGE_WIDTH_2
- PROFILE.FLANGE_WIDTH_B
- PROFILE.FLANGE_WIDTH_U
- PROFILE.HEIGHT_1
- PROFILE.HEIGHT_2
- PROFILE.HEIGHT_3
- PROFILE.HEIGHT_4
- PROFILE.MAJOR_AXIS_LENGTH_1
- PROFILE.MAJOR_AXIS_LENGTH_2
- PROFILE.MINOR_AXIS_LENGTH_1
- PROFILE.MINOR_AXIS_LENGTH_2
- PROFILE.MOMENT_OF_INERTIA_X
- PROFILE.MOMENT_OF_INERTIA_Y
- PROFILE.NEUTRAL_AXIS_LOCATION_ELASTIC_X
- PROFILE.NEUTRAL_AXIS_LOCATION_ELASTIC_Y
- PROFILE.NEUTRAL_AXIS_LOCATION_PLASTIC_X
- PROFILE.NEUTRAL_AXIS_LOCATION_PLASTIC_Y
- PROFILE.NORMALIZED_WARPING_CONSTANT
- PROFILE.PLASTIC_MODULUS_X
- PROFILE.PLASTIC_MODULUS_Y
- PROFILE.POLAR_RADIUS_OF_GYRATION
- PROFILE.RADIUS_OF_GYRATION_X
- PROFILE.RADIUS_OF_GYRATION_Y
- PROFILE.ROUNDING_RADIUS

- PROFILE.ROUNDING_RADIUS_1
- PROFILE.ROUNDING_RADIUS_2
- PROFILE.SECTION_MODULUS_X
- PROFILE.SECTION_MODULUS_Y
- PROFILE.SHEAR_CENTER_LOCATION
- PROFILE.SORT_OF_E_x_Cw_PER_G_x_J
- PROFILE.STATICAL_MOMENT_Qf
- PROFILE.STATICAL_MOMENT_Qw
- PROFILE.STIFFENER_DIMENSION
- PROFILE.STIFFENER_DIMENSION_1
- PROFILE.STIFFENER_DIMENSION_2
- PROFILE.STIFFENER_DIMENSION_3
- PROFILE.SUBTYPE
- PROFILE.TANGENT_OF_PRINCIPAL_AXIS_ANGLE
- PROFILE.TORSIONAL_CONSTANT
- PROFILE.WARPING_CONSTANT
- PROFILE.WARPING_STATICAL_MOMENT
- PROFILE.WEB_THICKNESS
- PROFILE.WEB_THICKNESS_1
- PROFILE.WEB_THICKNESS_2
- PROFILE.WEIGHT_PER_UNIT_LENGTH
- PROFILE.WIDTH
- PROFILE.WIDTH_1
- PROFILE.WIDTH_2
- PROJECT.ADDRESS
- PROJECT.BUILDER
- PROJECT.DATE_END
- PROJECT.DATE_START
- PROJECT.DESCRIPTION
- PROJECT.DESIGNER

- PROJECT.INFO1
- PROJECT.INFO2
- PROJECT.MODEL
- PROJECT.NUMBER#2
- PROJECT.OBJECT
- RADIUS
- RAIL_ANGLE
- RAIL_OFFSET
- RAIL_RADIUS
- REVISION_CODE
- ROW_IN_PAGE
- SERIAL_NUMBER
- SHIPMENT_NUMBER
- SUPPLEMENT_PART_WEIGHT
- TIME
- TITLE1
- TITLE2
- TITLE3
- VOLUME
- VOLUME_GROSS
- VOLUME_NET
- WEIGHT
- WEIGHT_GROSS
- WEIGHT_NET
- WIDTH

Tip: If you are adding Vico Properties (Vico_01, Vico_02, Vico_03, and Vico Object Types) to Tekla, please see "Specifying Vico Office Object Types in Tekla 2016" on page 1 or "Specifying Vico Office Object Types in Tekla 21.1" on page 1.

Publish from ArchiCAD

ArchiCAD is an architectural BIM CAD software for Macintosh and Windows developed by the Hungarian company Graphisoft. ArchiCAD offers computer aided solutions for handling all common aspects of aesthetics and engineering during the whole design process of the built environment – buildings, interiors, urban areas, etc.

Once you created a building information model in ArchiCAD, you can easily publish it to Vico Office and use it during your Vico Office workflow.

Setting up Models

For easier and faster use later, break down the models by trades/systems or other smaller chunks. These trade models or 'system files' must originate from the 'base model'.

Example:

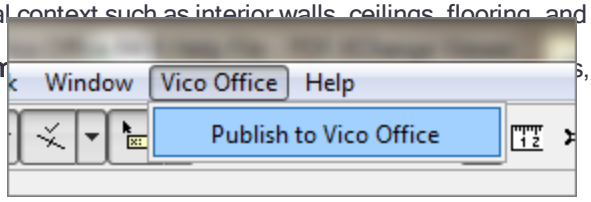
A system breakdown has the following structure:

- **Substructure model:** Contains all the structural members that 'touch the earth' such as foundations, basement walls, slabs on grade, and pits.
- **Superstructure model:** Contains all the structural members excluding the ones that were modeled under 'Substructure'.
- **Exterior model:** Contains the shell of building such as exterior walls, roofing, and canopies. This is a single model that contains all levels of the project.
- **Interior model:** Contains the rest of the architectural elements plus fixtures that are modeled in the architectural context such as interior walls, ceilings, flooring, and lighting and plumbing fixtures.
- **MEP m**[illegible]s, fitting and equipment, and air terminals.

To publish to Vico Office

1. Open the BIM file that was created in an ArchiCAD version that is compatible with your current version of Vico Office.
2. Switch to the 3D view.
3. Hide the layers that you do not want to publish to Vico Office.
4. From the **Vico Office** menu, select **Publish to Vico Office**.

   For each BIM application, Vico Office installs an add-on that adds a **Publish to Vico Office** item to the application's user interface.



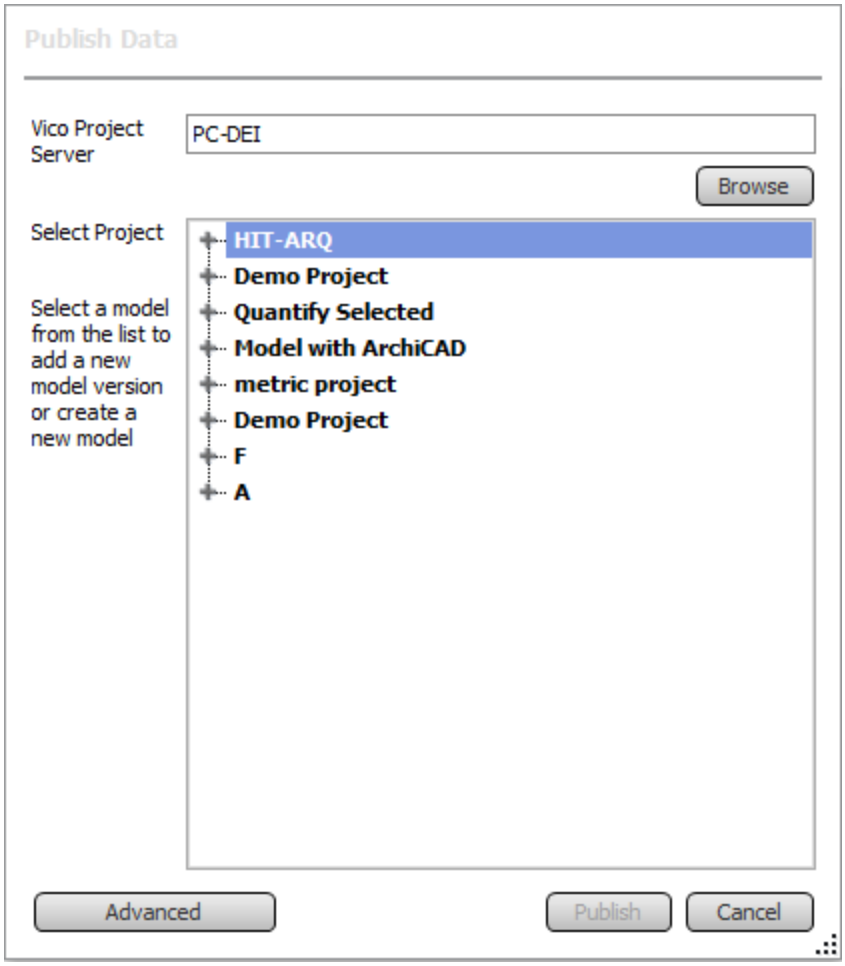
5. In the **Publish Data** dialog, browse to the **Vico Project Server** in your network to which your project information will be published.

   By default, this is set to the Vico Office database that is running on your computer. However, you can publish to a project that is stored in a database on another computer in the network.
6. In the **Select Project** list, expand the node to find your project. The **Project** list is sorted by project and then by existing models within each project.
7. To publish a new version of a previously published model, select the model. After it's published, the previous version is not replaced and a new version will appear in Vico Office's Model Manager.

–Or–

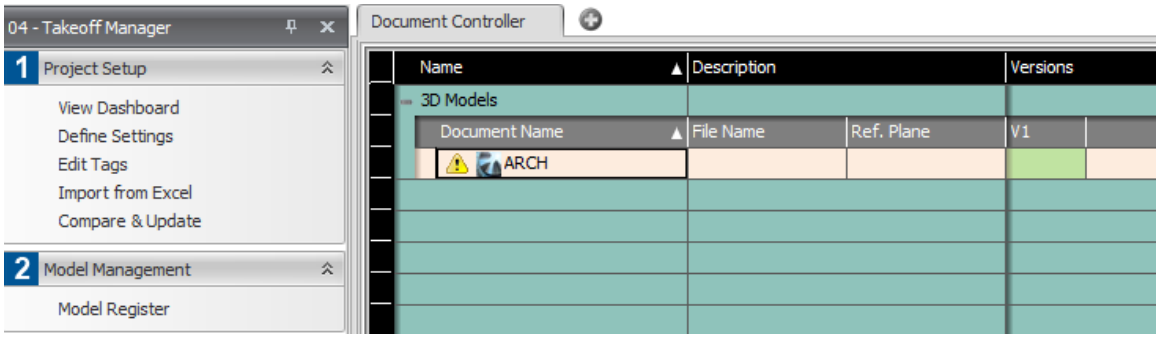
Click **Create New Model**. If this is the first model that will be published to Vico Office, only the **Create New Model** option is available.

Note: Models that were created in other supporting application are not displayed in the project list.



8. Optional - **Advanced**: By default, a default list of element types and standard parameters are published to Vico Office. If you wish to specify which elements and parameters you wish to publish to Vico Office, use the Advanced section of the publisher.
9. To begin the model publishing process, click **Publish**.

   Vico Office processes and stores the model information via the extraction of element geometry and properties. The Exporting Model Information progress bar indicates the publishing status and closes when the process is completed.
10. In Vico Office, activate the published model in the **Model Register** task or the **Document Control** task.



Note: The application icon in the **Document Name** cell shows which supporting application the model was created in.

Supported Parameters and CAD Quantities - ArchiCAD

CAD Quantities

The following CAD quantities from your ArchiCAD model are published to Vico:

Accessory

- Height
- Length
- Width

Beam

- Bottom surface area
- Conditional volume
- End surface area
- Height
- Hole Number
- Holes surface area
- Left side surface area
- Length left
- Length right
- Right side surface area
- Top surface area
- Total surface area of hole edges

- Total volume of holes
- Volume

Column

- Area
- Core Dimension 1
- Core Dimension 2
- Gross surface area of the core
- Gross Surface area of the core top and bottom
- Gross surface area of the veneer
- Gross Surface area of the veneer top and bottom
- Gross volume of the core
- Gross volume of the veneer
- Height
- Max height
- Min height
- Net surface area of the core bottom
- Net surface area of the core top
- Net surface area of the veneer bottom
- Net surface area of the veneer top
- Perimeter
- Surface area of the column core
- Surface area of the column veneer
- Volume of the column core
- Volume of the column veneer

Curtain Wall

- Height
- Length
- Slant angle
- Surface bordered by boundary frames
- Surface bordered by contour

- The number of panels belong to the Curtain Wall
- Thickness
- Total Length of Frames
- Total Panel Surface Area

Door

- Height
- Nominal W/D opening height on the reveal side
- Nominal W/D opening height on the side opposite to the reveal side
- Nominal W/D opening surface on the reveal side
- Nominal W/D opening surface on the side opposite to the reveal side
- Nominal W/D opening width on the reveal side
- Nominal W/D opening width on the side opposite to the reveal side
- Surface area
- Thickness
- W/D head height according to the vertical anchor
- W/D head height on the reveal side
- W/D head height on the side opposite to the reveal side
- W/D nominal head height
- W/D nominal sill height
- W/D Opening height on the reveal side
- W/D Opening height on the side opposite to the reveal side
- W/D Opening nominal surface area
- W/D Opening nominal volume
- W/D Opening surface on the reveal side
- W/D Opening surface on the side opposite to the reveal side
- W/D Opening volume
- W/D Opening width on the reveal side
- W/D Opening width on the side opposite to the reveal side
- W/D sill height according to the vertical anchor
- W/D sill height on the reveal side

- W/D sill height on the side opposite to the reveal side
- Width

Frame

- Category
- Depth
- Direction
- Length
- Material index
- Physical position
- Width

Junction

- Height
- Length
- Width

Lamp

- Surface Area
- Volume

Mesh

- Bottom surface area
- Edge Surface area
- Holes perimeter
- Holes Surface Area
- Perimeter
- Projected area
- Top surface area
- Volume

Morph

- Base height

- Elevation
- Height
- Net area
- Net area of the floor plan projection
- Number of the edges
- Number of the faces
- Number of the hidden edges
- Number of the nodes
- Number of the soft edges
- Number of the visible edges
- Perimeter of the floor plan projection
- Volume

Object

- Surface area
- Volume

Panel

- Gross perimeter of the frame
- Gross surface area
- Height
- Horizontal direction
- Material index of the edge
- Material index of the exterior surface area
- Material index of the interior surface area
- Net perimeter of the frame
- Net surface area
- Nominal panel height
- Nominal panel width
- Thickness
- Type of the panel
- Vertical direction

- Width

Roof

- Conditional bottom surface area
- Conditional top surface area
- Conditional volume
- Dome connection length
- Eaves lengths
- End Wall Connection Length
- Gross Surface area of the bottom
- Gross Surface area of the edges
- Gross Surface area of the top
- Gross volume
- Hips length
- Holes Perimeter
- Holes Surface Area
- Insulation skin thickness
- Length of Gable type edges
- Length of RTHollow type edges
- Net Surface Area of the Bottom
- Net Surface Area of the Edge
- Net Surface Area of the Top
- Number of holes in contour polygon
- Number of skylight
- Openings Surface Area
- Peaks length
- Perimeter
- Ridges Length
- Side Wall Connection Length
- Sum of the surfaces of the roof openings
- The area of the roof contour polygon

- Thickness
- Valleys length
- Volume

Shell

- Conditional area of the opposite surface area
- Conditional area of the reference surface area
- Conditional volume
- Gross Surface Area of the Edges
- Gross Surface Area of the Opposite to Reference Side (holes included)
- Gross Surface Area of the Reference Side (holes included)
- Gross volume of the shell (holes included)
- Insulation thickness of the shell
- Net area of the reference surface (without holes)
- Net area of the surface opposite to the reference (without holes)
- Perimeter of the contour polygon
- Projected floor plan area of the contour polygon
- Thickness
- Total area of the edges
- Total area of the holes
- Total area of the openings
- Total length of the connecting line with domes
- Total length of the connecting line with hollows
- Total length of the connecting line with side walls
- Total length of the connecting line with wall ends
- Total length of the eaves
- Total length of the gables
- Total length of the hips
- Total length of the peaks
- Total length of the ridges
- Total length of the valleys

- Total perimeter of the holes
- Total perimeter of the holes
- Volume of the shell

Skylight

- Header height
- Shell/Roof Opening height
- Shell/Roof Opening surface area
- Shell/Roof Opening volume
- Shell/Roof Opening width
- Sill height

Slab

- Bottom surface area
- Conditional Surface Area of the Bottom
- Conditional Surface Area of the Top
- Conditional volume
- Edge surface area
- Gross surface area of the slab bottom
- Gross surface area of the slab bottom with holes
- Gross surface area of the slab edges
- Gross surface area of the slab edges with holes
- Gross surface area of the slab top
- Gross surface area of the slab top with holes
- Gross volume of the slab
- Gross volume of the slab with holes
- Holes perimeter
- Holes surface area
- Perimeter
- Thickness
- Top surface area
- Volume

Wall

- Analytic surface of openings on the Inside Face
- Analytic surface of openings on the Outside Face
- Analytic volume of openings
- Area
- Combined width of doors
- Combined width of windows
- Conditional length on the Inside Face
- Conditional length on the Outside Face
- Conditional Surface Area on the Inside Face
- Conditional Surface Area on the Outside Face
- Conditional volume
- Conditional wall skin volume on the Inside Face
- Conditional wall skin volume on the Outside Face
- End Thickness of the Wall
- Gross surface on the Inside Face
- Gross surface on the Outside Face
- Gross volume
- Height
- Length
- Length at the center
- Length of the reference line
- Length on the Inside Face
- Length on the Outside Face
- Maximum height
- Maximum Height of the Wall Skin on the Inside Face
- Maximum height skin on the Outside Face
- Minimum height
- Minimum height skin on the Inside Face
- Minimum height skin on the Outside Face

- Number of columns
- Perimeter
- Surface area of the edge
- Surface of doors
- Surface of empty openings
- Surface of windows
- Surface on the Inside Face
- Surface on the Outside Face
- Thickness
- Volume
- Volume of columns
- Wall air skin thickness
- Wall insulation skin thickness
- Wall skin thickness on the Inside Face
- Wall skin thickness on the Outside Face
- Wall skin volume on the Inside Face
- Wall skin volume on the Outside Face

Window

- Height
- Nominal sill height
- Nominal W/D opening height on the reveal side
- Nominal W/D opening height on the side opposite to the reveal side
- Nominal W/D opening surface on the reveal side
- Nominal W/D opening surface on the side opposite to the reveal side
- Nominal W/D opening width on the reveal side
- Nominal W/D opening width on the side opposite to the reveal side
- Surface area
- Thickness
- W/D head height according to the vertical anchor
- W/D head height on the reveal side

- W/D head height on the side opposite to the reveal side
- W/D Nominal head height
- W/D Opening height on the reveal side
- W/D Opening height on the side opposite to the reveal side
- W/D Opening nominal surface area
- W/D Opening nominal volume
- W/D Opening surface on the reveal side
- W/D Opening surface on the side opposite to the reveal side
- W/D Opening volume
- W/D Opening width on the reveal side
- W/D Opening width on the side opposite to the reveal side
- W/D Sill height according to the vertical anchor
- W/D Sill height on the reveal side
- W/D Sill height on the side opposite to the reveal side
- Width

Zone

- Calculated area
- Calculated area
- Doors width
- Extracted column area
- Extracted fill area
- Extracted low area
- Extracted wall area
- Floor level
- Height
- Length of perimeter walls
- Net area
- Net perimeter
- Number of concave corners
- Number of the corners

- Perimeter
- Perimeter of holes
- Reduced area
- Sub-floor thickness
- Surface area of doors
- Surface area of perimeter walls
- Surface area of windows
- Total extracted area
- Volume
- Wall inset back side surface area
- Wall inset side surface area
- Wall inset top surface
- Windows width
- Zone area reducement

Using the Publish Data dialog to import or publish a model from ArchiCAD. it allows you to hide high polygon elements like bicycles, which do not serve any construction purposes, from the architectural model. The following elements can be published:

Supported Element Types

- Accessory
- Beam
- Column
- Corner Window
- Curtain Wall
- Door
- Frame
- Grid Element
- Junction
- Lamp
- Mesh
- Morph

- Object
- Panel
- Roof
- Shell
- Skylight
- Slab
- Stair
- Wall
- Wall End
- Window
- Zone

Note: All GDL parameters are listed under the Advanced section. All Parameters for Listing (GDL) are listed under the Primary section. All other GLD parameters are listed under the Secondary section. The ArchiCAD publisher also has an IFC section with IFC attributes and properties.

Publish from Bentley

Bentley-AECOsim Building Designer is a single building information modeling (BIM) software application for multi-discipline teams. It enables architects, structural, mechanical, and electrical engineers to design, analyze, construct, document, and visualize buildings of any size, form, and complexity.

Once you created a building information model in Bentley-AECOsim Building Designer you can easily publish it to Vico Office and use it during your Vico Office workflow.

Note: Publishing from Bentley is not supported in Vico R6.1.

Setting up Models

For easier and faster use later, break down the models by trades/systems or other smaller chunks. These trade models or 'system files' must originate from the 'base model'.

Example:

A system breakdown has the following structure:

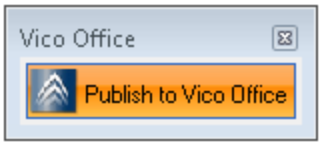
- **Substructure model:** Contains all the structural members that 'touch the earth' such as foundations, basement walls, slabs on grade, and pits.
- **Superstructure model:** Contains all the structural members excluding the ones that were modeled under 'Substructure'.
- **Exterior model:** Contains the shell of building such as exterior walls, roofing, and canopies. This is a single model that contains all levels of the project.

tectural context such as interior walls, ceilings, flooring, and lighting and plumbing fixtures.

- **MEP model:** Contains all the systems such as pipes, ducts, fitting and equipment, and air terminals.

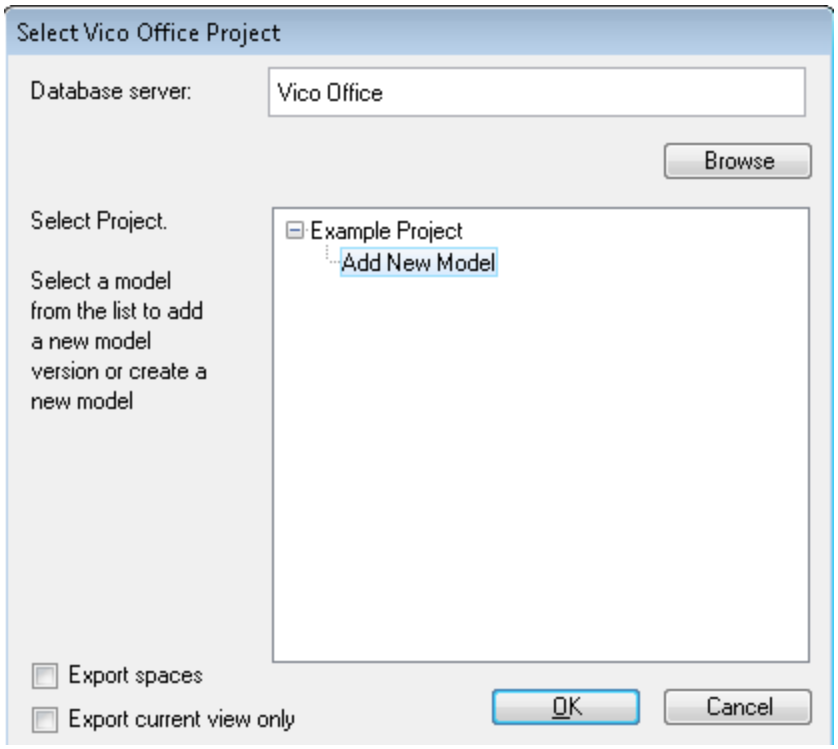
  Important: The modeling applications must be installed **before** Vico Office. During the Vico Office installation, you can then choose which publisher add-ons you wish to include.

  Once you installed Vico Office on your computer, a Vico Office window appears inside of Bentley with only one button, Publish to Vico Office.



To publish to Vico Office

1. Open the BIM file that was created in a Bentley version that is compatible with your current version of Vico Office.
2. Switch to the 3D view.
3. Click on the **Publish to Vico Office** button.



4. In the **Select Vico Office Project** dialog, browse to the **Database Server** in your network to which your project information will be published.

   By default, this is set to the Vico Office database that is running on your computer. However, you can publish to a project that is stored in a database on another computer in the network.

5. In the **Select Project** list, expand the node to find your project. The **Project** list is sorted by project and then by existing models within each project.

6. To publish a new version of a previously published model, select the model. After it's published, the previous version is not replaced and a new version will appear in Vico Office's Model Manager.

   –Or–

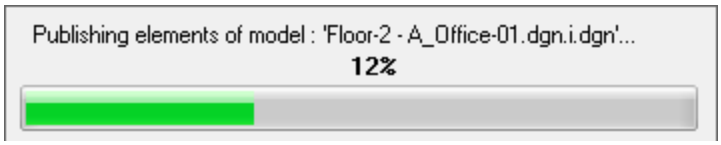
   Click **Create New Model**. If this is the first model that will be published to Vico Office, only the **Create New Model** option is available.

   Note: Models that were created in other supporting application are not displayed in the project list.

7. Optional: Select whether you wish to **Export spaces** and/or **Export current view only**.

8. To begin the model publishing process, click **OK**.

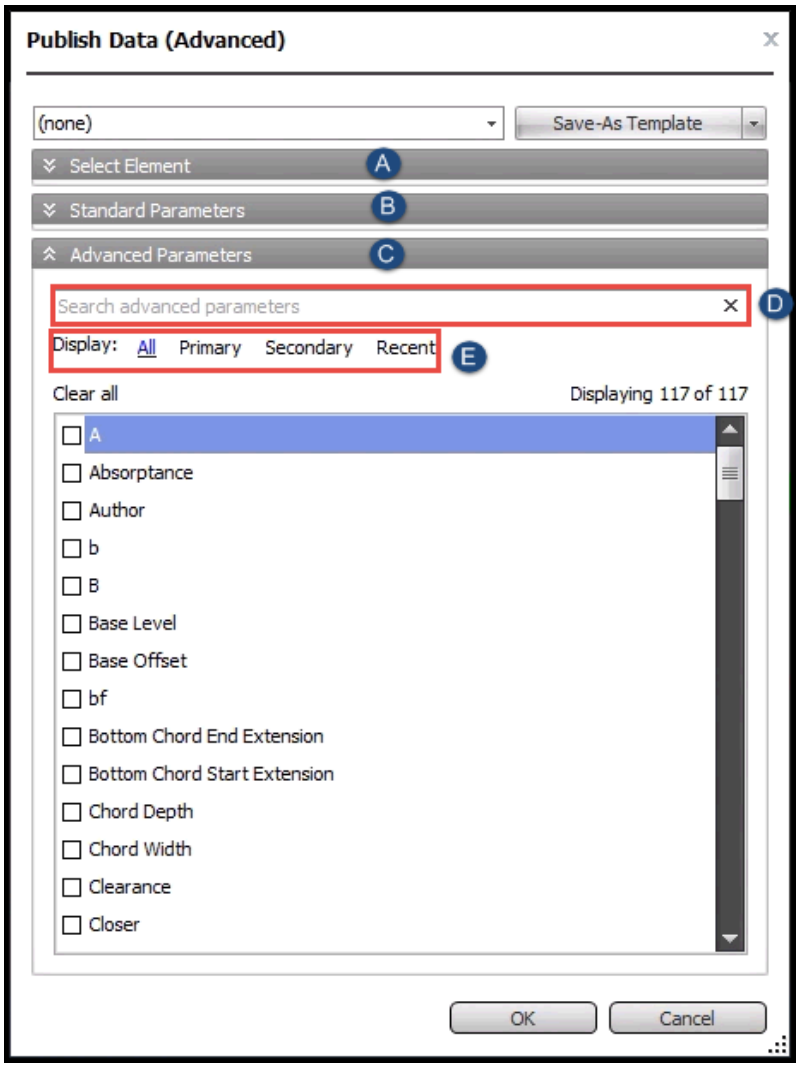
   Vico Office processes and stores the model information via the extraction of element geometry and properties. The Exporting Model Information progress bar indicates the publishing status and closes when the process is completed.



9. In Vico Office, activate the published model in the **Model Register** task or the **Document Control** task.

Publishing Data - Advanced Settings

On the Publish Data (Advanced) dialog box, choose which elements and parameters you wish to publish to Vico Office. Keep in mind that if you choose more elements and parameters to publish, it may have an impact on the publish duration. Therefore, it is highly recommended that you exclude elements that do not add any value to your project.



A - Element: All the elements are selected by default. Select which elements you wish to exclude by clearing their check box.

B - Standard Parameters: All standard parameters are selected by default. It is recommended that you include all the standard parameters.

C - Advanced Parameters: Parameters that are available in the current model, including user-defined parameters, are listed in this dialog box. They are grouped into four subgroups: All, Primary, Secondary, and Frequent. Unlike the Standard parameters, none of the advanced parameters are selected by default to be published.

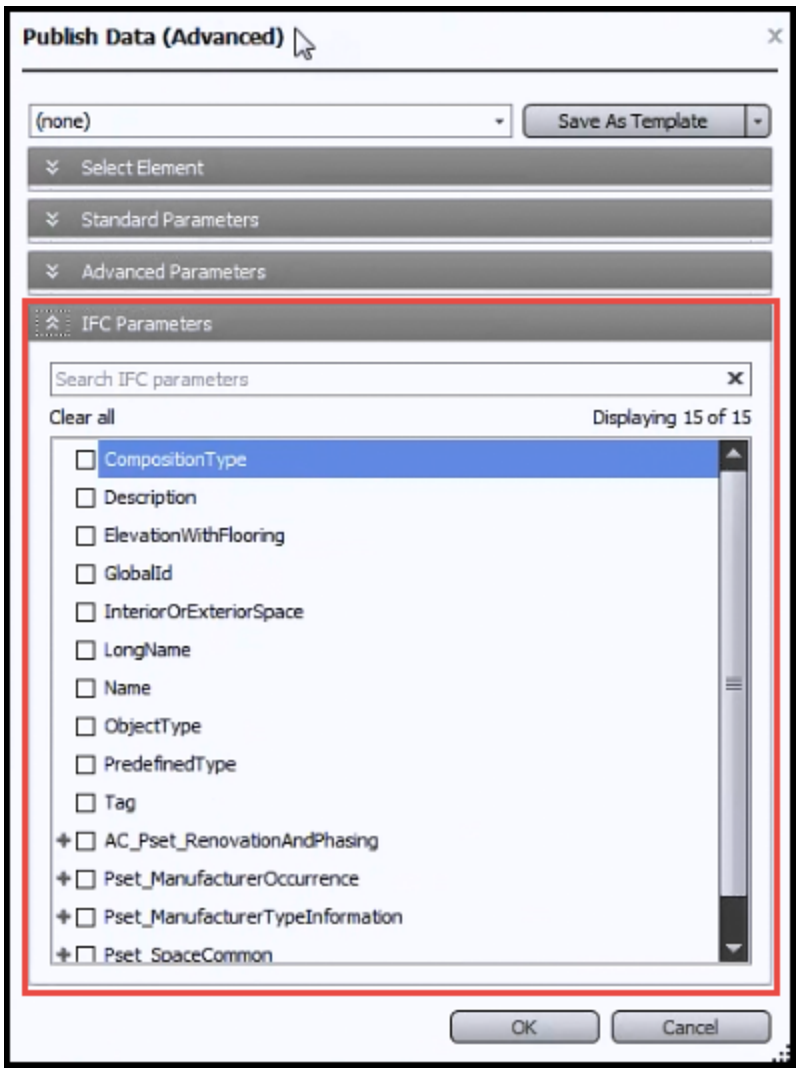
D - Use the Search box to quickly find the advanced parameters that you wish to include/exclude.

E - Click on a subgroup filter to display only the parameters from that group or click All to display all the parameters.

Note: When you select a subgroup filter and then enter a keyword in the Search field, the Search field will only search for a keyword within that subgroup.

IFC Parameters (Available for ArchiCAD only)

In ArchiCAD, you can also publish IFC attributes, IFC properties and IFC Classifications into Vico Office. The available parameters are all listed under the IFC Parameters section of the Publish Data Advanced dialog.



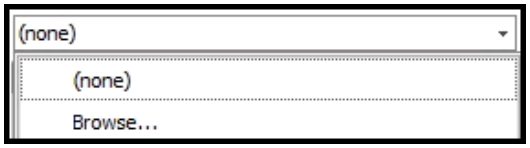
Templates

The Advanced dialog has a 'template' feature that saves the elements and parameters that were chosen to be published.

When viewing a template, if you change the settings (i.e., select/clear an element/parameter to be published), the template name and Save button color changes to red to indicate that the template has been modified.

To open an existing template

- Click Browse and search for the template.



Template name field

The template is imported to your local machine:

c:\Program Files\Vico Software\Vico Office (x64)\ParameterTemplates

If there is a name conflict, the imported template will be appended with a number: e.g., "Architectural Template (2)".

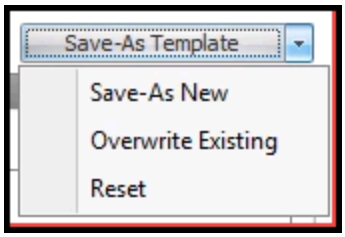
To save your selected settings

- In a new template: Enter a unique name in the Template name field and click **Save-As New**. The template is stored in your database. It is also stored in your local machine as an XML file:

  c:\Program Files\Vico Software\Vico Office (x64)\ParameterTemplates

  The XML template file on your local machine has the server name appended to the beginning of the template name.

- To an existing template: Click **Browse** to locate that template, and click **Overwrite Existing.**



Save action button

To delete a template

- Select the template to delete and click ✘.

To rename a template

- Select the template to edit and click . Enter the new name and press Enter.

Publishing a Model Version

You can update model-based project information in Vico Office by publishing a new version of a model that you previously published to Vico Office. When you publish the new version, the work that you performed with the model by reassigning elements to other takeoff items and manually overriding quantities is maintained.

To publish an updated model version

1. In your selected CAD application, select Publish to Vico from the Vico Office add-on menu.
2. In the Publish Data dialog, find and select the project to which you want to publish the updated model version.
3. Expand the project node to see the existing models that were published under that project.
4. Select the model to which you plan to update the quantities and geometry.

   When you publish a new model, unchanged model geometry is verified, and changes are processed and saved to the database.
5. After the publishing process is complete, you can then open the Model Register task to activate and update the model version.

   An notification icon indicates that a newer model version exists. By default the new model version indicator is shown as long as the newest version is not active. Note that the new model versions are sorted based on the original publishing order, from the oldest to the newest.

Integrating with Trimble Connect

Trimble Connect (TC) is a cloud-based collaboration application that enables you to share files with other supported applications and your team members. This is an easier way to update your in-progress models without the long procedure of publishing. Every time you use any of the supported applications to make changes in your model, you can upload it to the Trimble Connect server and download it directly to Vico Office. Trimble Connect uses Trimble Identity (TID) for the login credentials. This will allow you to use a single account across all Trimble products.

Supported Applications

- Tekla (export to .ifc)
- SketchUp 2014 (.skp)

If you don't have a Trimble Connect Account:

Create a Trimble ID account

1. On the Trimble Connect site, sign up for a Trimble ID account.
2. Activate your account by clicking the link in the activation email.

   If you do not see the activation email in your Inbox, check your spam or junk folder to ensure that the email was not filtered.
3. Create a project, and invite other people to join it.

Configure your access to the Trimble Connect site

1. Open the Define Settings task.
2. Type **'app.connect.trimble.com'** in the Trimble Connect Server URL field.

   This URL will access the projects in your region.
3. Choose the Trimble Connect region that you wish your projects connected to.

You are now set up to download models from Trimble Connect. When downloading models for the first time, you will be prompted to enter your Trimble ID credentials. Vico Office will save these credentials for future connections.

To reset your Trimble Connect password

1. On the Forgot your password page, enter the email address used to log in to Trimble Connect, and then follow the instructions in the "Reset your password" email.
2. Use that password as your new Trimble Connect password.

Download a Model from Trimble Connect

After configuring your Trimble Connect access, you can now easily download building models to Vico Office. When connecting to Trimble Connect for the first time, you will be prompted to enter your credentials.

To download a model from Trimble Connect

1. Open the Model Register task.
2. On the **Model Register** ribbon tab, click **Import Trimble Connect**.

   If this is the first time connecting to Trimble Connect you will be prompted to enter your credentials. On the Trimble Connect Login dialog box, enter your Trimble ID credentials.

   Note: If you do not have your credentials at the moment, optionally click one of the following to close the dialog box:

   - **Cancel Once**: You will be able to re-open this dialog box to reconnect to Trimble Connect.
   - **Cancel for Session**: You will be disabling the **Import Trimble Connect** button until you log back on to Vico Office.
3. Navigate between your documents, select the version of the file that you wish to import, and click **Import Selected Version**.
4. Select the model from the list to add the new model version. Only the models that were created with the same application are displayed. For example, if you are importing a SketchUp (.skp) model, only SketchUp models are displayed.

   –Or–

   Select **Add New Model** to create a new model.
5. Click **Import**.

   When you select an existing model, this model is not replaced with the new one. Instead, Vico Office assigns a version number to the imported model name before it is added to the Model Register.

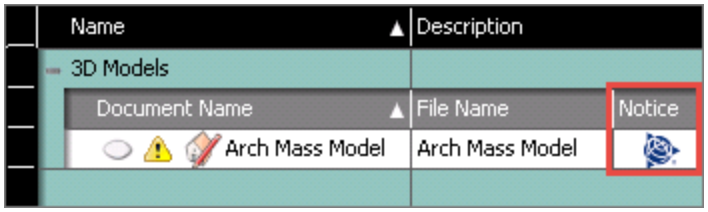
   Vico Office processes and stores the model information via the extraction of element geometry and properties. The Exporting Model Information progress bar indicates the publishing status and closes when the process is completed.
6. In Vico Office, you must activate the imported model in the **Model Register** or the **Document Control** task before it can be used.

Update a Model from Trimble Connect

Every time you upload a new version of your model onto Trimble Connect, Vico Office indicates the changes in the Document Register.

1. Open the Document Control or the Model Register task.
2. Right-click the model where the changes are indicated.

   The **Notice** column is populated if the file was updated in Trimble Connect.



3. Select the Go To Trimble Connect file option.

Document Control

Vico Office **Document Controller** helps project teams manage project documents and efficiently identify, interpret, and react to drawing changes in a collaborative environment.

The **Document Register** view provides one central place for all project models and drawing versions and an easy, yet powerful way to review the project document status, and communicate changes in document sets to the project team.

The Document Controller's powerful comparison tools help reduce project risk and improve productivity by quickly scanning and mapping changes in thousands of drawings, generating document-based RFIs and by providing easy-to-use visual comparison tools.

Document Controller provides a unified repository to store and track all your project inputs, including 2D PDF drawings, 3D BIM models, photos, spreadsheets and other project reports. The program supports a folder and versioning structure to group and classify your data according to the design releases coming from the project. On the left of the default screen is your Document Register, while the active viewset can be found on the right side of the screen. Palettes for view filtering, reference planes and element properties can be found on the right side of the screen and are available for docking when used regularly.

Key highlights:

- Files can be added and tracked within Document Controller, along with models from most authoring applications, including SketchUp.
- 2D drawings can be compared to other 2D drawings, including different versions of the same drawing or the same version of drawings from different sets or disciplines.
- 2D drawings can be mapped as reference planes for model checking and detailed takeoff.
- Issues found on 2D drawings or across 3D models can be clouded and marked up for tracking.
- Issues can be elevated to RFI or Constructability Issue status.

To open the Document Control task

1. Right-click the Workflow Panel header, and then click **Master Workflow** or **Document Controller**.
2. In the **Content Management** workflow group (**Master Workflow** module), or in the **Document Management** workflow group (**Document Controller** module), click **Document Control**.

   The default viewset includes the Document Register view and the 3D view.

Adding Folders and Subfolders

Vico supports an n-tiered folder structure, so you can create a structure that is as deep as needed. In the Document Register view, you can create a folder structure to organize your project documents.

New folders are created at the second hierarchy level. The project is the first hierarchy level.

Name	Description	
01 - Drawing	2D Drawings	
01 - STRUC	Structural Drawings	
Floor Plans	Floor Plans	
Document Name	File Name	Ref. Plane
S2.01_Page 1.pdf	S2.01.pdf	First Floor Plan;
S2.02_Page 1.pdf	S2.02.pdf	Level 2;
S2.03_Page 1.pdf	S2.03.pdf	Level 3;
S2.04_Page 1.pdf	S2.04.pdf	Level 4;
02 - ARCH	Architectural Drawings	
01 - Floor Plans	Floor Plans	
02 - Notes	Notes	
03 - Elevations	Elevations	
03 - MECH	Mechanical Drawings	
01 - Floor Plans	Floor Plans	
02 - Notes	Elevations	
03 - Elevations	Elevations	

To add a folder or subfolder

1. Open the Document Control task.
2. Do one of the following:
   - To create a folder, click **New Folder** on the ribbon.
   - To create a subfolder, select the desired parent folder, and then click **New Subfolder** on the ribbon.

   Tip: You can also right-click a folder to open the context menu.
3. In the **Folder Name** field, type the folder name.
4. In the **Folder Description** field, type a description for the folder.
5. Click **Create**.

Adding Versions and Files

Versions can be added to Document Controller to group releases of drawings or other documents.

When you add a version, you can create an empty version or select the files or folder that you wish to add. Create empty versions for the project all at once before populating them with drawings, or create the versions individually and populate them with drawings as you go.

Adding drawings into Document Controller fully imports their content into Vico Office. Changing or updating content in the source drawing folder does not update the content in Vico. You must re-import drawings into Vico to update their contents in Vico.

To add new version of 2D Drawings

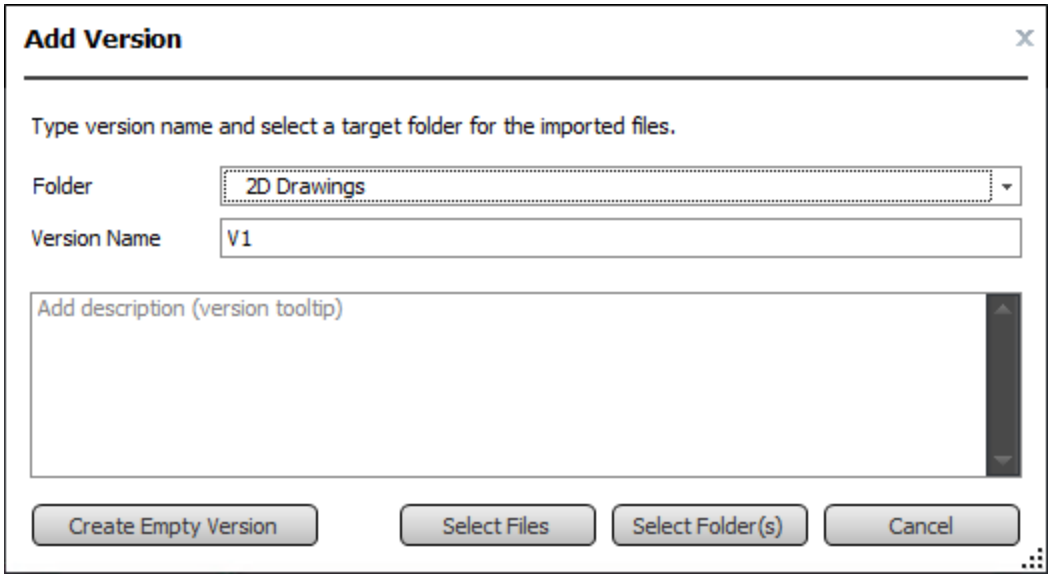
1. Open the Document Control task.
2. Click a previously created parent folder.
3. On the **Document Control** ribbon tab, click **Add Version**.

   –Or–

   Right-click in the view, and then click **Add Version**.

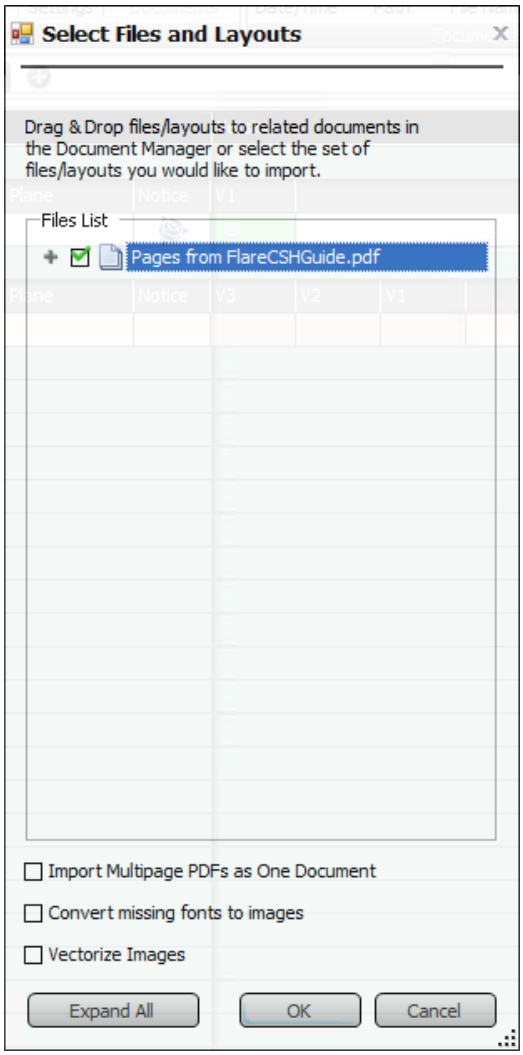
   The **Add Version** dialog box is displayed.
4. In the **Version Name** field, type the name.

   Note that the parent folder is auto-selected in the **Folder** list. To change where the version is stored, select a different folder from the list.



5. Click one of the following:
   - Create Empty Version: Choose this to create an empty version for the project before populating them with drawings.
   - Select Files: Selects individual files from a folder.
   - Select Folder(s): Select the folder(s) to add.
6. Browse to the drawings on your computer.
7. Click **OK**.

   The **Select Files and Layout** dialog box is displayed.



8. Optionally select the following options:
   - **Import Multipage PDFs as One Document:** Select if you wish to import multiple PDF pages into a single document.

- **Convert missing fonts to images**: When fonts are not correctly displayed when viewing PDF files or when printing to PDF, select this check box and re-import your file.
- **Vectorize Images:** Recommended for large PDFs as they may not fit in your computer's graphic memory. If you encounter issues where your PDF cannot be viewed, or when your PDF cannot be aligned and scaled, you may wish to vectorize your document.

9. Click **OK**.

   You can continue to use Vico Office while it is importing the files.

To add a new Document

1. Open the Document Control task.
2. Click a previously created subfolder.
3. On the ribbon, click **New Document**.
4. In the **Document Name** cell, type the name.

   Note that all version cells are gray indicating this document that is not part of a version.

To add Files

1. Open the Document Control task.
2. Navigate to the previously created parent.
3. On the ribbon, click **Add Files**.
4. In the **Folder** drop-down, select a subfolder.
5. In the **Version Name** field, type the name.
6. Click **Select Files**.
7. Browse to the drawing set on your computer.
8. Select the files, and then click **Open**.

   The **Select Files and Layout** dialog box is displayed.

   Note: If you are importing files with many images, it may take significant time to convert those images to geometry. To improve performance, clear the 'Convert images to geometry' check box so that these images are not converted.

9. Click **OK**.

d

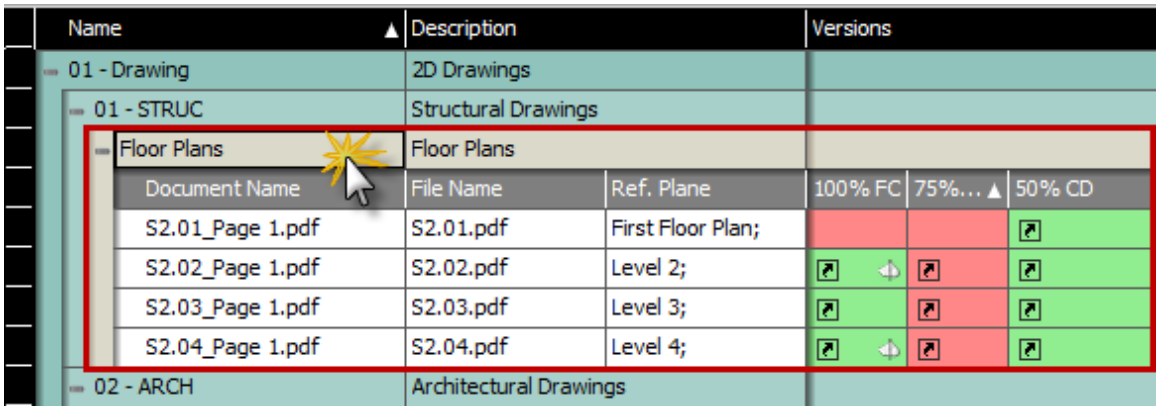
Editing and Deleting Content

You can rename documents or delete content such as folders, subfolders, and drawings in the **Document Register** view at any time.

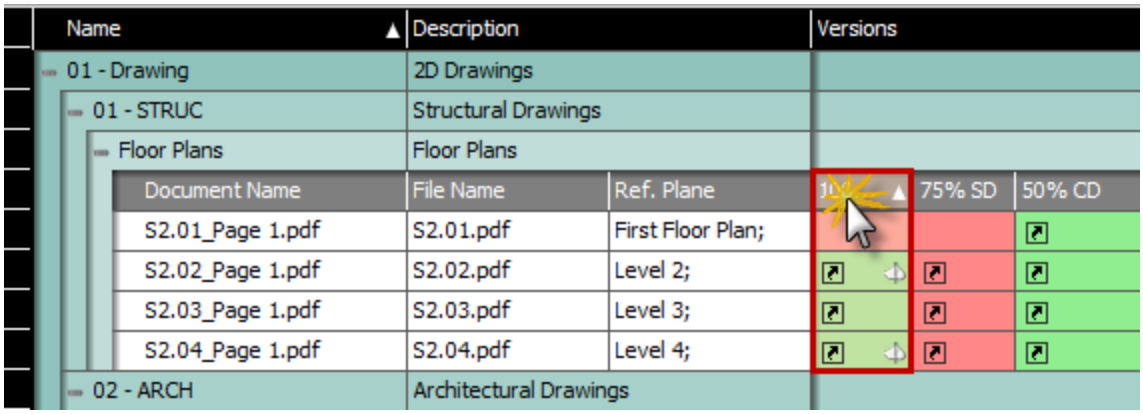
Note: If you import a document with incorrect font, simply delete and re-import it.

Important: Deleting content from the **Document Register** view permanently deletes the data and cannot be undone.

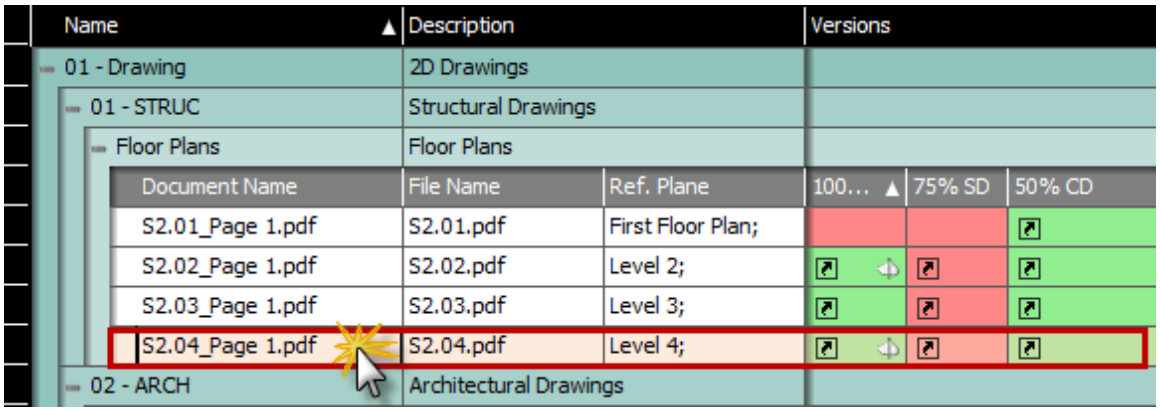
- If you select a folder, all documents in that folder are deleted.



- If you select a row header, all the pages associated with that version are deleted.



- If you select a row, all the versions associated with that document are deleted.



To delete content

1. Open the Document Control task.
2. Select one or more folders, subfolders, or documents to be deleted.
3. On the **Document Control** ribbon tab, click **Delete Selected**.

   –Or–

   Right-click the item, and then click **Delete**.

Viewing a Document

To view a document

1. Open the Document Control task.
2. In the **Document Register** view, click the document, and then click **View Document** on the **Document Control** ribbon.

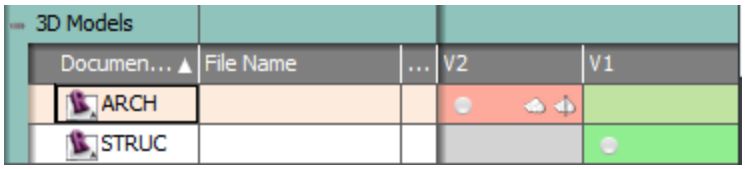
   –Or–

   Right-click the document, and then click **View**.

   The document opens in a new viewset.

Note: You can also drag a document into the **3D View**.

- To view the most current version, drag the row into the active viewset.
- To view an older version, drag a specific version cell into the active viewset.



Analyzing 2D Drawings

In Document Controller, you can store and review 2D PDF drawing releases by version. As new versions are added, you can see which sheets have been added, changed, or removed and which ones remain the same.

Then compare versions on a sheet-by-sheet basis or in groups of sheets using the **Slider**, **Highlight**, and **Overlay** modes.

To compare 2D drawings

1. Open the Document Control task.
2. On the **Document Control** ribbon tab, select the desired mode.

   For more information on the modes, see:

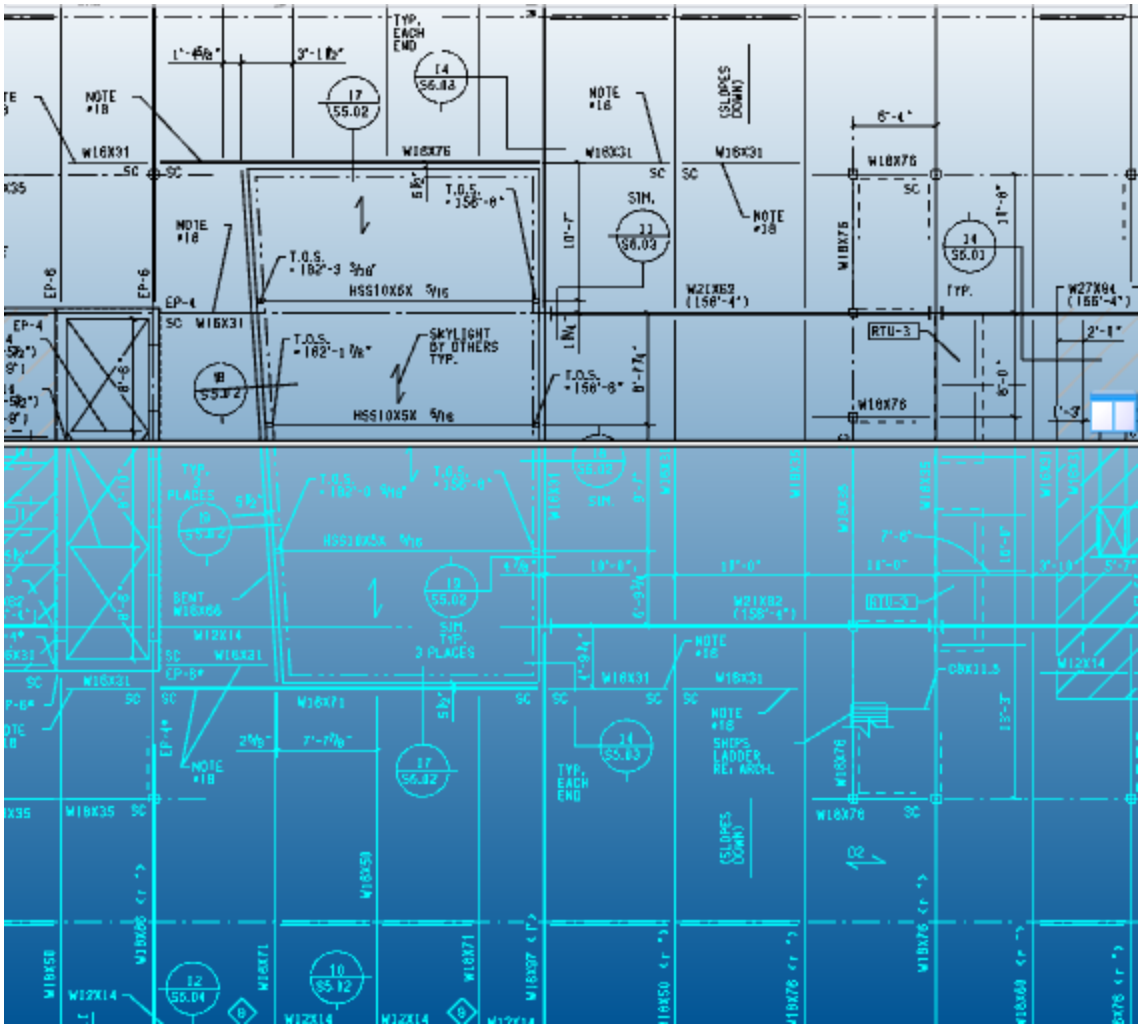
   - "2D Slider Mode " on the next page
   - "2D Highlight Mode " on page 206
   - "2D Overlay mode " on page 209
3. In the Document Register view, press the **Ctrl** key as you click the drawings that you want to compare.
4. On the ribbon, click **Compare Documents**.

   –Or–

   Right-click the drawings, and then click one of the following:

   - **Compare:** The drawings appear in the active viewset.
   - **Compare in New Viewset:** The drawings appear in a new viewset. The active viewset remains available, so you can return to it.

The drawings appear in the 3D View.

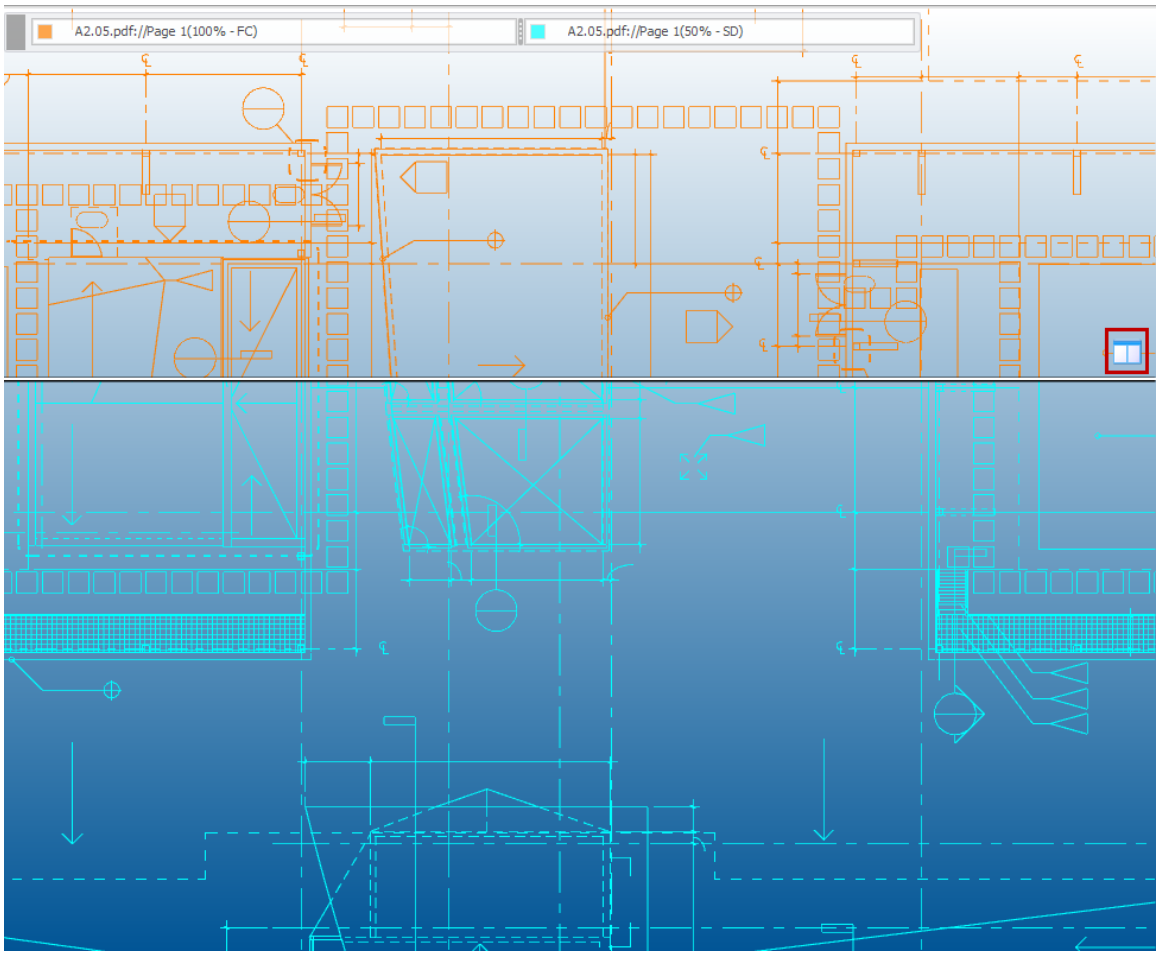


2D Slider Mode

The **Slider Mode** is the default option for comparisons.

- In this mode, a 'slider bar' is placed over the two drawing sets. As the slider bar is moved across the drawings, the applicable content is revealed.
- The slider bar is vertical by default and can be moved left and right for analyzing changes.

  Tip: To change the slider bar to a horizontal position, click the toggle button.
- The boxes at the top left of the active viewing window indicate which drawings and versions are being compared. To change the default color of a drawing, click in the left side of the box, and then select a color in the **Color** dialog.



2D Highlight Mode

The **Highlight** mode quickly identifies elements that have been changed. The selected drawings are placed on top of each other, and items that are new, deleted, modified, or unchanged can be indicated by the color and transparency settings.

The default settings of the **Highlight** mode shows deleted items in red and new elements in green. You can choose the color that represents each condition and the translucency to be applied to each one.

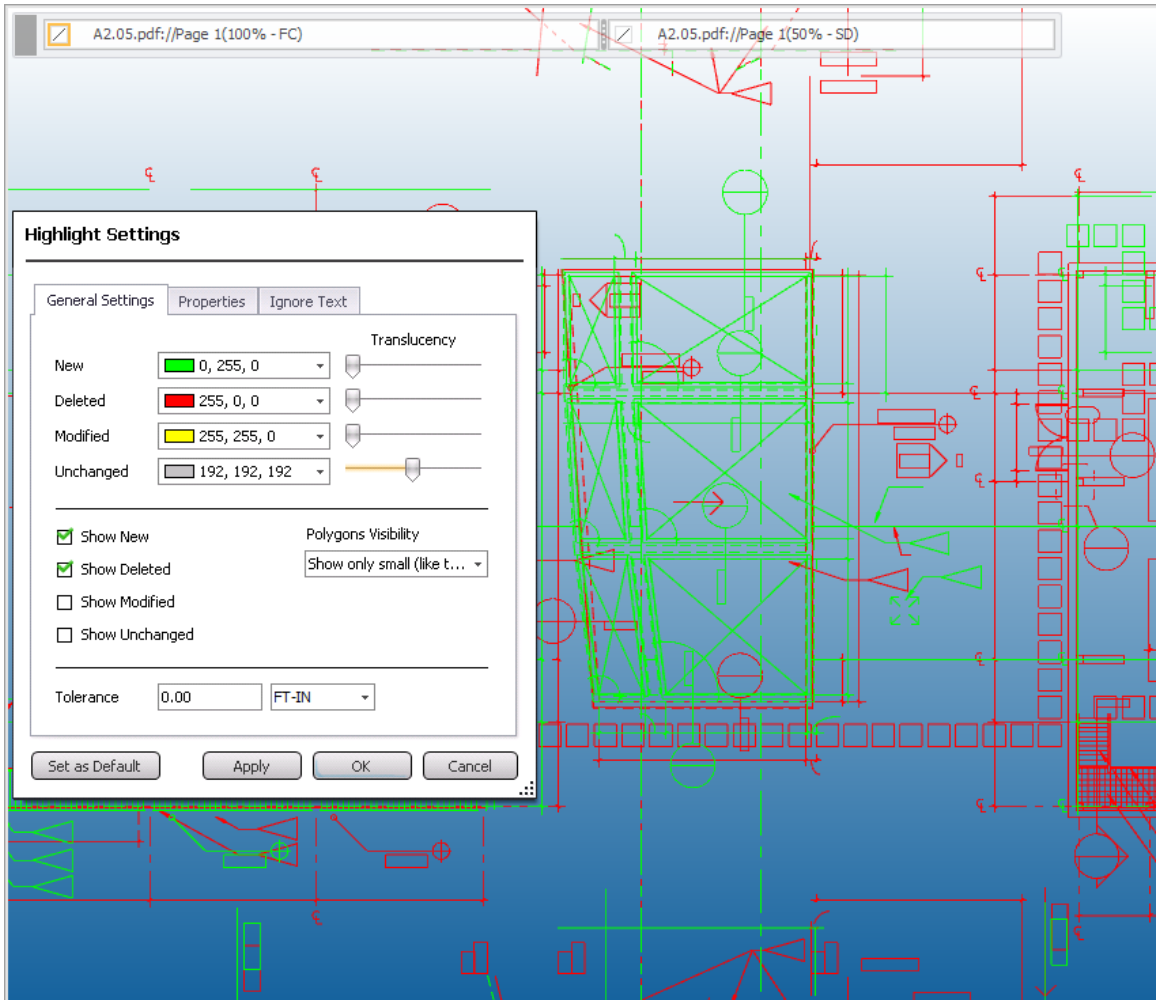
To change the settings

1. On the ribbon, click **Highlight Settings**.
2. On the **General Settings** tab, select which conditions, such as new or deleted elements, are visible or hidden in the viewing area by selecting or clearing the corresponding check box.
3. To hide or view polygons, select an option from the **Polygons Visibility** list.

Note: In some PDFs, the text is presented as polygons instead of text characters. To view this type of text, select **Show only small (like text)**.

4. To set how precise the analysis is based on the geometric position, use the **Tolerance** indicator.
5. On the **Properties** tab, select which properties, such as line color or text size, are included in or excluded from the comparison by selecting or clearing the corresponding check box.
6. To omit specific text strings from the change analysis, enter them on the **Ignore Text** tab.

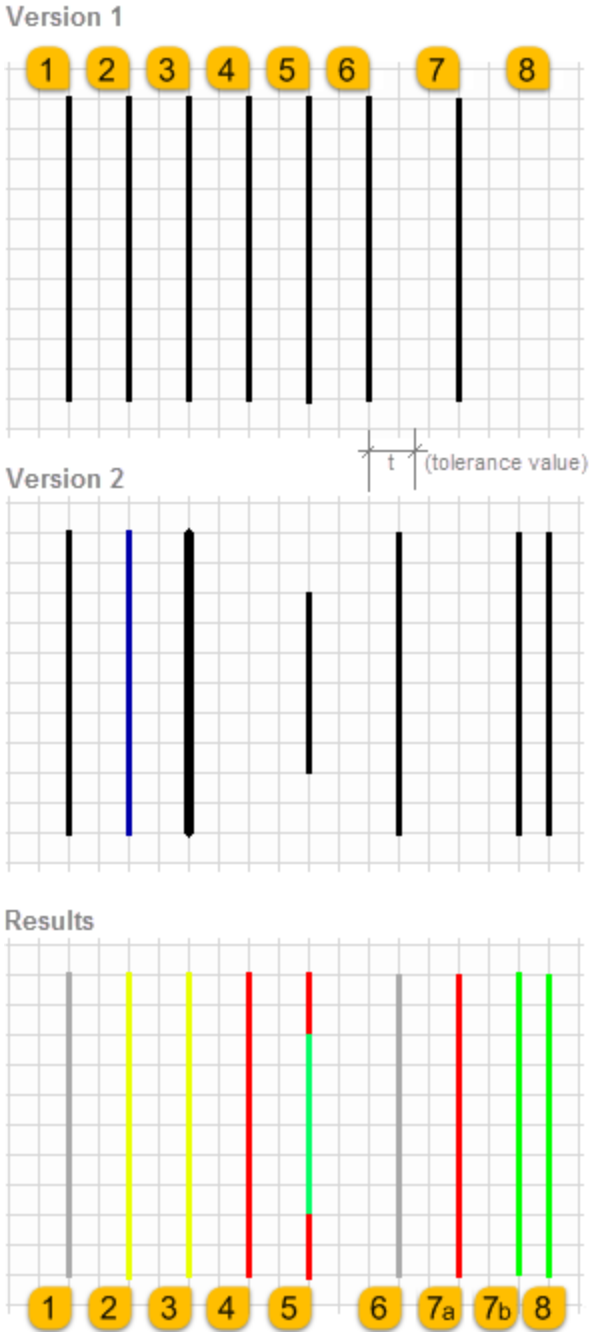
For more information on interpreting the results, see "How the Highlight Mode Works" below.



How the Highlight Mode Works

The **Highlight** mode shows what has changed, what was deleted, and what is unchanged between document versions. The results are based on the settings, including the tolerance value, in the **Highlight Settings** dialog.

EXAMPLE



The line colors indicate the results of the comparison:

1. Unchanged
2. Modified
3. Modified

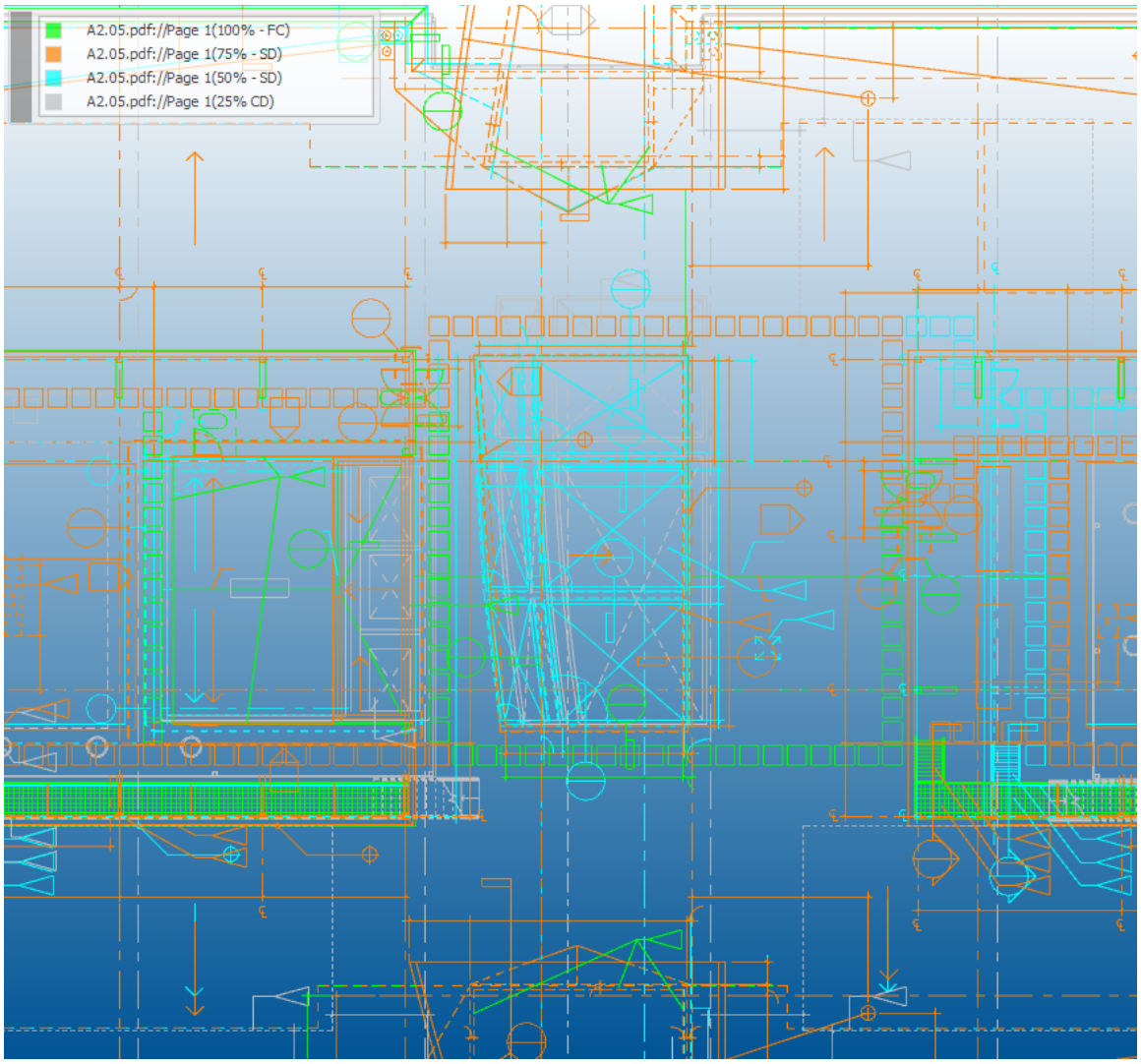
4. Deleted
5. New and deleted
6. Unchanged (The change for line 6 is within the set tolerance.)
7. a. Deleted (The change for line 7 is not within the set tolerance, so the original line is considered to be deleted.)

   b. New (The change for line 7 is not within the set tolerance, so this line is considered to be new.)
8. New (This line was added.)

2D Overlay mode

In the **Overlay** mode, all versions of a document are placed in a stack, so they can be reviewed at the same time.

- The box at the top of the screen indicates which versions are included in the comparison.
- To differentiate between versions, you can assign a color to each one. To assign a color, click the square to the left of the version in the box, and then select a color in the **Color** dialog.
- To remove a version, point to the version in the box, and then click the red x beside it.
- To access more options, such as resetting a color or adding a document, right-click the box.



Analyzing 3D Models

Document Controller can be used to view, store, and compare 3D models from ArchiCad, Revit, SketchUp, Tekla and Bentley authoring applications. It also has the ability to import DWG and IFC formats coming from many different authoring applications. The tool can be used as a standalone viewer of models but in addition, Document Controller has change management and 4D/5D capabilities integrated into it. Document Controller has the ability to support multiple model releases to evaluate the design as it evolves. Models can be viewed one at a time or in groups to display all project content.

In Document Controller, quickly analyze changes in your 3D models to see how the design has evolved from release to release. Changes, additions, deletions and unmodified content can be color-coded to

quickly reveal updates in the model using the **Highlight** mode. You can also use the **Slider Mode** to move geometric faces around while viewing old and new content on either side of the slider.

To compare 3D models

1. Open the Document Control task.
2. On the **Document Control** ribbon tab, select the desired mode.

   For more information on the modes, see:

   - "3D Slider Mode " on the next page
   - "3D Highlight Mode " on page 213
3. In the **Document Register** view, press the **Ctrl** key as you click the models that you want to compare.

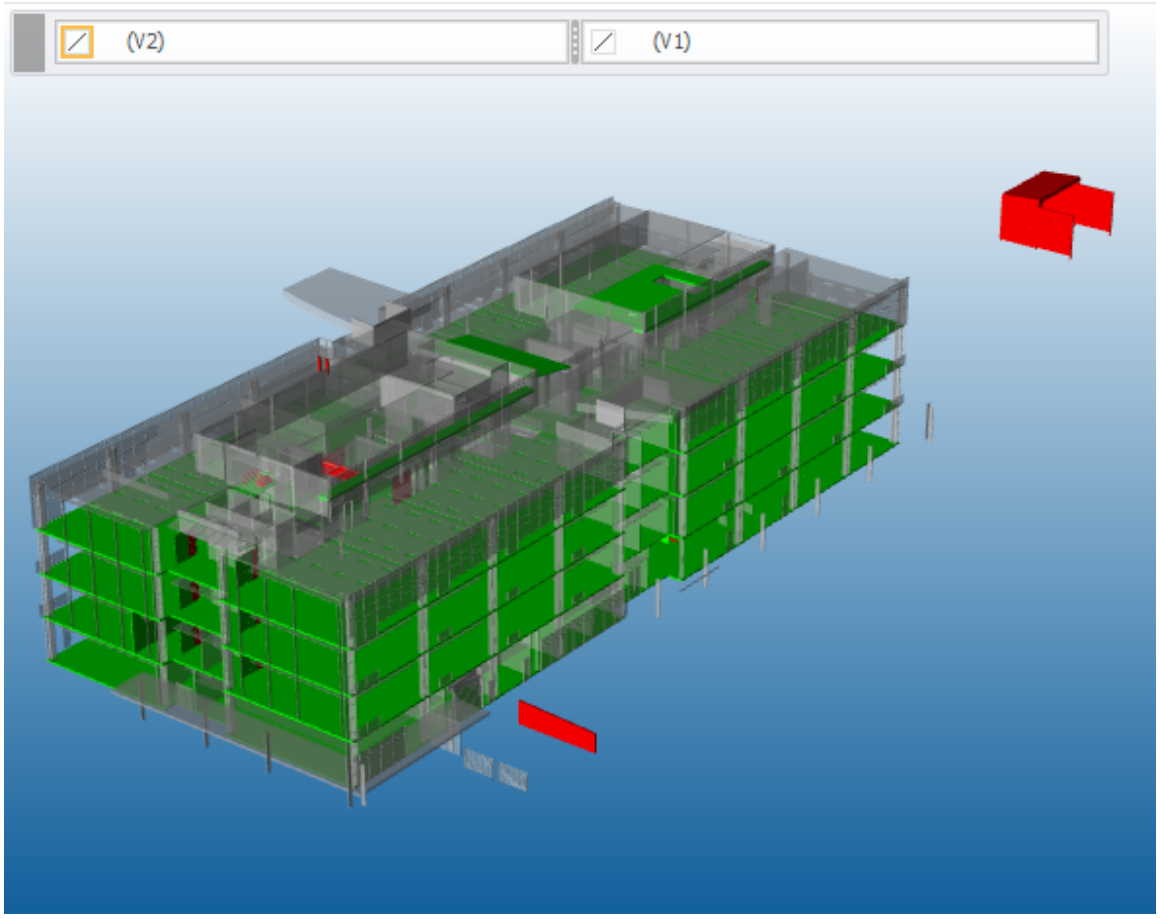
   Tip: The sequence in which you select the versions is important when you want to highlight new, deleted, changed, or unchanged elements. In most cases, you will want to select the latest version first and then the earlier version before clicking **Compare Documents**.
4. On the ribbon, click **Compare Documents**.

   –Or–

   Right-click the models, and then click one of the following:

   - **Compare:** The documents appear in the active viewset.
   - **Compare in New Viewset:** The documents appear in a new viewset. The active viewset remains available, so you can return to it.

The drawings appear in the 3D View.



3D Slider Mode

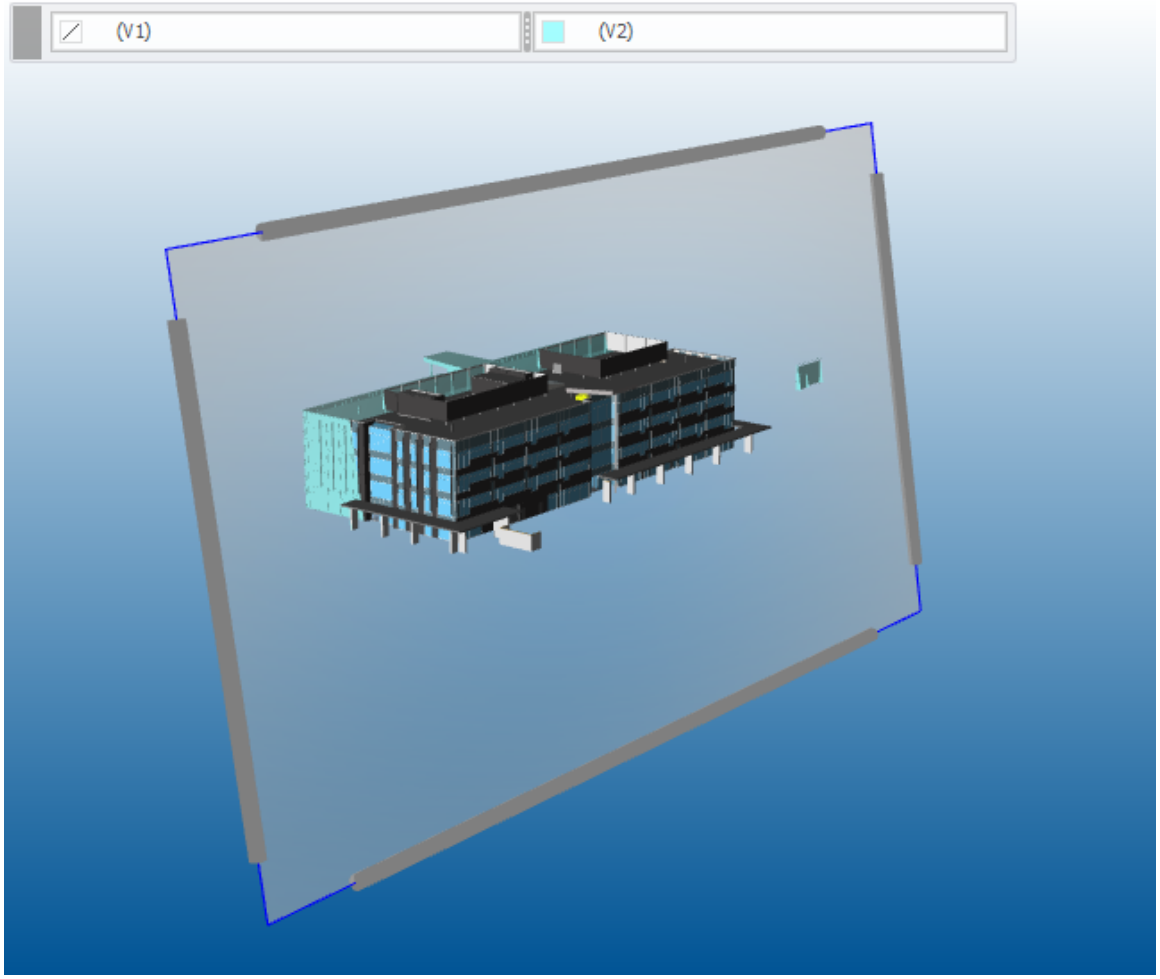
The **Slider Mode** is the default option for model comparisons. In this mode, a 'slider pane' transitions across the two model versions, revealing the applicable content as it is moved across the versions.

The slider pane can be moved in five different directions to reveal changes.

- Click and drag the center of the slider pane to move the entire pane across the models.
- Click any of the sides, indicated with a thick gray bar to move only that end of the slider pane.

Tip: To reveal more precise changes between the model versions, use a combination of full and side movements.

The box at the top of the active viewing window indicates which models and versions are being compared. To change the color of a version, click the square to its left, and then select a color from the **Color** dialog.



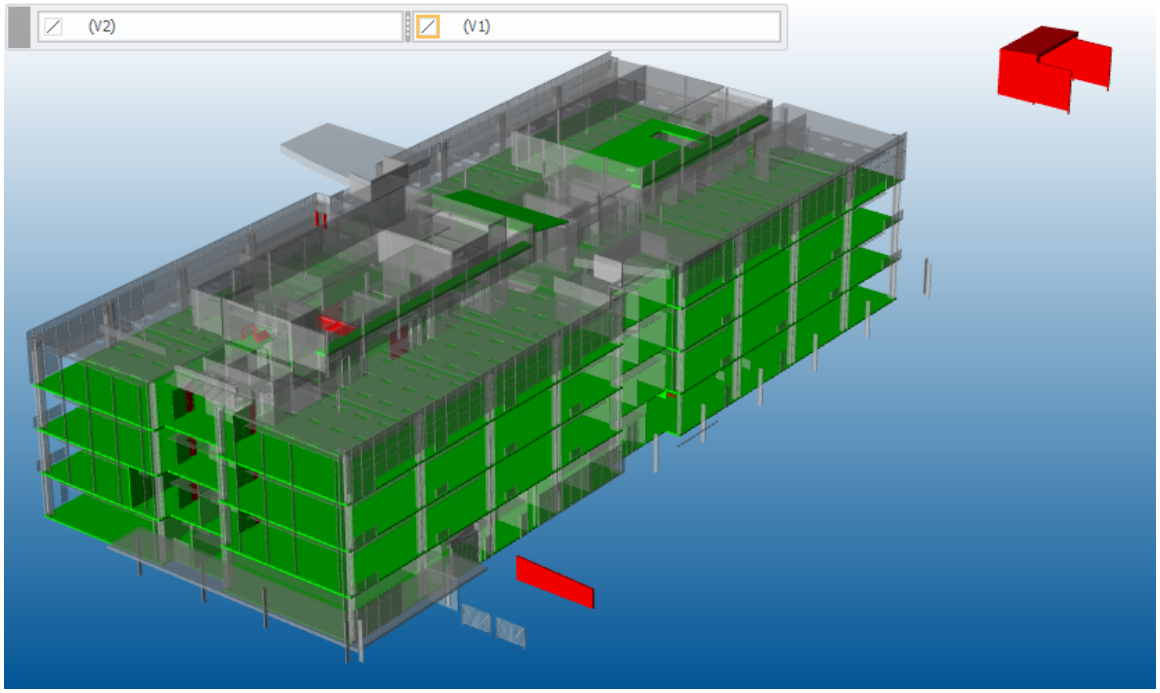
3D Highlight Mode

Use the **Highlight** mode to quickly identify elements that have been changed. This mode places the selected models together in the active view and can show which items are new, deleted, modified or unchanged using color and transparency settings.

The default settings show deleted elements in red and new elements in green. To change the default settings, click **Highlight Settings** on the ribbon.

- Select the color and translucency setting for each condition on the **General Settings** tab.
- To show or hide a condition, select or clear the corresponding check box on the **General Settings** tab.
- To set how precise the analysis is based on the geometric position, adjust the **Tolerance** indicator on the **General Settings** tab.

- To select which properties, such as line color or text size, are included or excluded from the comparison, select or clear the corresponding check box on the **Properties** tab.
- To omit specific text strings from the change analysis, enter them on the **Ignore Text** tab.

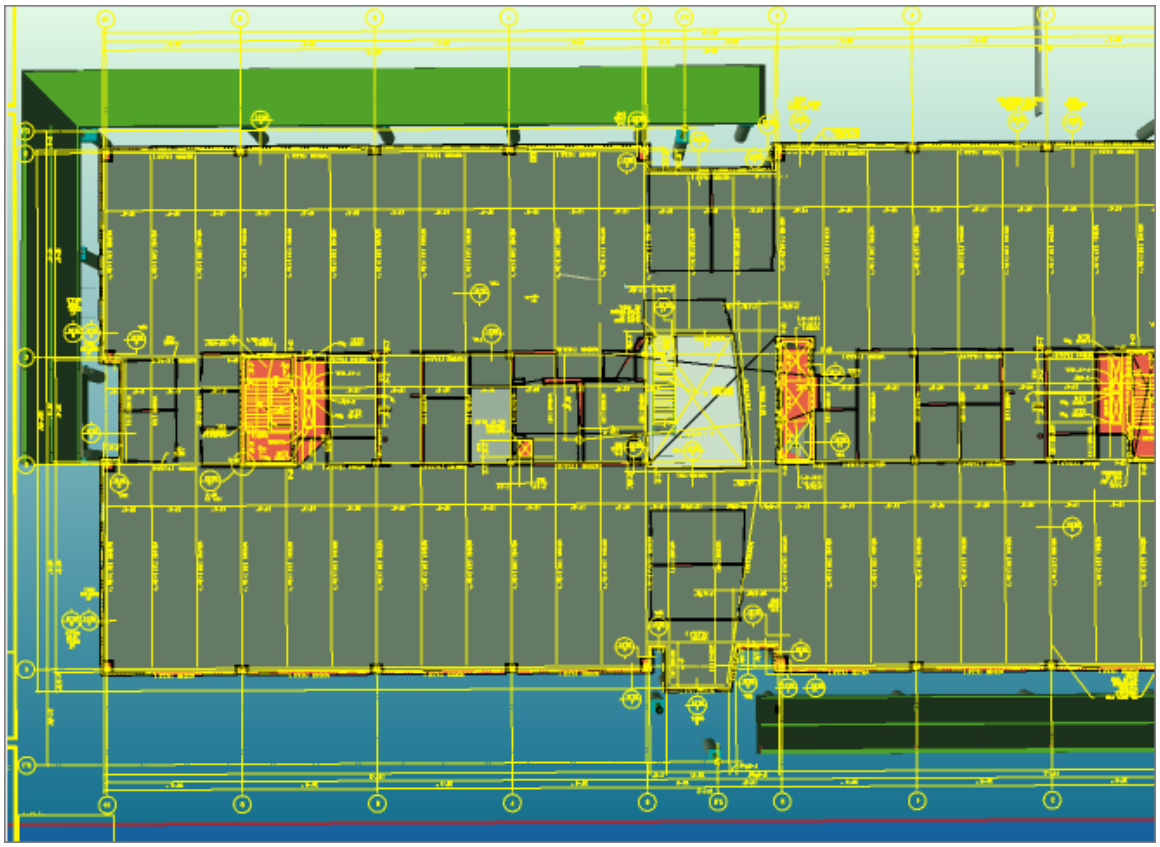


Reference Planes & Hybrid View

Reference planes are geometric faces that can be used for sectioning models and mapping 2D documents. Documents are mapped to reference planes to create a 2D/3D hybrid environment, where the BIM model can be checked against the 2D contract documents.

The general workflow for setting up a hybrid view:

1. Create a reference plane (horizontal, vertical, free, or LBS-based) on a specific section of the BIM model.
2. Map the 2D drawing to the reference plane.
3. Scale the 2D drawing to match the model view.
4. Align the drawing and the model, so you can analyze and compare the two sets of data.



Reference Planes Palette

The **Reference Plane** palette contains the controls for creating and manipulating reference planes. You can create reference planes, display or hide planes, map drawings, align and scale drawings, and use the plane as a section boundary against the model.

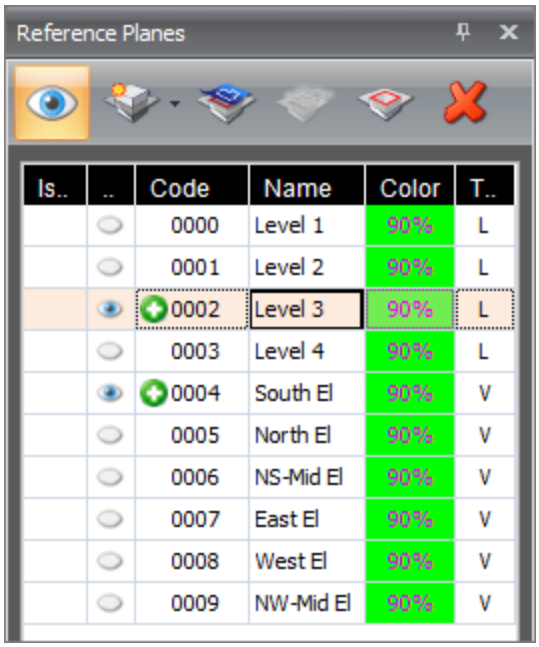
To open the Reference Planes palette

1. Along the right edge of the screen, click **Reference Planes**.

   Note: If the **Reference Planes** palette is not visible, click the palettes icon on the right side of the screen, and then click **Reference Planes**.

2. To dock the palette to the active viewset, click the pin icon in the upper-right corner of the palette.

Commands



Command	Description
Display Reference Planes	Reveal or conceal the reference planes in your project.
Create New Reference Plane	Create a new reference plane in your project • **Horizontal plane:** Lays flat along the X,Y axis. • **Vertical plane:** Aligned up and down, along the Z axis. • **Free plane:** Aligned in any angle or direction, based upon model points selected. • **LBS plane:** Sets a reference plane at each floor split from your LBS structure.

Command	Description
Map Document	Select any document or document version from the register list and map it onto the selected reference plane. Map documents to a reference plane, after aligning and scaling it, to validate the 3D content against 2D drawings.
Align & Scale	Move and resize 2D documents to match the 3D model after they are mapped onto a reference plane.
Section Box	Cut the 3D model where the reference plane is located.
Delete Selected	Delete the selected reference plane or remove a document that has been mapped to a plane.

Columns

Column	Description
IsLatestRevision	A circle indicates the latest revision.
Visibility	An eye icon indicates element is visible.
Code	Used to sort the reference planes listed in the palette.
Name	The name of the reference plane.
Color	The color that identifies the reference plane.

Column	Description
Type	The type of reference plane.

Context Menu

To access additional quick commands for the selected plane, right-click a reference plane in the palette.

Command	Description
Align & Scale	Shift and resize the 2D document according to points located on the 3D model.
Flip Document	Invert the orientation of the document on the selected reference plane.
Move Document	Shift the 2D document on the reference plane surface to align with points on the model.
Section Box	Activate model sectioning according to the reference plane location (see description above).
Use Latest Document Version	Ensure that the most recent release of a document is applied to the reference plane after the first document is mapped to the plane.
Show Selected	Toggle on and off the display of the reference plane or document that is selected.
Hide Selected	Turn of the display of the selected reference plane or document that is selected.
Remove	Permanently delete the reference plane and/or document that is mapped to it. This cannot be undone.

Horizontal Reference Planes

Horizontal reference planes are flat surfaces that lay on the X, Y axis of the model. They often run parallel to floor slabs.

To create a horizontal reference plane

1. Open the Document Control task.
2. Click the **Document Controller, 3D and Issues** viewset tab.
3. On the **3D View** ribbon tab, click **New Ref. plane** > **Horizontal Plane**.

   –Or–

   On the Reference Planes palette, click the **Create New Reference Plane** button > **Horizontal**.
4. In the **New Reference Plane** dialog, enter the following information:
   - **Code:** Used for sorting the plane list.
   - **Name:** Often correlates with something intuitive (for example, "First Floor Plan") about the project.
   - **Elevation:** Indicates where along the Z axis the reference plane should be positioned. Type the elevation, or click **From Model** to define the elevation value directly from the model.

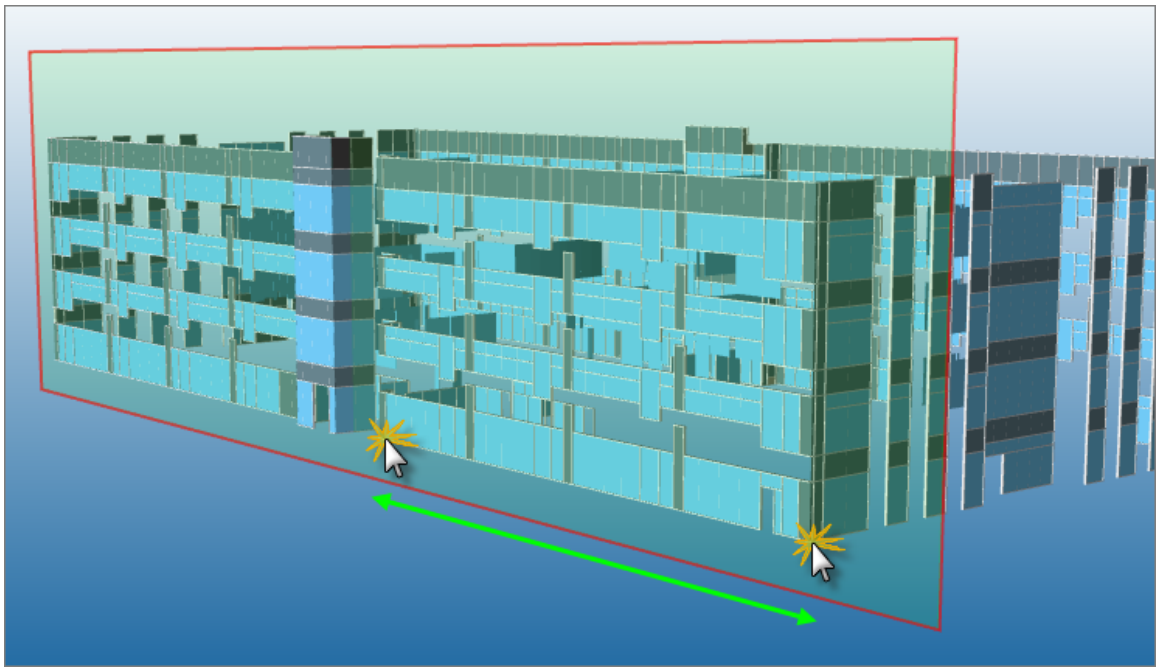
     HINT: It is often easiest to define the elevation of new reference planes by filtering out the 3D content that is not applicable or helpful to creating the reference plane. Use the **Filtering** palette to select the most pertinent elements, such as slabs, before clicking **From Model**, and it will be easier to create the plane. Also, turn on project O-snaps (from the 3D navigation toolbar) to precisely select end points from the model.
5. Click **OK**.

Vertical Reference Planes

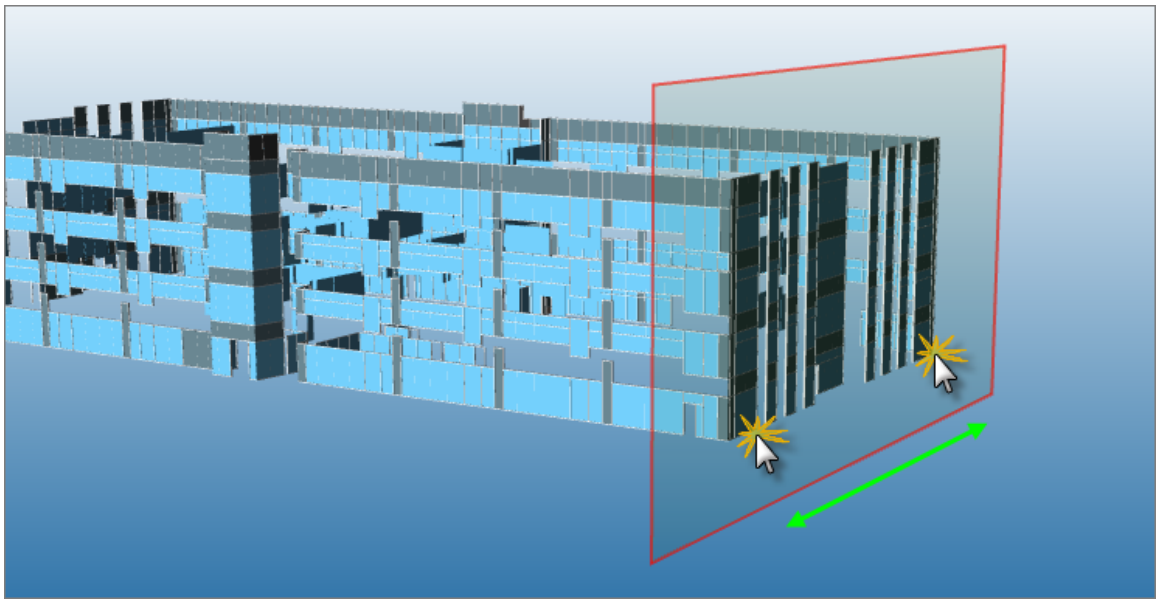
Vertical reference planes are flat surfaces that run up and down along the Z axis of a model. They often run parallel with walls.

Vertical Reference Plane Examples

This vertical reference plane is located on the north face of the building, spanning the east to west direction. It was created by selecting two points along the north face of the building.



This vertical reference plane is located on the east face of the building, spanning the north to south direction. It was created by selecting two points along the east face of the building.



To create a vertical reference plane

1. Open the Document Control task.
2. Click the **Document Controller, 3D and Issues** viewset tab.
3. On the **3D View** ribbon tab, click **New Ref. plane** > **Vertical Plane**.

   –Or–

   On the Reference Planes palette, click the **Create New Reference Plane** button > **Vertical**.
4. In the **New Vertical Reference Plane** dialog, enter the information for the two points to clarify if the plane should run in the X direction, the Y direction, or diagonally.

   The selected points create a vertical reference plane that is actually in the horizontal plane of the model when clicking.

   Tip: It is often easiest to define a vertical reference plane by filtering out the 3D content that is not applicable or helpful to creating the reference plane. Use the **Filtering** palette to select the most pertinent elements, such as slabs or walls, to make vertical reference plane creation easier. Also, turn on project O-snaps (from the 3D navigation toolbar) to precisely select end points from the model.
5. Click **OK**.

Free Reference Planes

Free reference planes are flat surfaces that can run in any direction. They can be aligned in any angle or direction based on the selected model points.

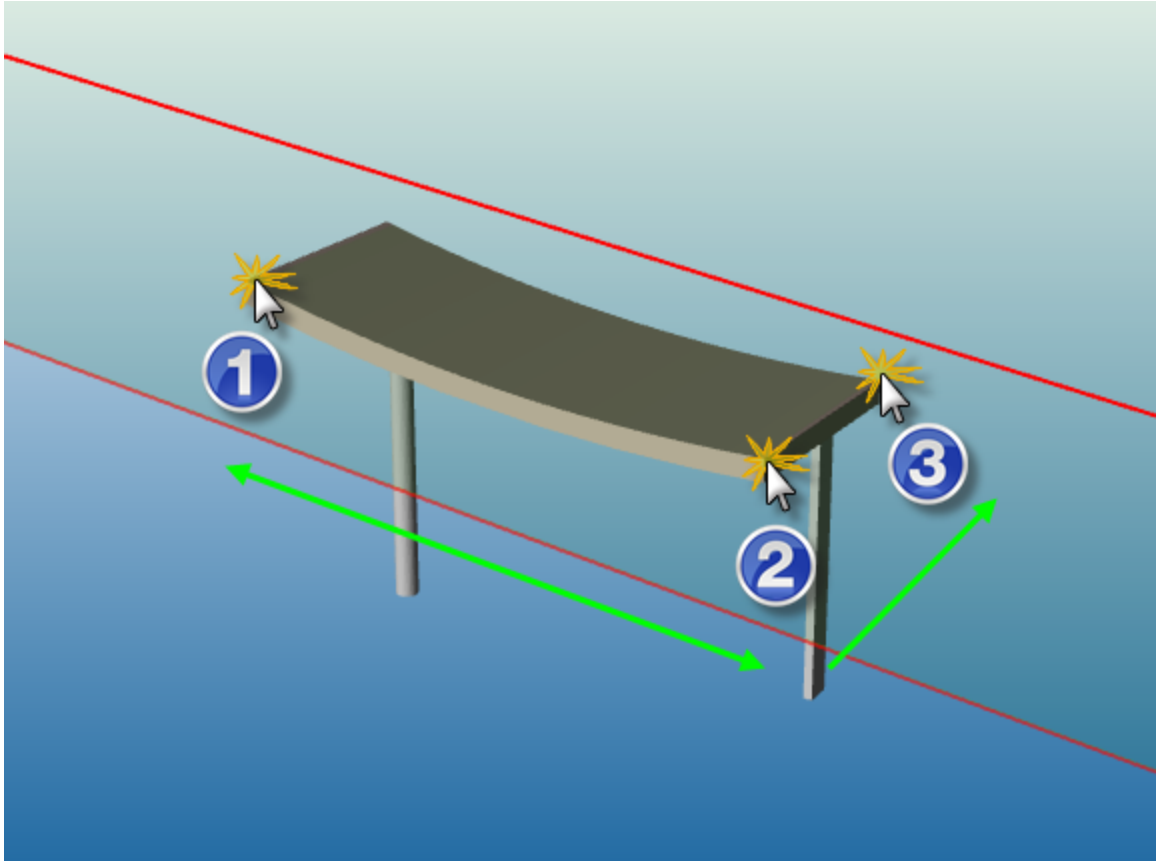
To create a free reference plane

1. Open the Document Control task.
2. Click the **Document Controller, 3D and Issues** tab.
3. On the **3D View** ribbon tab, click **New Ref. plane** > **Free Plane**.

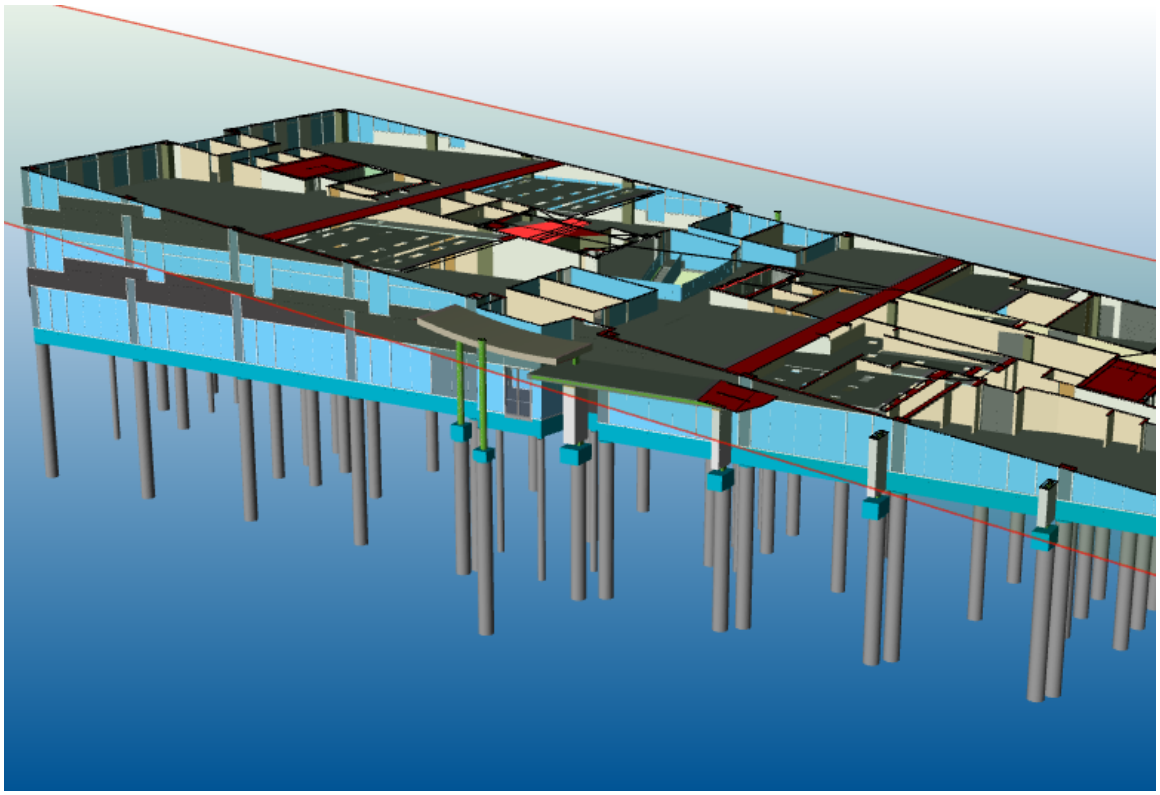
   –Or–

   On the Reference Planes palette, click the **Create New Reference Plane** button > **Free**.
4. In the **New Reference Plane** dialog, enter the information for the three points.

   The first two points determine the major direction of the reference plane, and the third point defines the minor direction.



5. Click **OK**.



A free reference plane created along the sloped entry roof, sectioning off the upper part of the building.

LBS Reference Planes

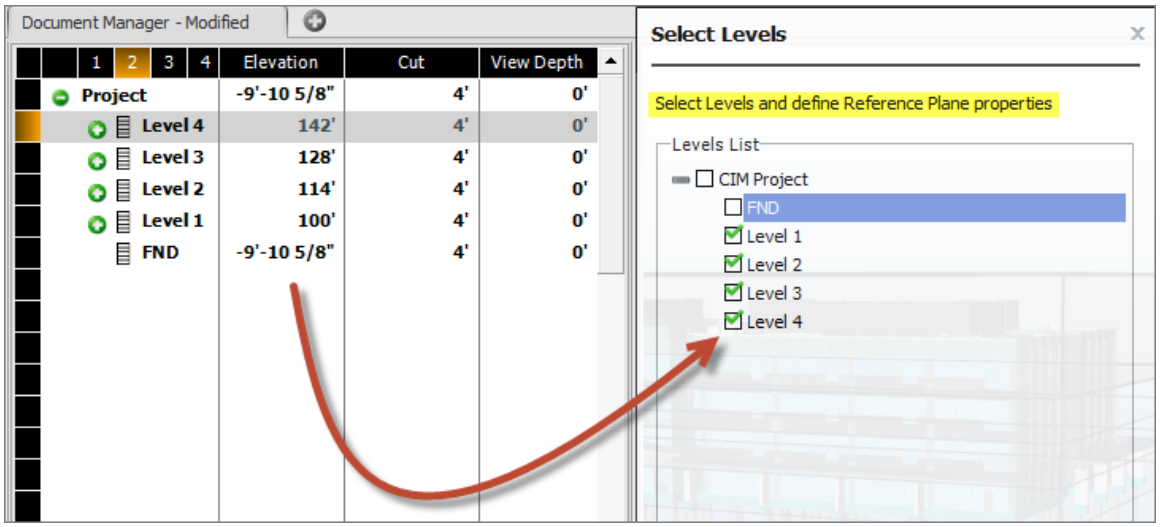
A location breakdown structure system (LBS) reference plane is a fast and efficient way to generate references places that are applicable to most project floor plan documents. You can select the horizontal floor locations from the LBS tree where the reference planes are located. Optionally, offset the reference plane in a positive or negative direction from the exact elevation that is given for the floor elevation.

To create an LBS reference plane

1. Open the Document Control task.
2. Click the **Document Controller, 3D and Issues** tab.
3. On the **3D View** ribbon tab, click **New Ref. plane** > **LBS Level Plane**.

   –Or–

   On the Reference Planes palette, click the **Create New Reference Plane** button > **LBS**.
4. In the **Select Levels** dialog, select the levels.



A reference plane is set at each floor split from the preconfigured LBS.

5. Click **OK**.

HINT: Use this option multiple times for a series of reference planes created above or below a given floor level.

Example:

You use the command three times to create planes that are 2', 4' and 6' above each floor level to validate different millwork drawings. To further organize the list, you use intuitive coding (HP-01-02, HP-01-04, HP-01-06, and so on).

..	..	Code	Name	Color	T..
		0000	Level 1	90%	L
		0001	Level 2	90%	L
		0002	Level 3	90%	L
		0003	Level 4	90%	L

Mapping Documents

After reference planes are created, you can can map 2D drawings to the reference plane, so the 3D model can be validated. This is an important step because 2D drawings are often the contract documents, but the model is used for estimating and scheduling.

To map a document to a reference plane

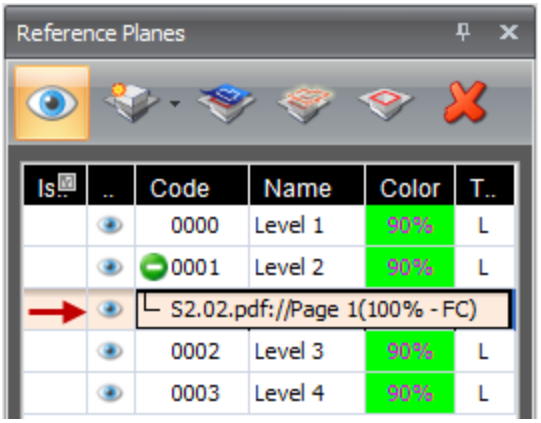
1. Open the Document Control task.
2. Click the **Document Controller, 3D and Issues** tab.
3. In the **3D View**, click the reference plane.
4. On the **3D View** ribbon tab, click **Map Document**.

   –Or–

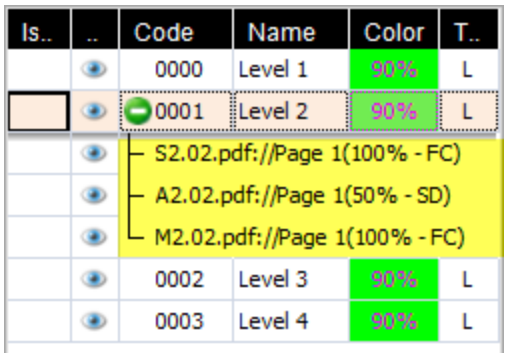
   On the Reference Planes palette, click the **Map Document** button .
5. In the **Select Document** dialog, select the document.

   Note: You can also select the document version from the **Document Version** list at the bottom of the dialog.
6. Click **OK**.

   The drawing appears in one of the corners of the reference plane and is ready for aligning and scaling. The mapped drawing also appears in the **Reference Plane** palette under the selected plane.



Note that several documents and versions can be mapped to a single reference plane to account for the many disciplines that are commonly associated with construction documents.



Aligning and Scaling

Most construction documents are created to scale and therefore it is necessary to align and scale their position according to the BIM model. By default drawings come in at their scaled size, often around 36"x48" and must match the building footprint, which can be significantly larger.

Align and Scale Tips

- Select points in a unique area or shape, such as a notch in the slab edge, in the document. Selecting unique places of the drawing will make it easier to validate the location on the BIM because of the rare geometry.
- To reduce misalignments, select a first and second point that are far from each other, preferably two corners of the building.
- To select very precise points on the drawing, use the Zoom Window tool .
- For increased selection accuracy, turn on O-snaps.

To align and scale a document

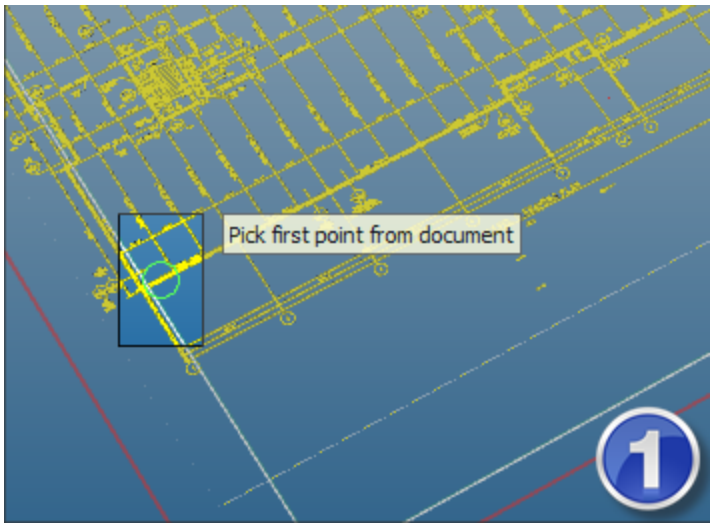
1. Open the Document Control task.
2. Click the **Document Controller, 3D and Issues** tab.
3. Click in the **3D View**.
4. On the Reference Planes palette, right-click the document, and then click **Align & Scale**.

   –Or–

   On the **Reference Planes** palette, select the document, and then click **Align & Scale** on the **3D View** ribbon tab.

   A copy of the image is placed in the lower-left corner of the reference plane. If you cannot see the image, right-click the document in the palette, and then click **Define Scale**. Enter a larger size until you can see the image in the reference plane.

5. On the drawing, select the first point that will match up with the model.

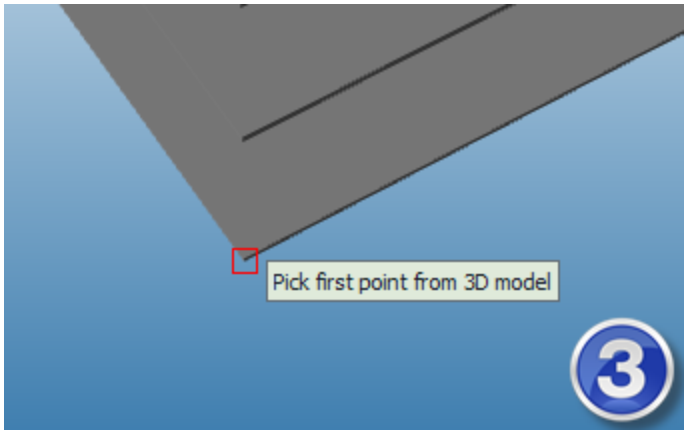


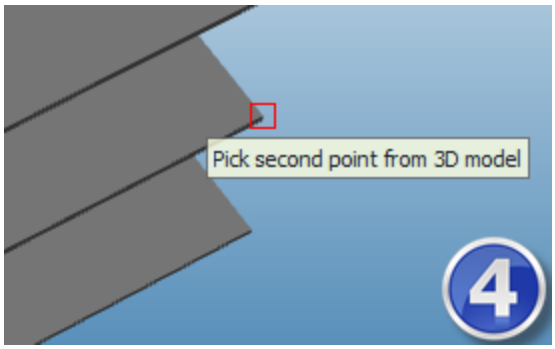
6. Press the space bar to Zoom Extents and reuse the Zoom Window function to locate a precise location for second point selection.
7. On the drawing, select the second point that will match up with the model.

You are prompted to select points on the model that match the drawings. Make sure that the first model selection point matches the first point selected on the drawing and that the second point selected on the model matches the second point selected on the drawing.

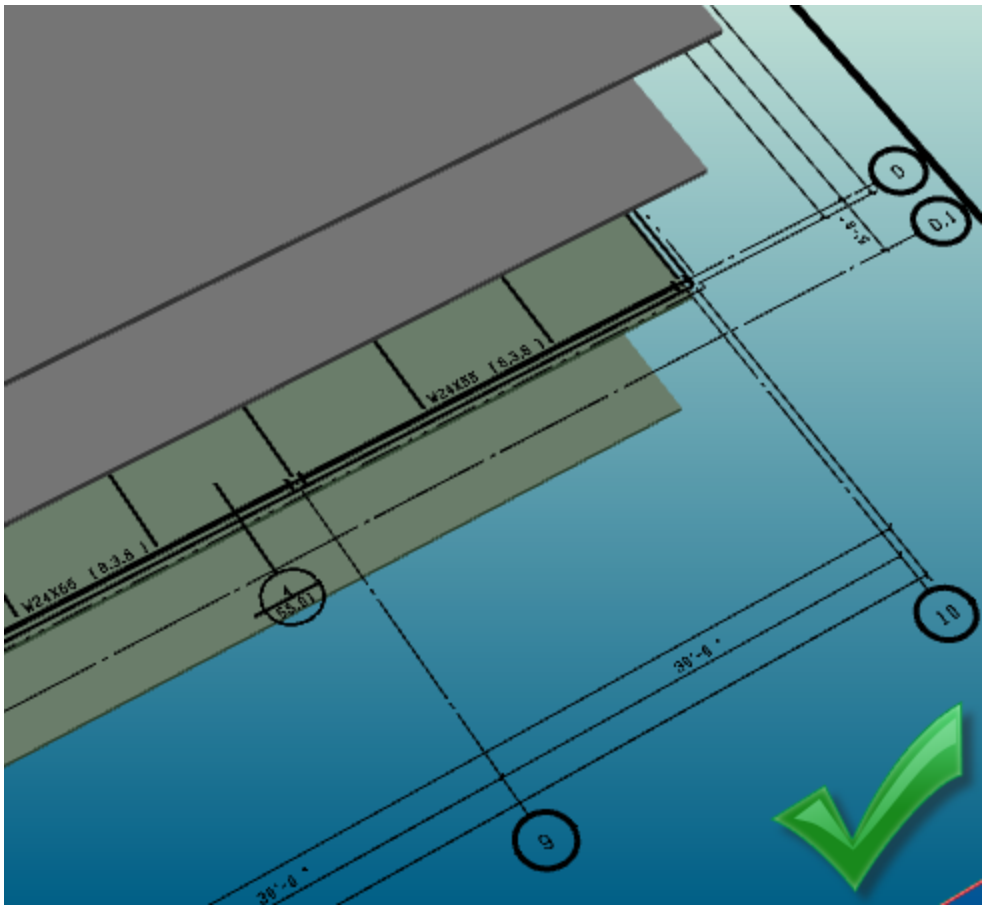
8. Select the points on the model that match the drawings.

Make sure that the first model selection point matches the first point selected on the drawing and that the second point selected on the model matches the second point selected on the drawing.





After the two drawing points are mapped to the two model points, the selected document is aligned and scaled with the model.



Tip: To validate that the document was align and scale operation worked well by peeling away model elements, use the model sectioning functionality. Again, identify areas of unique geometry to ensure a good match. If the drawing and model seem misaligned, repeat the align and scale operation once more until the results are exact.

Documenting Changes

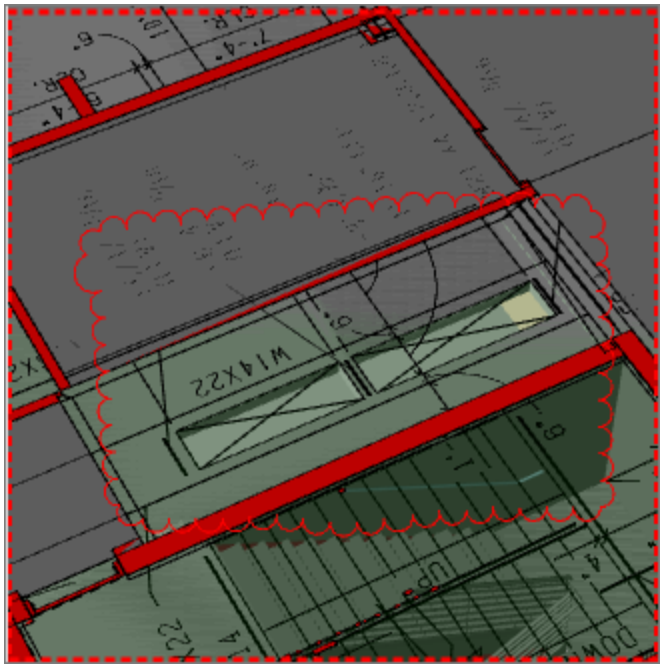
After the dataset is organized in the Document Controller, you may want to perform change analysis and model validation. You can use a custom view to track design change issues. A common layout includes the **Issue Card View** on the left and the **3D View** on the right with reference planes and mapped drawings turned on.

To create an issue from the Document Controller

1. Open the Document Control task.
2. To display the default model view, click **Reset View** on the **3D View** ribbon tab.

3. In the **Document Register** view, right-click the document, and then click **View**.
4. In the **Document Register** view window, switch to the **Issue Card View**.

5. To add an issue, click the **View & Markup Tools** ribbon tab > **Add Cloud**, and then draw the shape in the **3D View**.

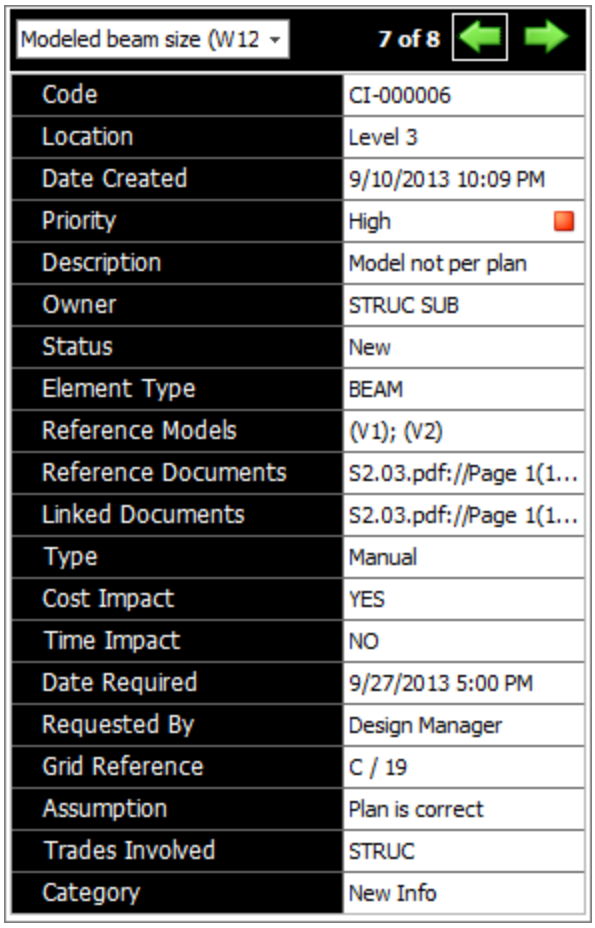


A view point and an issue are automatically generated.

6. Add more details to the issue using the markup tools on the **View & Markup Tools** ribbon tab:
   - **Freehand Tool:** Sketch additional information.
   - **Add Text:** Add text information.
   - **Erase:** Remove the selected text or view point.
   - **Pick Color:** Change the color of the text.
   - **Add Elements:** Associate model elements with issues for Auto Reveal and Auto Zoom functionality.
   - **Add View Point:** Create a new view of the issue.
   - **Add Image:** Add images from the clipboard (screen shots) or from saved file locations.

- **Auto Reveal:** Peel away other 3D content that may be obstructing the view.
- **Auto Zoom:** Magnify the issue within the immediate range of the active viewset.

7. In the **Issue Card View**, add the meta data necessary for the issue to be understood and resolved.

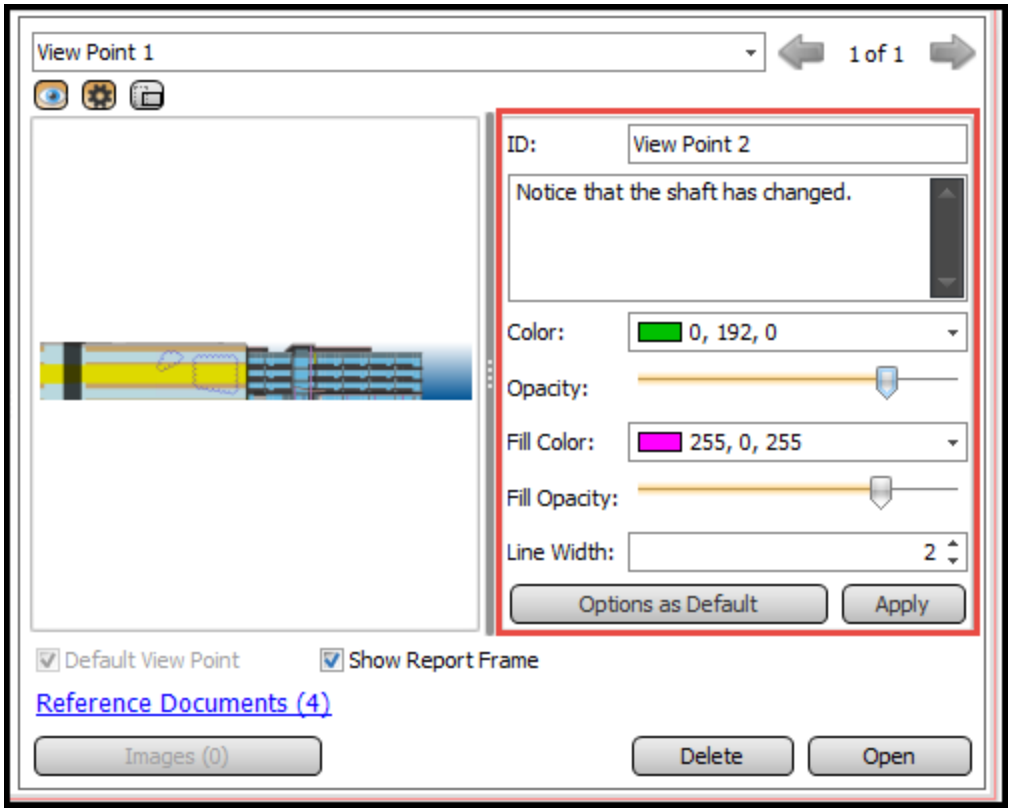


Modeled beam size (W12 7 of 8

Code	CI-000006
Location	Level 3
Date Created	9/10/2013 10:09 PM
Priority	High
Description	Model not per plan
Owner	STRUC SUB
Status	New
Element Type	BEAM
Reference Models	(V1); (V2)
Reference Documents	S2.03.pdf://Page 1(1...
Linked Documents	S2.03.pdf://Page 1(1...
Type	Manual
Cost Impact	YES
Time Impact	NO
Date Required	9/27/2013 5:00 PM
Requested By	Design Manager
Grid Reference	C / 19
Assumption	Plan is correct
Trades Involved	STRUC
Category	New Info

8. Set the overall look of each cloud markup, including its color, line width, and opacity.
   - When selecting the color of cloud, it is recommended that you select a color that will yield the highest contrast. For example, if you are marking up a drawing that has a brighter hue, selecting a darker color for the cloud will yield the best contrast.
   - If you are placing a cloud markup on a drawing that has a fill color, you can choose to reduce the opacity of the cloud.

- Click **Apply** to set the appearance of the cloud.



9. Click **Finish Markup** on the View & Markup Tools ribbon.

Model Register

After you publish your models from any of the supported BIM applications (ArchiCAD, Revit, Tekla or Bentley) , the published models are available in the **Model Register** task.

In the model activation process, the takeoff items are created based on the activation options. For every takeoff item created, Vico's quantity extraction algorithms are executed to analyze the geometry and to extract the appropriate element quantities, which results in a set of takeoff quantities per takeoff item.

The available properties for takeoff item creation rules vary per application. For more information, see:

- "ArchiCAD TOI Creation Settings" on page 240
- "Revit TOI Creation Settings" on page 242
- "Tekla TOI Creation Settings" on page 245

To open the Model Register task

- In the **Model Management** workflow group, click **Model Register**.

  Note: The **Model Management** workflow group is available in every module except the Master Workflow.

  The default viewset includes the Model Register view and the 3D View.

Activating a Model

After publishing models from the selected BIM application and defining the units of measurement, you can activate them so that Vico Office can use them to quantify the Takeoff items. You can activate models in the **Document Register** or the **Model Register** task.

Note:

- If the **Document Controller** module is not available, look for the **Model Management** group in any module, and then click **Model Register**.
- If a new model version is published and activated, it will make the already quantified Takeoff items out-of-date.
- All published models from the selected BIM application are visible in the **3D View**.

To activate a model in the Model Register

1. Open the Model Register task.
2. Right-click the row of the model, and then click **Activate Selected**.

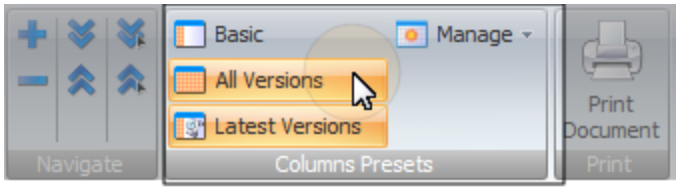
   - or -

On the **Model Register** ribbon tab, click **Activate Selected Models.**

During the activation process, Takeoff items are created and grouped based on the CAD tool's default grouping. After the model activation is completed, a gray circle icon is displayed in the version column.

To activate a model in the Document Register

1. Open the Document Control task.
2. To view all available versions of the model and their activation status, click **All Versions** in the **Column Presets** group on the ribbon.



3. Select the model or models that you want to activate.

   To select multiple models, hold the **Ctrl** key while you make your selections.
4. Right-click the row of the model, and then click **Activate Selected**.

   - or -

   On the **Model Register** ribbon tab, click **Activate Selected Models.**

   During the activation process, Takeoff items are created and grouped based on the CAD tool's default grouping. After the model activation is completed, a gray circle icon is displayed in the version column.

Default Takeoff Items Grouping

- ArchiCAD: Layer, Element Type
- IFC: Name
- Revit: Family
- SketchUp: Component
- Tekla: Assembly Name + Assembly.Assembly Name
- CAD-Duct: Layer, Element Type
- Bentley: Layer, Element Type

In the version column, the cell color or icon indicates if a document is part of a version and if it has been changed between versions:

- **Grey cell:** No published model version.
- **Green cell:** No change in the new model version compared to the previous one.
- **Red cell:** Change in the new model version compared to the previous one. This is a published model but not active.
- **Gray circle icon:** Model is active.
- **Cloud icon:** Marked up screenshots have been created from the model for constructability reports.

Your data can be in three different states:

1. Published but not active - Models that have been published from a CAD tool are visible in 3D view. However, if they are not activated, they are not used when quantifying Takeoff items.
2. Active but not 'quantified' - After activating a model, Takeoff items are created and visible on Takeoff Manager. They are initially grouped based on the CAD tool's default Takeoff item grouping. The quantities for these takeoff items consist of CAD information, CAD names and Basic quantities, and allow for a quick start and interrogation.

   The Takeoff items on Takeoff Manager can be re-grouped using the Takeoff Items builder (TOI Builder).
3. Quantified Takeoff items - After quantifying the Takeoff items, Vico generates Premium Quantities using a process that involves Vico algorithm and locations.

Models in the Model Register

Info	Code	Name	Type	Mappec	Count
		STB Stütze - rund		No	131

Name	Unit	Mappec	Project
Count	EA	No	131.00
Height	FT-IN	No	1460'-2 3/8"
Vertical Surface Area	SQ FT	No	4,502.22
Top Surface Area	SQ FT	No	98.54
Bottom Surface Area	SQ FT	No	98.54
Hole Surface Area	SQ FT	No	0.00
Net Volume	CU YD	No	40.68
Gross Volume	CU YD	No	40.68
Joint Horizontal Surface Area	SQ FT	No	0.00
Joint Vertical Surface Area	SQ FT	No	0.00
Piece Count	EA	No	131.00
Piece Height	FT-IN	No	1460'-2 3/8"
CAD_Count	EA	No	131.00
CAD_Length	FT-IN	No	1460'-2 3/8"
CAD_Volume	CU YD	No	41.15

Quantified Takeoff item in the Takeoff Manager

Note: When a CAD model has been activated, some elements may not be assigned to a Takeoff item. In this case, they are labeled as 'Unassigned_<ElementType>'.

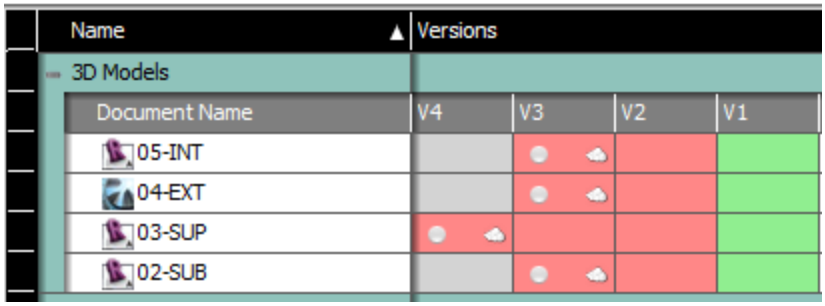
Deactivating a Model

Remove the active status from an active model version.

To deactivate a model

1. Open the Model Register task.
2. Select an active model or model version from the list.

   The selected model or model version is indicated by an orange cell to the far left.



3. On the **Model Register** ribbon tab, click **Deactivate Selected Models**.

   –Or–

   Right-click the selected model or model version, and then click **Deactivate Selected Models**.

4. In the **Deactivate Model Version** dialog, click **Deactivate** to continue.

   Note: When you deactivate a model or model version, the quantities are removed from the takeoff items and the takeoff quantities. To restore them, you can reactivate the model version later.

   The **Deactivating Model** progress dialog appears. When the deactivation process is completed, the gray circle that indicates the active model version is removed. The elements in this model are no longer included in the current takeoff.

Importing a Model

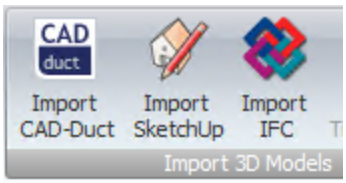
With a license for an importer (CAD-Duct, AutoCAD, SketchUp, and IFC), you can import BIM projects saved in the respective file formats into your Vico Office project.

The supported importers are:

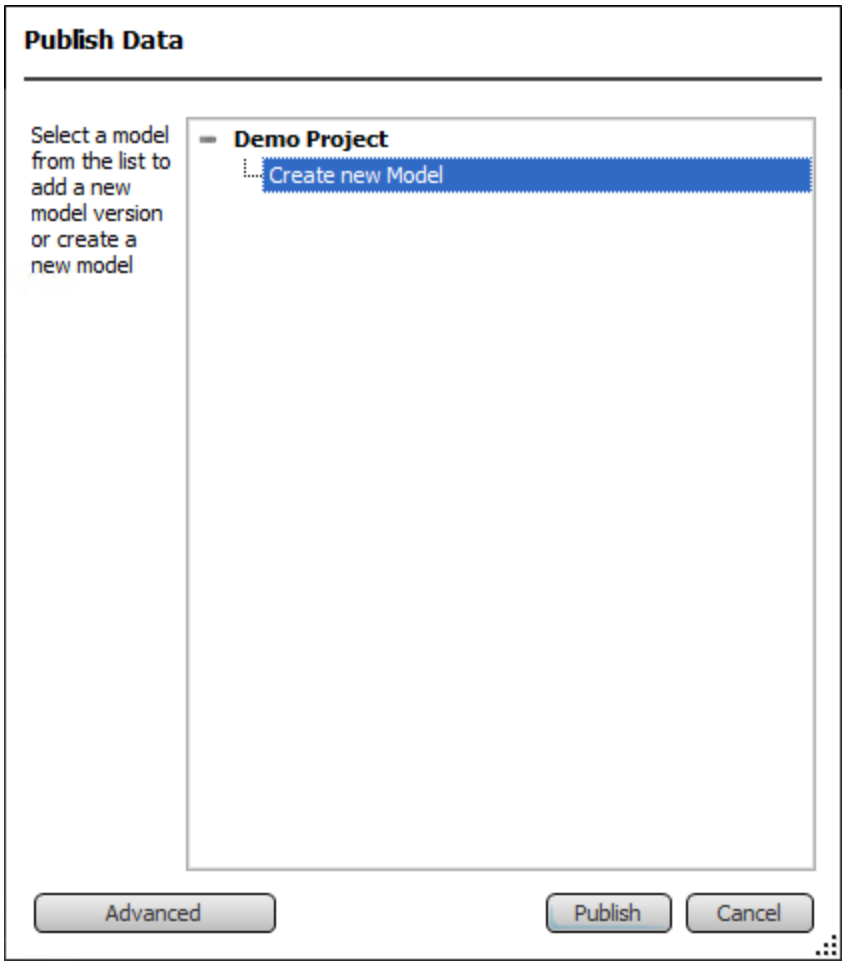
- CAD-Duct - via XML
- IFC - Versions IFC2x3 and IFC4
- SketchUp: Versions 8, 2013, 2014, 2015, 2016, 2017
- Trimble Connect

To import a CAD-Duct, AutoCAD (3D), SketchUp, or IFC file into Vico Office

1. Open the Model Register task.
2. On the **Model Register** ribbon tab, click the applicable button.

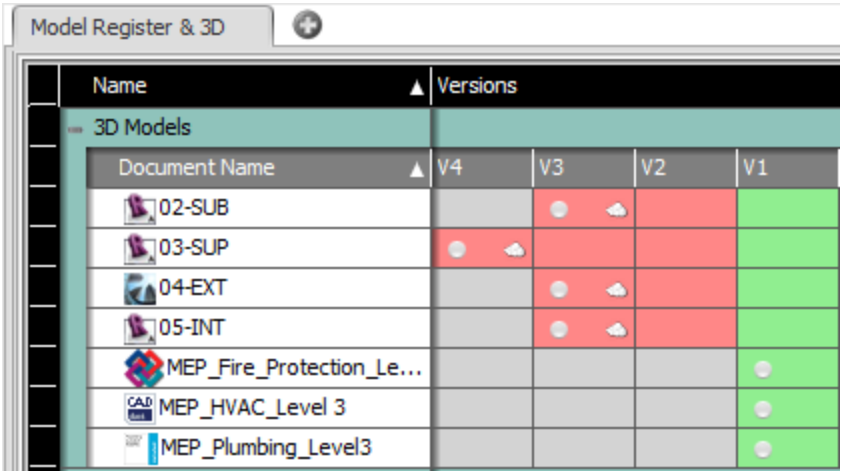


3. Select the desired model file, and then click **Open** in the **Import File** dialog.
4. In the **Publish Data** dialog, click **Create New Model** (or an existing model if it was imported earlier).



5. Optional - **Advanced**: By default, a default list of element types and standard parameters are imported to Vico Office. If you wish to specify which elements and parameters you wish to publish to Vico Office, use the Advanced section of the publisher.
6. To begin the model import process, click **OK**.

   When the import procedure is completed, a new model is added to the list of models in your project as if it were published from a BIM application.



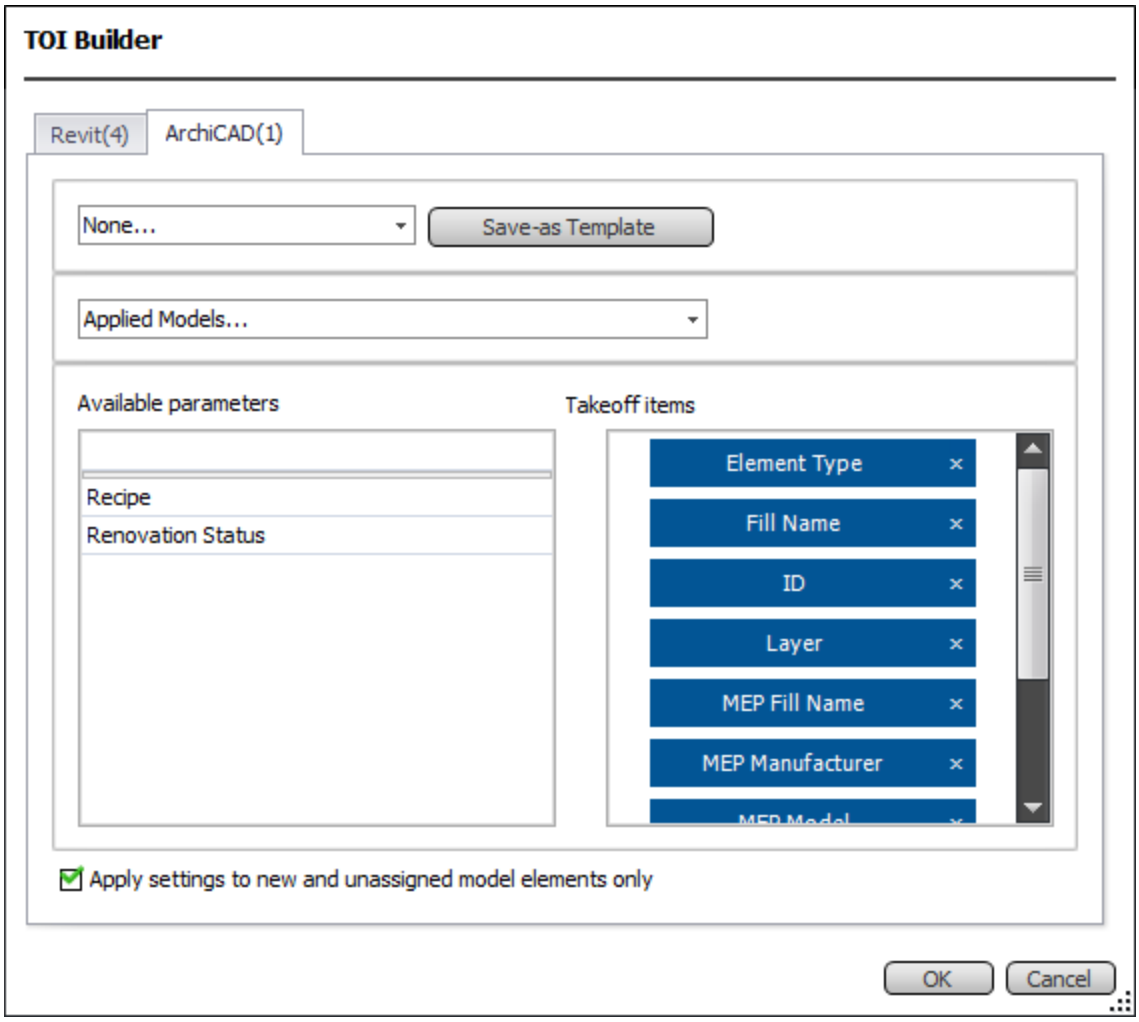
7. In Vico Office, activate the published model in the **Model Register** task or the **Document Control** task.

Tip: To make sure that Vico Office can correctly recognize the types of the elements in a CAD-Duct model, your export to IFCxml from CAD-Duct should contain the following information:

1. Source (the element's category)
2. Library (the element's type)
3. Service (the MEP system)

If any of these properties are missing, elements will be imported as "Objects" in Vico Office and will only return the "Count" quantity. Additionally, before running the IFCE command use the IFCATTR command and verify that the "Use Default Format" option is selected.

ArchiCAD TOI Creation Settings



Publishing Types	Description
Element Type	If selected, takeoff items are created and sorted by ArchiCAD **Element Type** such as Wall, Column or Slab.
Layer	If selected, takeoff items are created and sorted based on **Layer Names** that you defined in ArchiCAD.
ID	If selected, takeoff items are created and sorted based on assigned **Element IDs**.

Publishing Types	Description
MEP System Property	If selected, MEP takeoff items are sorted by the **MEP System Property** values you assigned to MEP elements.
MEP Manufacturer and Model	If selected, MEP takeoff items are created and sorted based on MEP manufacturing and model property values that were assigned to MEP elements such as equipment and fixtures.

Creating ArchiCAD TOIs

To generate ArchiCAD-based takeoff items

1. Open the Model Register task.
2. Activate the ArchiCAD model or model version in Vico Office.

   Takeoff items are initially created and grouped based on the model's 'Layer' and 'Element Type' parameters. Takeoff items are listed on the Takeoff Manager.
3. Re-group or organize your Takeoff items using the TOI Builder.
4. Quantify your TOIs.

Takeoff Item Creation Settings Examples:

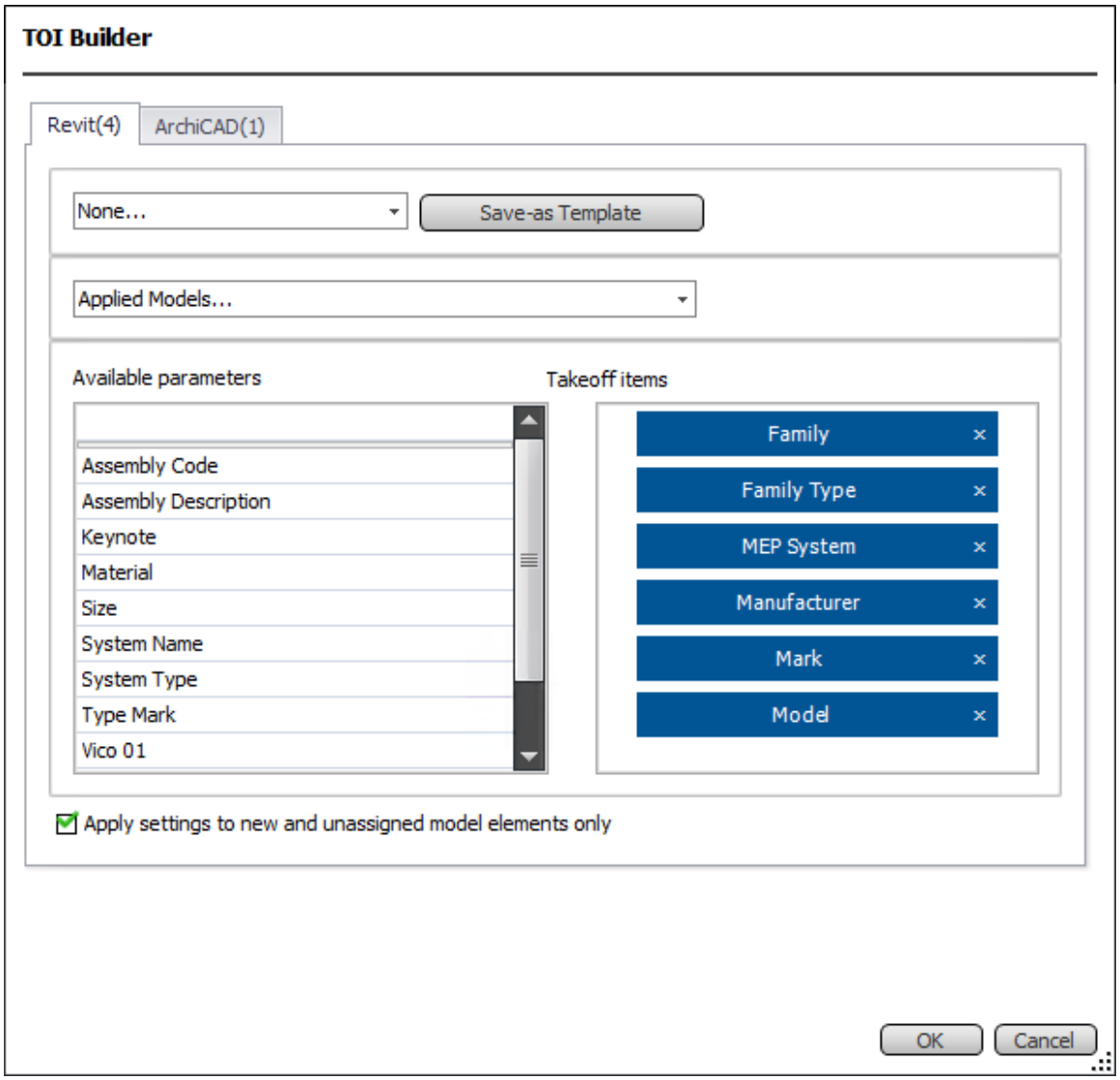
All available takeoff item creation properties are selected:

- **WALL-A-Walls-001** (Element Type - Layer - ID)
- **DUCT-M-Medgas-002-Medical Gas** (Element Type - Layer - ID - System Property)

One takeoff item creation setting is selected:

- **WALL** (Element Type)
- **Domestic Water** (MEP System Property)

Revit TOI Creation Settings



Publishing Types	Description
Family	If selected, takeoff items are created and sorted based on unique **Family** definitions.
Family Type	If selected, takeoff items are created and sorted by unique **Family Types**.

Publishing Types	Description
Mark Values	If selected, takeoff items are created and sorted based on unique **Mark Values**.
MEP System Type	The MEP System Type is used to create unique takeoff items if it is available for an element. Typically, this property is available for all pipe, duct, and cable elements.
MEP Manufacturer	The MEP Manufacturer property is generally available for all equipment and fixture elements and will result in unique takeoff items if selected.

Creating Revit TOIs

When activating a Revit model or model version in Vico Office, you can specify the Revit element properties based on which takeoff items should be created.

To generate Revit-based takeoff items

1. Open the Model Register task.
2. Activate the Revit model or model version in Vico Office.

   Takeoff items are initially created and grouped based on the model's 'Family' parameters. Takeoff items are listed on the Takeoff Manager.
3. Re-group or organize your Takeoff items using the TOI Builder.
4. Quantify your TOIs.

   Note: The TOI description column follows the following text syntax [<Family>-<Family Type><Mark>].

Basic-Generic - 8"-Walls
Basic-Generic - 8" 5-Walls
Curtain-Exterior Glazing-Walls
Basic-Generic - 8" 4-Walls
Basic-Generic Gypsum Wall - 5"-Walls
Generic - 12"-Floors
Generic - 12" 2-Floors
sidewalk 2-Floors
road-Floors
sidewalk 3-Floors
Generic - 12" 3-Floors
sidewalk-Floors
Round Column-06" Diameter-Columns
Round Column-06" Diameter 2-Columns
Single-Flush-36" x 84"-Doors
Double-Flush-72" x 78"-Doors

Example:

Takeoff item creation settings with the 'Family' property selected:

All the takeoff items are organized and listed in the description column based on the single takeoff item creation property, which in this case would include all related Family Type elements assigned to one TOI [<Family>].

Basic
Curtain
Round Column
Single-Flush
Double-Flush
Sliding-2 panel
Double-Glass 1
Fixed
Park Bench
Elevator-Electric
Walls 1
Toilet-Domestic-3D
Sink-Single-2D
Street Light - Standard

Tekla TOI Creation Settings

Publishing Types	Description
Class	If selected, takeoff items from the Tekla Model are created and sorted based on unique **Element Class** property values.

Creating Tekla TOIs

To generate Tekla-based takeoff items

1. Open the Model Register task.
2. Activate the Tekla model or model version in Vico Office.

   Takeoff items are initially created and grouped based on the model's 'Assembly Name' and 'Assembly.Assembly Name' parameters. Takeoff items are listed on the Takeoff Manager.
3. Re-group or organize your Takeoff items using the TOI Builder. For example, if you select the Class property, it will be used to create and sort takeoff items. The Class name will be used in the description of the takeoff item.
4. Quantify your TOIs.

Takeoff Model

In the **Takeoff Model** task, you can quantify the elements, verify the generated takeoff item (TOI) element assignments and/or reassign them into new takeoff items as desired. You can also create a new takeoff quantity (TOQ) and assign model geometry for automatic quantity takeoff.

A takeoff item (TOI) is a group of takeoff information. This is created manually or based on properties of elements extracted from CAD models. Each TOI contains one or more takeoff quantities (TOQ), which are typical quantities of the TOIs that can be used for estimating or scheduling purposes. The set of TOQs included in a TOI is based on the element type that is assigned to the TOI. For example, 'Walls' have different TOQs than 'Slabs'. Each TOI from a CAD model also includes the CAD quantities.

The reassigning of assigned and unassigned elements into new or existing TOIs is an interactive process between the **Takeoff Manager** view and the **3D View**. Takeoff items and takeoff quantity items can be created and selected in the **Takeoff Manager** view so that you can then use the Paint Mode in the **3D View** to assign or reassign the model elements and geometry. The process of verification, assigning, and reassigning model elements and quantities in the **3D View** can be greatly enhanced by the use of the Filtering palette and Properties palette.

When you are satisfied with the collection of TOIs and their assigned TOQs, you can view a full breakdown of all the TOIs and their quantities in the **Takeoff Manager** view. The quantity totals displayed by your projects location breakdown can subsequently be used to generate customizable quantity reports.

To open the Takeoff Model task

1. Right-click the Workflow Panel header, and then click **Takeoff Manager**.
2. In the **Takeoff Manager** workflow group, click **Takeoff Model**.

   The default viewset includes the Takeoff Manager view and the 3D View, so you can verify takeoff items side-by-side with the 3D view. The model-based takeoff items are created in the Model Register task.

Quantity Calculation Rules

When you quantify Takeoff items, Vico Office analyzes the geometry that was brought in from a BIM application and calculates the following for each element:

- Volume
- Surface Area

Quantities such as length and width are not calculated in Vico Office but are derived from meta data that is saved with the geometry during the publish or import operation.

Volume

Volume is calculated by creating a solid element where the element's boundaries are defined by the faces of the published element. After the volume is created, net volume quantities can be obtained through solid element analysis.

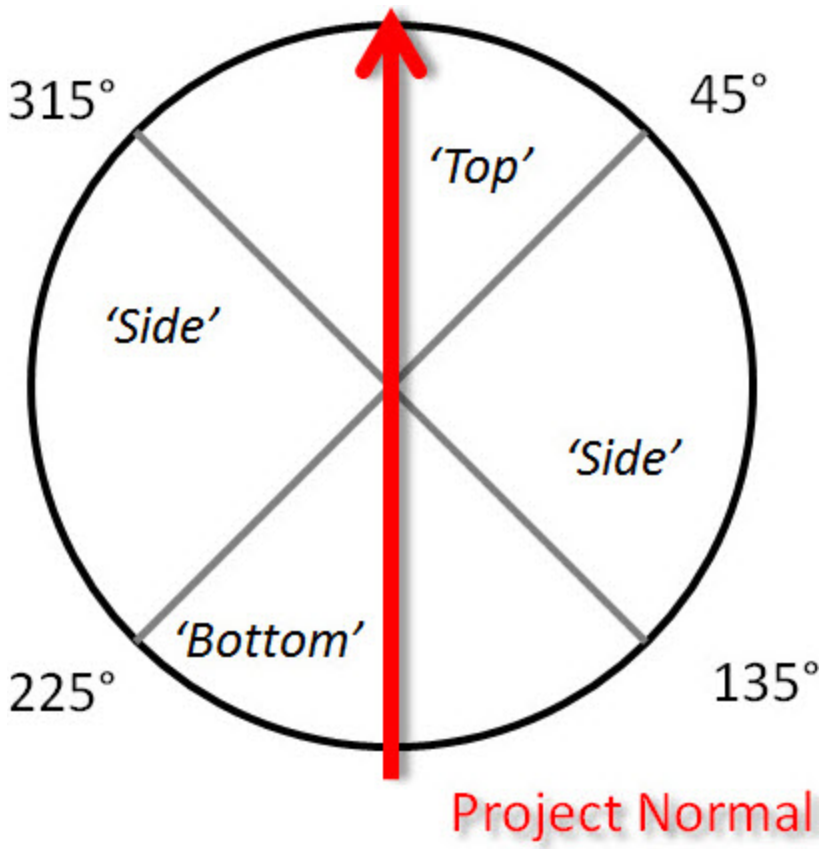
When the published geometry contains faces that do not entirely close a 3D volume, Vico Office attempts to fix this geometry with increasing levels of tolerance. If the volume correcting does not succeed, the element is marked as 'incomplete' and returns to a '0' volume value. In this case, the takeoff item which the element belongs to is marked with a notification icon .

In calculating the surface area, the most important thing is to give the correct direction of the element faces. The calculation rules in Vico Office use the corkscrew rule to determine the direction of a face.

By following the drawing direction of the points of a face, this direction can be determined. The direction of the face is then compared to the project's normal vector, which is a vector that points exactly in the z-direction.

Based on this comparison, an angle variance with the normal vector can be determined, which then lets Vico Office classify the face.

- If the direction of a face is in the 315° to 45° range, the face is classified as **Top**.
- If the direction of a face is in either 45° to 135° or 225° to 315° range, the face is classified as **Side**.
- If the direction of a face is in the 135° to 225° range, the face is classified as **Bottom**.



Element Types

The initial classification is then further processed based on the Vico element type. Each element type has its own set of takeoff quantities, which are collections of faces that are classified based on the following rules.

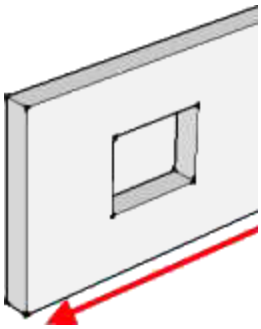
Walls

In addition to the element's 3D geometry, published information of wall elements also contains the Reference Line or Placement Line, which is saved as a start point and an end point.

For walls, the classified faces are processed as follows:

- 'Top' faces are assigned to **Top Surface Area**.
- 'Bottom' faces are assigned to **Bottom Surface Area**.
- 'Side' faces which are parallel to the Reference Line are assigned to **Side Surface Area**.
  AND

- the 'Side' face that is nearest to the Reference Line is assigned to **Net Reference Side Surface Area**.
- the 'Side' face that is farthest from the Reference Line is assigned to **Net Opposite Reference Side Surface Area**.

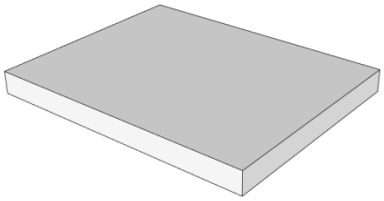


- 'Side' faces that are not parallel to the Reference Line are assigned to **Ends Surface Area**.
- Window openings are found by looking for 'loops within loops'. Any loop that matches this definition is considered 'Opening' and is used to calculate**Opening Surface Area**.
- Door openings are found by looking for points in a side surface that go 'straight up' then horizontal. If this condition is found, an opening polygon is created and calculated.

Slabs

For slabs, the classified faces are processed as follows:

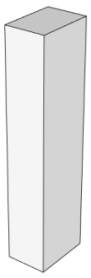
- 'Top' faces are assigned to **Net Top Surface Area**.
- 'Bottom' faces are assigned to **Net Bottom Surface Area**.
- 'Side' faces are assigned to **Edge Surface Area**.
- 'Internal Loops' are used to calculate **Hole Surface Area**.
- 'Top' faces are used to calculate **Edge Perimeter**.



Columns

For columns, the classified faces are processed as follows:

- 'Top' faces are assigned to **Top Surface Area**
- 'Bottom' faces are assigned to **Bottom Surface Area**
- 'Side' faces are assigned to **Vertical Surface Area**

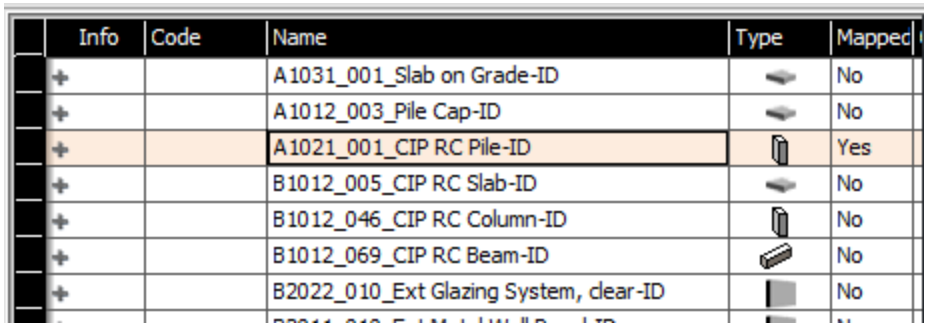


Isolating 3D Elements from Takeoff Model

Isolate 3D elements from the **Takeoff Model** task, so you can verify the model elements and quantities in the **3D View**.

To isolate 3D elements from the Takeoff Manager

1. Open the Takeoff Model task.
2. Select a takeoff item from the list.



Info	Code	Name	Type	Mappec
+		A1031_001_Slab on Grade-ID		No
+		A1012_003_Pile Cap-ID		No
+		A1021_001_CIP RC Pile-ID		Yes
+		B1012_005_CIP RC Slab-ID		No
+		B1012_046_CIP RC Column-ID		No
+		B1012_069_CIP RC Beam-ID		No
+		B2022_010_Ext Glazing System, clear-ID		No

If you turn on Running Mode, the selected element can appear in the **3D View** in different ways (highlight, isolate, hide, dim, translucent). For more information, see 272.

3. Right-click the selected takeoff item, and then click **Isolate**.

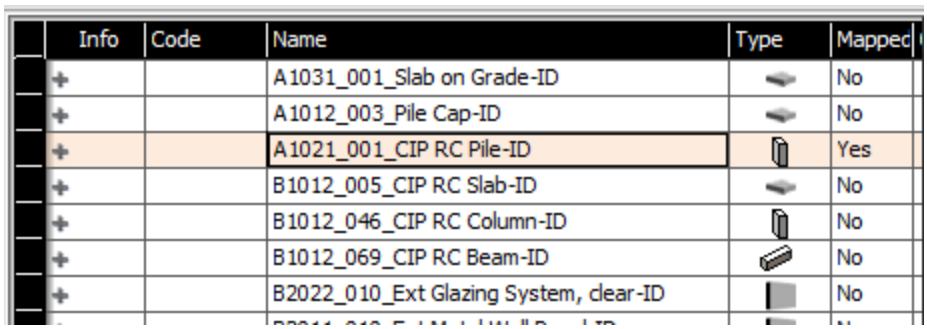
In the **3D View**, only those elements that are associated with the selected takeoff item are displayed. This is a temporary state; as soon as you select another TOI, the **3D View** is reset.

Selecting Model Elements

To select model elements from the Takeoff Model task

1. Open the Takeoff Model task.
2. Select a takeoff item from the takeoff item list.

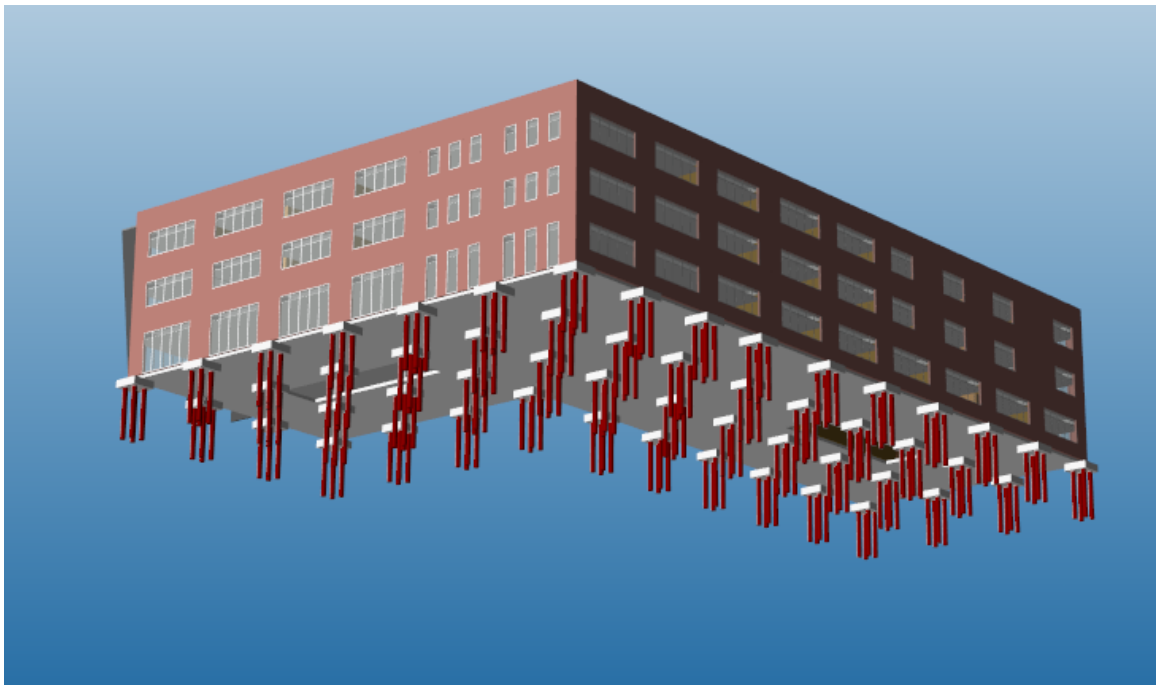
   If you turn on Running Mode, the selected element can appear in the **3D View** in different ways (highlight, isolate, hide, dim, translucent). For more information, see 272.



Info	Code	Name	Type	Mappec
+		A1031_001_Slab on Grade-ID		No
+		A1012_003_Pile Cap-ID		No
+		A1021_001_CIP RC Pile-ID		Yes
+		B1012_005_CIP RC Slab-ID		No
+		B1012_046_CIP RC Column-ID		No
+		B1012_069_CIP RC Beam-ID		No
+		B2022_010_Ext Glazing System, clear-ID		No

3. Right-click the selected takeoff item, and then click **Select Visible Assigned Elements**.

   The elements that are associated with the selected takeoff item are highlighted in red.



4. Open the Properties palette, and click the arrow buttons to cycle through the collected elements.

   The **Properties** palette displays the total number of elements in the selection list. You can also view and manually edit quantity information of elements at an individual level.

Selecting Elements with Missing Quantities

To select elements with missing quantities

1. Open the Takeoff Model task.
2. In the takeoff item list, select a takeoff item that contains at least one missing quantity.

   The missing quantities are indicated by the notification icon ⚠.
3. Right-click the selected takeoff item, and then click **Select Visible Elements with Missing Quantities**.

   Vico Office selects all the visible elements with missing quantities.
4. Use the Properties palette to review individual element quantities in more detail.

   If needed, you can also choose to edit or input the missing quantities manually.

Creating a Takeoff Item

Create a takeoff item (TOI), so you can assign elements to a custom group as needed for cost or schedule calculation purposes.

In the **Takeoff Model** task, the activated models are displayed next to the takeoff items. When you select a model, that element is highlighted in the model.

To create a TOI

1. Open the Takeoff Model task.
2. On the **Takeoff Manager** ribbon tab, click **New TOI**.

   –Or–

   Right-click a TOI, and then click **Add New Takeoff Item**.

   The new TOI is created in an empty cell.
3. In the **Code** and **Description** fields, name and classify the TOI as desired.
4. In the **Type** field, either predefine the model element type that you plan to add to the new TOI, or simply start painting the elements in the 3D View with the painter tool.

   The painting method automatically configures the **Type** field to the first type of element you paint. The selected TOI element type then define which TOQs should be applied and calculated to the newly grouped elements.

   As you paint elements to assign them to the new TOI, the elements are either subtracted from the unassigned element group or re-assigned from another TOI group.

Removing an Element from a Takeoff Item

If an element was wrongly assigned to a takeoff item, it should be removed from the currently selected takeoff item.

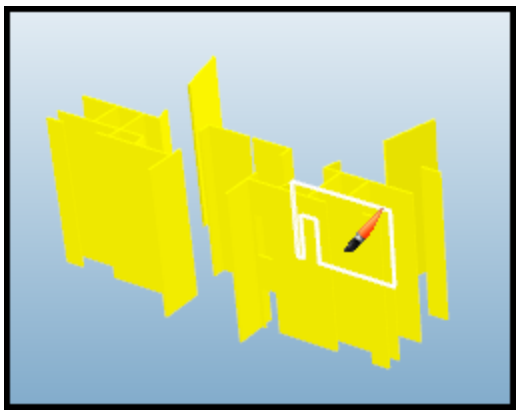
To change TOI element type to an unassigned element

1. Open the Takeoff Model task.
2. Select a takeoff item from the takeoff list.

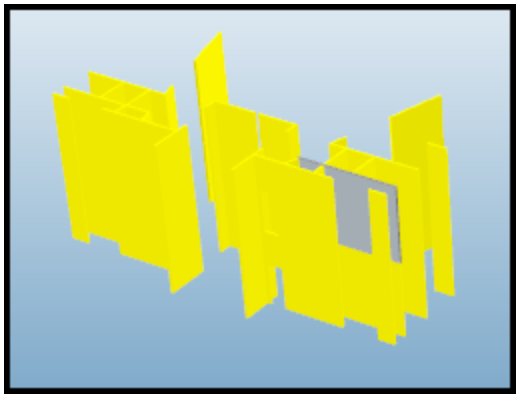
   If you turn on Running Mode, the selected element can appear in the **3D View** in different ways (highlight, isolate, hide, dim, translucent). For more information, see 272.
3. Identify the element or elements that should be removed from the TOI, and move the cursor to the **3D View**.

Office changes the cursor into the painting tool.

4. With Painting Mode activated, click the elements that you want to remove from the selected TOI.



Office no longer shows the element as highlighted. This action indicates that the element is removed from the TOI and is automatically associated with a new TOI (if one has not been created) with the following name: 'Unassigned-<ElementType'.



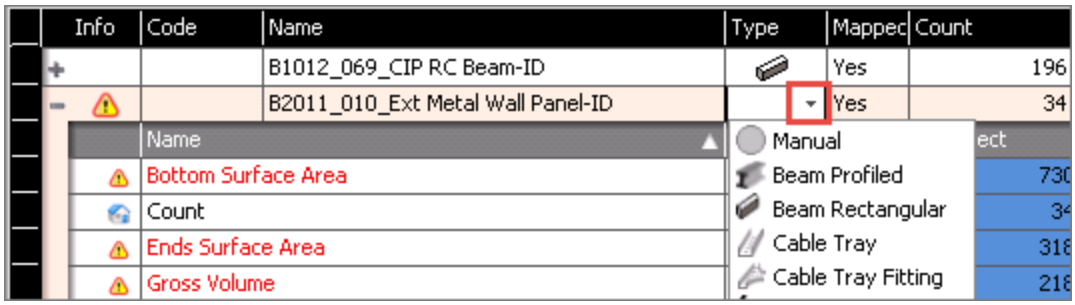
The unassigned elements can also be seen with the Show Only Unassigned option in the **Filtering** palette. Using this option, you can later filter for a specific set of unassigned model elements so that they can be reassigned into a new TOIs.

Assigning a Different Element Type to a Takeoff Item

If the wrong element type is assigned to a TOI, you can change the element type. Then the TOQs are recalculated and replaced with the new set of quantities.

To change type for a TOI

1. Open the Takeoff Model task.
2. Select the takeoff item that contains the incorrectly assigned elements.
3. Double-click the **Type** field, and then open the type list.



4. Select the element type that you want to associate with the TOI.

   The set of TOQs are replaced with the new set of quantities. If any properties cannot be calculated, a notification icon for the TOQs and for the TOI is displayed. The missing TOQ calculations are also displayed in a red font.

Filtering Palette

The **Filtering** palette is a quick way to filter the content that is visible in the active viewset. You can select which models, model elements, layers, locations, and items are displayed in the active viewing area. You can also isolate, hide, or make translucent any of the selected items in the palette.

When you select a filter, the available filter-specific items appear in the **Filter Item** list. You can select the desired items to include in the filter to support reassigning and verifying TOIs or TOQs in the **3D View**.

Note: Clicking **Select All Elements with Missing Quantities** in the TOI/TOQ context menu will override the current filter set.

To open the Filtering palette

1. Along the right edge of the screen, click **Filtering**.

   Note: If the **Filtering** palette is not visible, click the palettes icon on the right side of the screen, and then click **Filtering**.
2. To dock the palette to the active viewset, click the pin icon in the upper-right corner of the palette.

Filtering Palette Commands

Item	Description
Show All	Show all model elements, whether or not they are assigned to a TOI, that are included in the active models.
Show Only Unassigned	Show only those model elements that are currently not assigned to any TOIs and therefore do not contribute to the quantity takeoff.
Model 	Reveal only the desired active model(s). For more information, see "Applying a Model Filter" on page 258.
Location 	Reveal only the desired model location (s), which are derived from your BIM projects. For more information, see "Applying a Location Filter" on page 259.
Layer 	Reveal only the desired layers from authoring applications, such as ArchiCAD and DWG, that use the layer concept. **Note:** Layers with the same layer name, derived from several models, are displayed as one item. For more information, see "Applying a Layer Filter" on page 260.
Type 	Reveal only the desired elements from authoring applications, such as Tekla and Revit, that use the element concept. For more information, see "Applying a Type Filter" on page 261.

Item	Description
Manual	Reveal elements that have been selected using the Takeoff Manager interface. In the 3D view, you can select the elements individually or use a cross window selection (**Selection Mode**). If nothing is selected, the **Filter Item List** is empty. For more information, see "Applying a Manual Selection Filter" on page 262.
Filter Item List	Displays the available filter-specific items. Select the items that you want to include in the filter to support reassigning and verifying TOIs or TOQs in the **3D View**.
Select All	Select all listed items currently shown in the **Filter Item** list. Selected list items are indicated by a green check mark.
Deselect All	Clear all listed items currently shown in the **Filter Item** list. Deselected list items are indicated by the absence of a green check mark.
Reset All Filters	Remove all selections and restore the full 3D model view.
Isolate Selected	Isolate all elements that meet the filtering criteria in the **3D View**.
Hide Selected	Hide all elements that meet the filtering criteria in the **3D View**.

Item	Description
Translucent Mode 	Display all selected elements in the **3D View** that are currently selected in the active filter or filter set in a translucent state compared to the rest of the model elements.
Filter Set List Type FilterSet Name	Create a filter set by saving your defined filter set combinations. In the **Filter Set** list, type a name for your filter set, so that it can be saved.
Save New	Save a filter set so it is added to your list of filter sets.
Update	Update filter settings of a previously saved filter set.
Apply	Activate the current filter definitions.

Viewing All Unassigned Elements

If elements are removed from a takeoff item, they are automatically associated with a new TOI (if one has not been created) with the following name: 'Unassigned-<ElementType'. You can use the **Filtering** palette to identify which elements are currently unassigned in the project.

To view all unassigned elements

1. Open and pin the Filtering palette.
2. At the top of the **Filtering** palette, select **Show Only Unassigned**.
3. To activate the filter, click **Apply**.

   The elements in the project that are not currently associated with any takeoff items are displayed in the **3D View**.

Applying a Model Filter

To apply a model filter

1. Open and pin the Filtering palette.
2. In the **Filtering** palette, click the model filter icon .

   The **Filter Item** list displays the activated models.
3. In the list, select the models that contain the model elements that you want to view.

   A green check mark appears beside the selected models.
4. Select a filter mode.
   - **Isolate Selected:** Isolate all elements that meet the filtering criteria in the **3D View**.

     
   - **Hide Selected:** Hide all elements that meet the filtering criteria in the **3D View**.

     
   - **Translucent Mode:** Display all selected elements in the **3D View** that are currently selected in the active filter or filter set in a translucent state compared to the rest of the model elements.

     
5. To apply the filtering criteria, click **Apply**.

   The selected models appear in the **3D View** and are available for work in the **Model Register** task.
6. *Optional:* Save the filter set.
7. *Optional:* To return the models to their original status, click **Reset All Filters**.

Applying a Location Filter

To apply a location filter

1. Open and pin the Filtering palette.
2. In the **Filtering** palette, click the location filter icon .

The **Filter Item** list displays the project stories or levels that were defined in and derived from the original modeling application.

3. In the list, select the locations that contain the model elements that you want to view.

   A green check mark appears beside the selected locations.

4. Select a filter mode.

   - **Isolate Selected:** Isolate all elements that meet the filtering criteria in the **3D View**.

   - **Hide Selected:** Hide all elements that meet the filtering criteria in the **3D View**.

   - **Translucent Mode:** Display all selected elements in the **3D View** that are currently selected in the active filter or filter set in a translucent state compared to the rest of the model elements.

5. To apply the filtering criteria, click **Apply**.

   The elements within the selected locations appear in the **3D View** and are available for work in the **Model Register** task.

6. *Optional:* Save the filter set.

7. *Optional:* To return the models to their original status, click **Reset All Filters**.

Applying a Layer Filter

Note: The layer filter is only available for certain CAD applications that allow you to sort elements in layer groups.

To apply a layer filter

1. Open and pin the Filtering palette.
2. In the **Filtering** palette, click the layer filter icon .

   The **Filter Item** list displays the layers that were defined in and derived from the original modeling application.
3. In the list, select the layers that contain the model elements that you want to view.

   A green check mark appears beside the selected layers.
4. Select a filter mode.
   - **Isolate Selected:** Isolate all elements that meet the filtering criteria in the **3D View**.

     
   - **Hide Selected:** Hide all elements that meet the filtering criteria in the **3D View**.

     
   - **Translucent Mode:** Display all selected elements in the **3D View** that are currently selected in the active filter or filter set in a translucent state compared to the rest of the model elements.

     
5. To apply the filtering criteria, click **Apply**.

   The elements within the selected layers appear in the **3D View** and are available for work in the **Model Register** task.
6. *Optional:* Save the filter set.
7. *Optional:* To return the models to their original status, click **Reset All Filters**.

Applying a Type Filter

To apply a type filter

1. Open and pin the Filtering palette.
2. In the **Filtering** palette, click the type filter icon .

   The **Filter Item** list displays the elements types that are supported in Vico Office.
3. In the list, select the element types that you want to view.

   A green check mark appears beside the selected layers.
4. Select a filter mode.
   - **Isolate Selected:** Isolate all elements that meet the filtering criteria in the **3D View**.

     
   - **Hide Selected:** Hide all elements that meet the filtering criteria in the **3D View**.

     
   - **Translucent Mode:** Display all selected elements in the **3D View** that are currently selected in the active filter or filter set in a translucent state compared to the rest of the model elements.

     
5. To apply the filtering criteria, click **Apply**.

   The selected element types appear in the **3D View** and are available for work in the **Model Register** task.
6. *Optional:* Save the filter set.
7. *Optional:* To return the models to their original status, click **Reset All Filters**.

Applying a Manual Selection Filter

To apply a manual selection filter

1. Open and pin the Filtering palette.
2. At the top of the **Filtering** palette, click the manual filter icon .

The **Filter Item** list is empty until you manually select elements.

3. To select elements, do one of the following:
   - Right-click the view, and then click **Select All Assigned Elements**.
   - On the **3D View** tab, click **Selection Mode**, and then click the desired elements in the **3D View**.

   The selected elements are shown in red.

4. To add the selected elements to the **Filter Item** list, click **Add Selected** in the **Filtering** palette.

   The list displays the number of elements per type. To remove an element from the list, click the delete icon ✖ to its right.

5. In the list, select the elements that you want to view.

   A green check mark appears beside the selected elements.

6. Select a filter mode.
   - **Isolate Selected:** Isolate all elements that meet the filtering criteria in the **3D View**.

   - **Hide Selected:** Hide all elements that meet the filtering criteria in the **3D View**.

   - **Translucent Mode:** Display all selected elements in the **3D View** that are currently selected in the active filter or filter set in a translucent state compared to the rest of the model elements.

7. To apply the filtering criteria, click **Apply**.

   The elements within the selected types appear in the **3D View** and are available for work in the **Model Register** task.

8. *Optional:* Save the filter set.
9. *Optional:* To return the models to their original status, click **Reset All Filters**.

Saving a Filter Set

After you define filtering criteria in one or more of the available filters, you can save it as a filter set that can be used again later.

To save a filter set, you must first define filtering criteria in one or several of the filters that are available. If you are satisfied with your selection, and you would like to use this filtering set multiple times, you can save it as a filter set. With the filter defined, click the dropdown combo box where created filter sets are stored.

To save a filter set

1. Open and pin the Filtering palette.
2. Define the filtering criteria.

   For more information, see:

   - "Applying a Model Filter" on page 258
   - "Applying a Location Filter" on page 259
   - "Applying a Layer Filter" on page 260
   - "Applying a Type Filter" on page 261
   - "Applying a Manual Selection Filter" on page 262
3. In the **Filter Set** list, replace the text with the name of the filter set.
4. Click **Save New**.

   The new filter set is saved in the list.

Note:

- If you change the settings (select or clear items in the filters), the list background changes to red to indicate that the filter set has changed. If desired, save the changes in the active filter set by clicking **Update**; otherwise, the saved filter set retains its original settings. You can also save the changes as a new filter set.
- To delete a filter set from the list, click the delete icon ✘ to its right.

Properties Palette

The Properties palette contains additional details on the selected element, Takeoff item, or document. To see the properties, select each element, document or TOI.

To open the Properties palette

1. Along the right edge of the screen, click **Properties**.

   Note: If the **Properties** palette is not visible, click the palettes icon on the right side of the screen, and then click **Properties**.

2. To dock the palette to the active viewset, click the pin icon in the upper-right corner of the palette.

You can click the arrow keys to cycle through the selected set of elements in the **Model Register** or **Takeoff Pad** view. As you go through each element, it is outlined in the **3D View**. You can visually verify individual elements while you verify quantities in detail in the **Properties** palette.

Properties (Takeoff Item) Palette

- **Takeoff Item Information (Read Only):** This section lists any error message or tip on the selected Takeoff item. This section is read-only.

  Note: Use this box to enter any additional information on the selected Takeoff item.

Properties (Element) Palette

Items	Description
Model Data	
Source Model	The original CAD model that the currently selected element published from.
Selected Version	The version of the model that is currently selected.
Active Version	The name of the model from which the currently selected element was published.
Newest Version	The newest model version that currently exists in the Model Manager view. The active version and the newest version can be identical if the latest version is active.
Takeoff Item	The name of the takeoff item that the currently selected element is assigned to.

Items	Description
Object Type	The type of modeling component which was used to create the selected element in the source CAD application.
Location Data	
Location System	Indicates any alternative location breakdown structures for the same location in the project's location breakdown structure. This is displayed only if a Location System has been defined.
Location	The project location to which the selected model element belongs. The defined model locations are defined in the CAD application and transferred over to Vico Office.
Quantity Data: More info...[1]	
Quantity Type	The quantities that are associated with the current element type of the selected element.
Value	The calculated totals of the quantities for the selected element. In this field, you can also choose to manually edit the current value of any quantities if verified otherwise. The change will also be reflected in the Mini TOM view as well as in the Takeoff Manager view.
Units	The unit of measurement applied to the corresponding quantity type. These units are derived from the Project Settings view where the units of measurement were defined.
CAD Quantity Data: More Info...[2]	
Quantity Type	The quantities that are associated with the current element type of the selected element.
Value	The calculated totals of the quantities for the selected element. These values cannot be edited.

[1]Displays the quantities of the elements. This section includes both Vico Premium quantities (if the element has been quantified) and the Basic (CAD) quantities (CAD_Count, CAD_Length, CAD_Volume - these are the default CAD quantities and the ones that are mapped to the TOQ by the user).

[2]Displays only the CAD quantities published from the CAD.

Items	Description
Units	The unit type published from the CAD, if available. If you map a CAD quantity to a Takeoff quantity that does not have a unit, then Vico office sets its default unit to the mapped CAD quantity's unit type.

Manually Updating a Quantity of an Individual Element

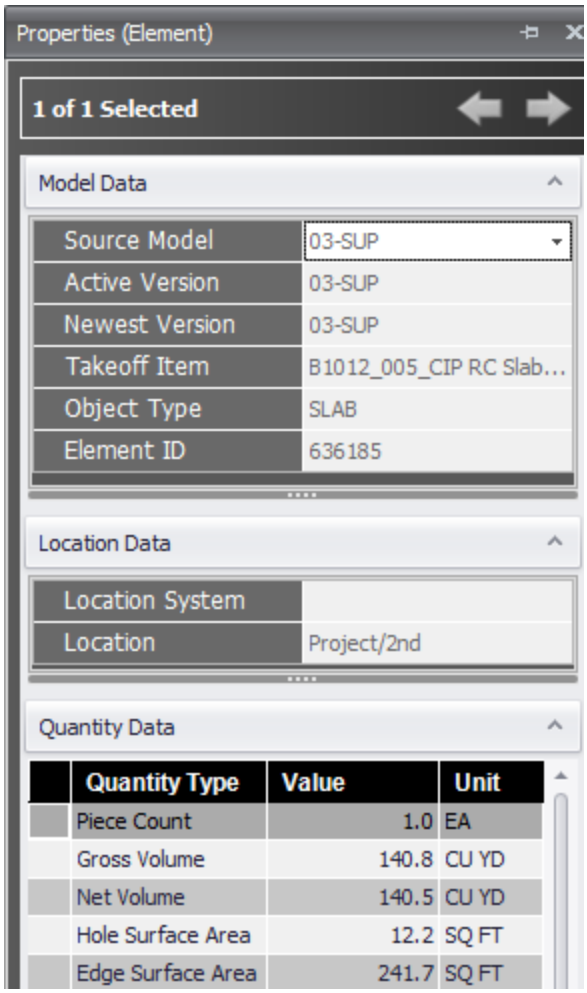
When elements are selected in the **3D View**, you can view the details for an individual element in the **Properties** palette.

To manually update the quantity of an element

1. Open and pin the Properties palette.
2. To select model elements, do one of the following:
   - Use the selection options in the **Takeoff Manager** view context menu.
   - On the ribbon, click the **3D View** tab > **Selection Mode**, and then click the desired elements.

   The selected elements are highlighted in red, and the **Properties** palette is activated.
3. To cycle through the individual element properties, click the arrow keys at the top of the palette.

   The selected elements are emphasized in the **3D View**. Detailed information is also displayed in the **Properties** palette for one element at a time.



4. If a quantity is verified and needs to be manually adjusted, click the **Value** column of the corresponding quantity type, and then enter the new value.

Assigning and Unassigning a Model Element in Paint Mode

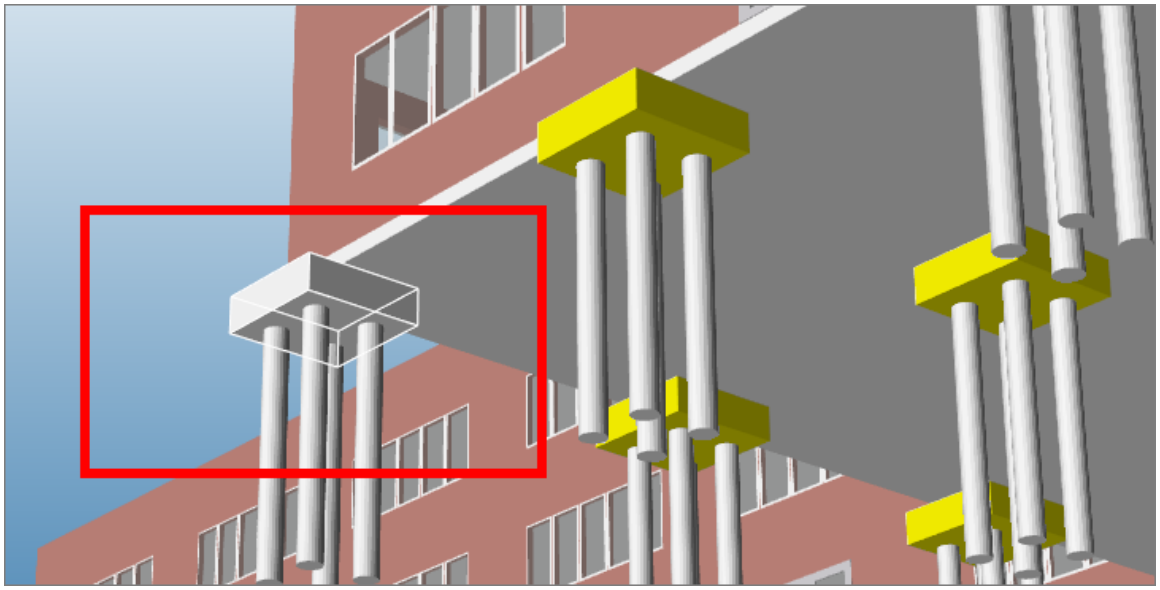
To assign and unassign elements using Paint Mode

1. Open the Takeoff Model task.
1. In the **Takeoff Manager** view, select the takeoff item that you would like to assign 3D elements to.

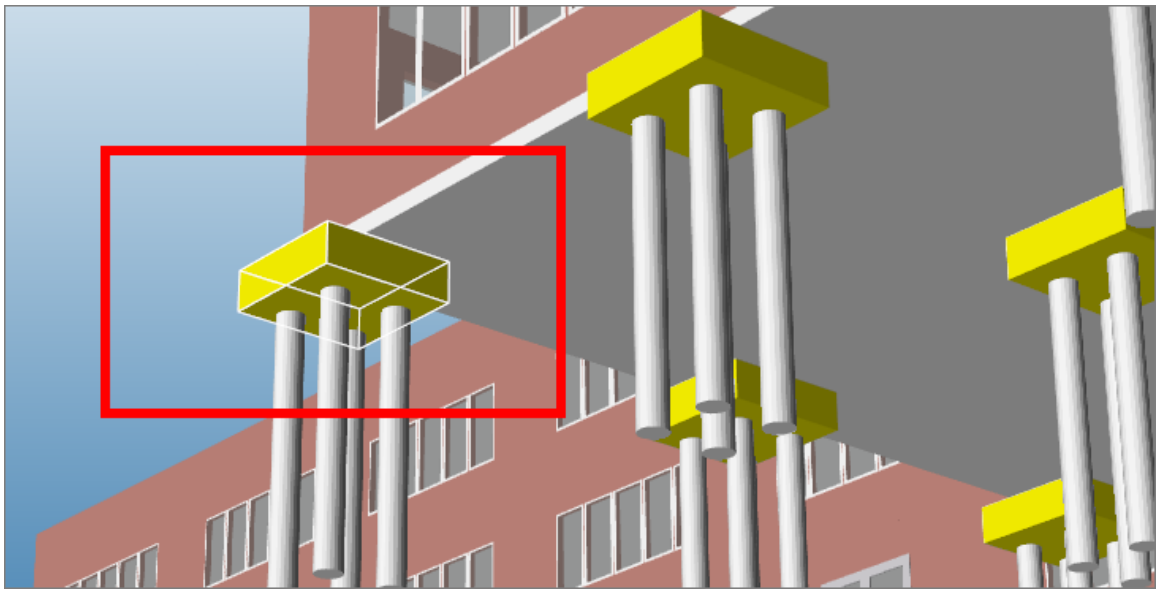
   Note: If Running Mode is turned on, the selected element will be highlighted with the selected mode.
2. On the **3D View** ribbon tab, click **Painting Mode**.

   Now you see that the cursor presents a paint brush.

3. Point the paint brush cursor at elements to see their outline. This is the 'Pre-Highlight' representation of elements in the model.



4. When you identify the element that you would like to assign to the selected takeoff item, click it. The element is now assigned to the selected takeoff item.



To unassign an element from a takeoff item

1. Open the Takeoff Model task.
2. Select the takeoff item that you want to modify.

   Elements associated with the selected takeoff item will be highlighted in the **3D View**.
3. On the ribbon, click the **3D View** tab > **Painting Mode**.

   Now you see that the cursor presents a paint brush.
4. Point the cursor at the element that you would like to remove from the currently selected takeoff item, and then click it.

   The element is no longer highlighted, which indicates that it is not assigned to the selected takeoff item. A new TOI is created with a 'Unassign-<ElementType>' name to ensure that the unassigned element is still included in a model's cost estimate.

Assigning an Element Surface to a TOQ

The Vico quantity extraction algorithms use the surfaces of model element geometry to calculate 'area' type quantities. If you want to assign a surface to a new or to another takeoff quantity, you can use the Painting tool to do this.

To assign model geometry to takeoff quantities

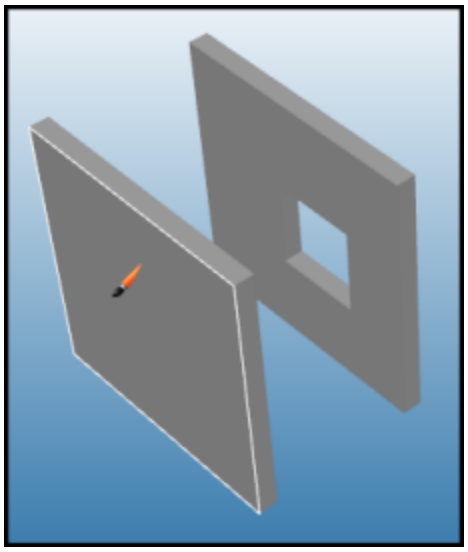
1. Open the Takeoff Model task.
2. To create a new takeoff quantity, select a takeoff item, and click **New TOQ** on the **Takeoff Manager** ribbon tab.
3. Select the new takeoff quantity, and move your cursor to the **3D View**.

	New Takeoff Item		No	
	Name	Unit	Mappec	Projec
	Bottom Surface Area	SQ FT	No	
	Count	EA	No	
	Ends Surface Area	SQ FT	No	
	Gross Volume	CU YD	No	
	Joint Horizontal Surface Area	SQ FT	No	
	Joint Vertical Surface Area	SQ FT	No	
	Length	FT-IN	No	
	Net Opposite Reference Side Surface Area	SQ FT	No	
	Net Reference Side Surface Area	SQ FT	No	
	Net Volume	CU YD	No	
	New Takeoff Quantity		No	
	Opposite Reference Side Opening Surface Area	SQ FT	No	
	Piece Count	EA	No	
	Piece Length	FT-IN	No	
	Reference Side Opening Surface Area	SQ FT	No	

The cursor changes to a paint brush.

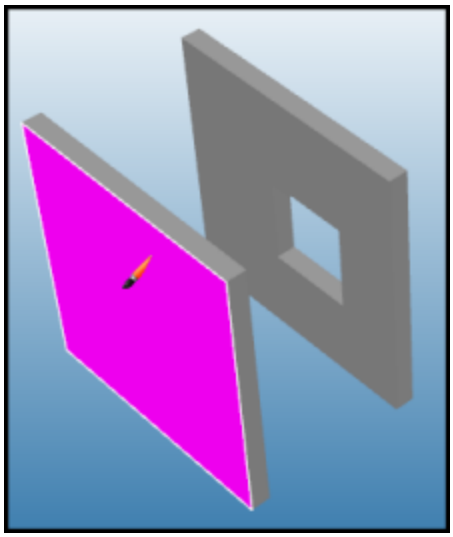
4. Point to an element that is assigned to the takeoff item of the selected takeoff quantity.

   The surfaces of the element are pre-highlighted.



5. Click the surface that you want to assign to the selected takeoff quantity.

   The surface is highlighted in purple and is used for automatic calculation of the selected quantity.



Running Mode

You can control the interaction with other views in the viewset using the Running Mode that has been implemented to optimize the program's ability to communicate 3D/4D/5D information to consumers.

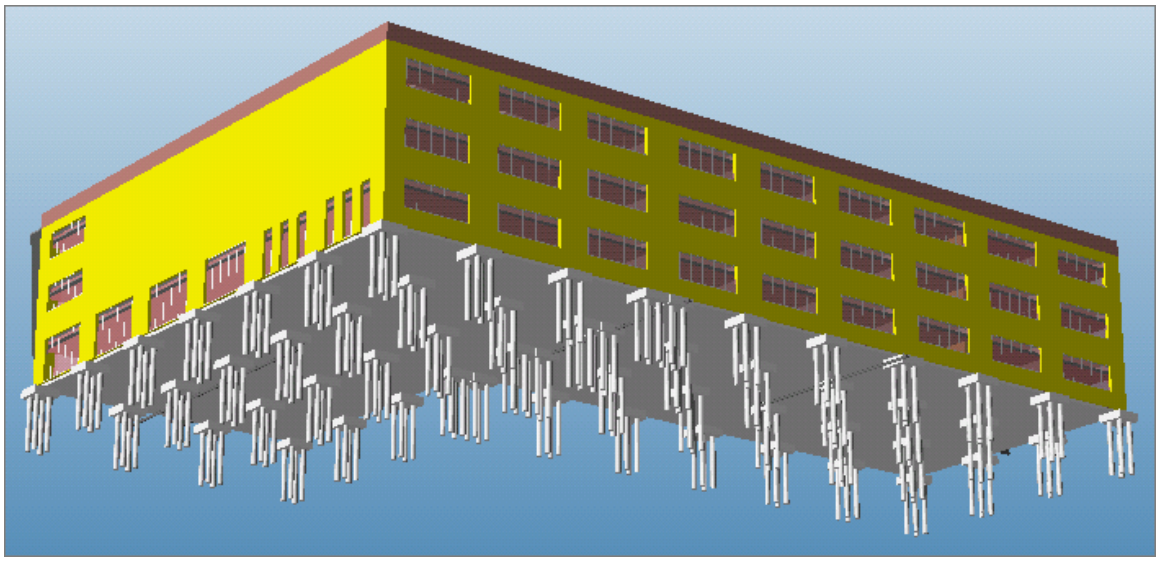
Running Mode is available for the Takeoff Model task and all takeoff 3D views.

Note: Running Mode is turned on by default. On the **Running Mode** tab, the **On/Off** button is orange when this mode is on.

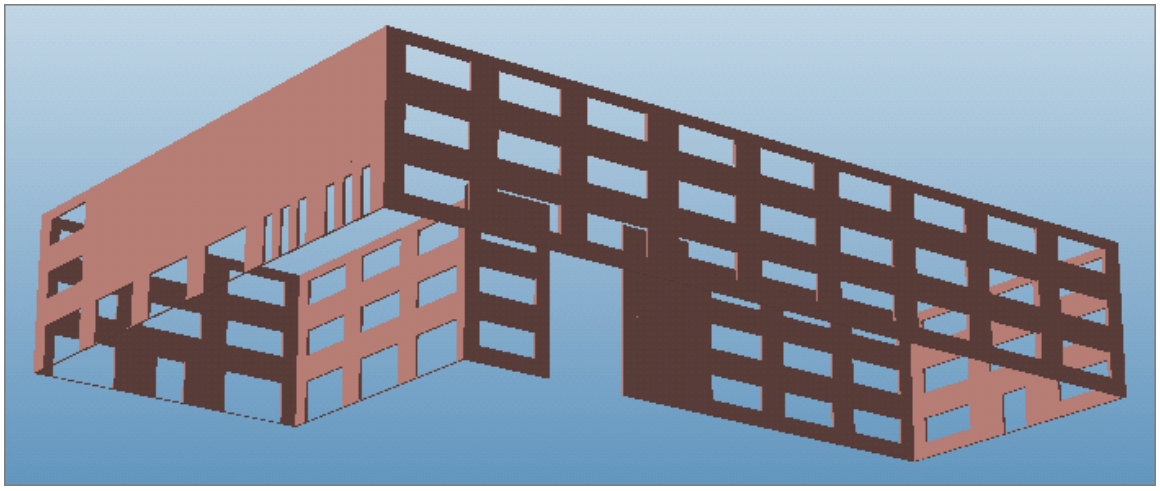
To turn on Running Mode

1. In the **Takeoff Manager** view, select the items to which Running Mode is applied.
2. On the ribbon, click the **Running Mode** tab.
3. Select the type of elements to which Running Mode applies.
   - **Linked to Selected:** Applies to elements that belong to the items selected in the **Takeoff Manager** view.
   - **Unlinked to Selected:** Applies to elements that are not related to the items selected in the **Takeoff Manager** view.
4. From the mode list, select the behavior.

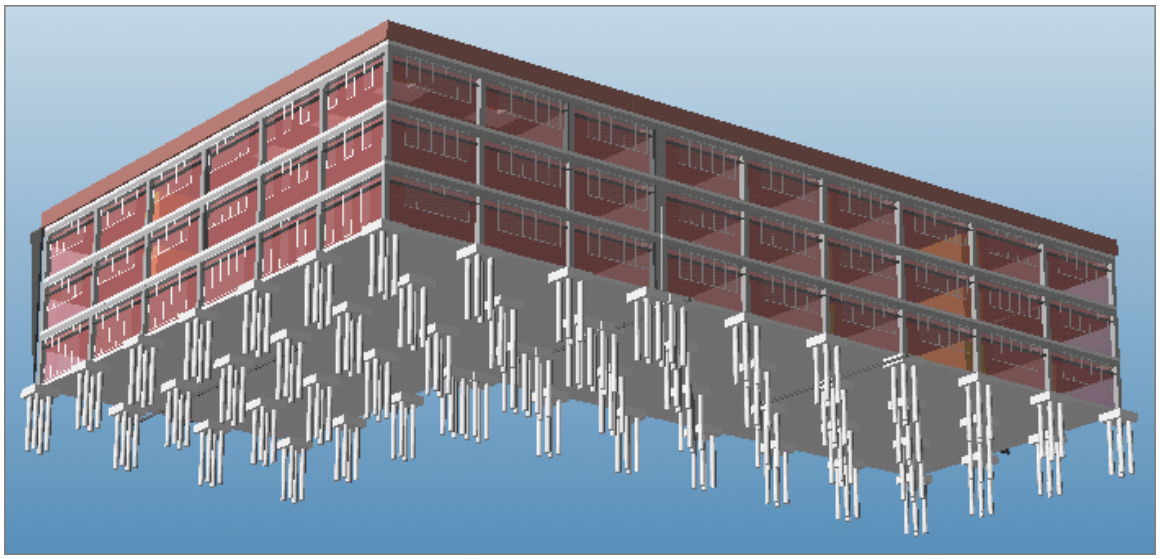
- **Highlight:** Elements are highlighted in yellow.



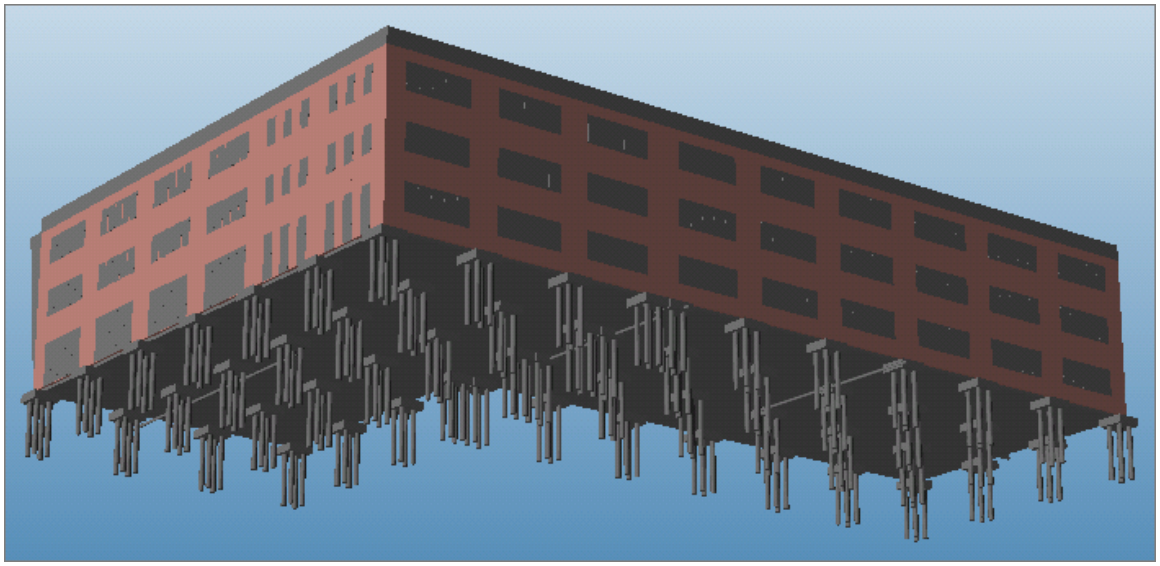
- **Isolate:** Elements are isolated.



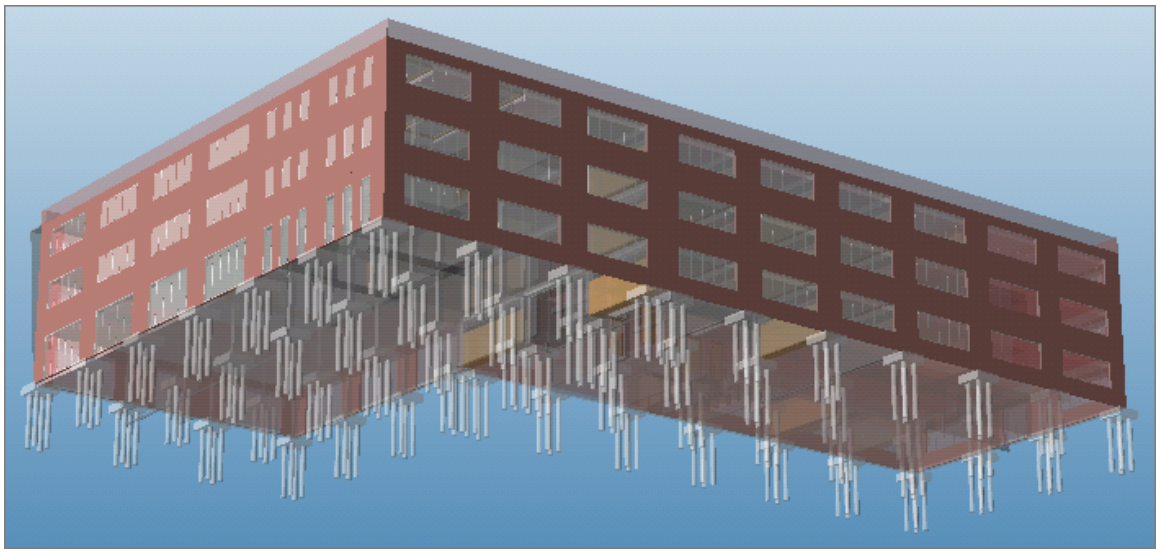
- **Hide:** Elements are hidden.



- **Dim:** Elements retain their original appearance, and everything else is solid gray.



- **Translucent:** Elements retain their original appearance, and everything else is translucent.



5. To zoom in to all associated 3D elements of the selected item, select the **Auto Zoom** check box.
6. To hide any elements that obstruct the target elements, select the **Auto Reveal** check box.
7. In the **Takeoff Manager** view, select the items to which Running Mode is applied.
8. To turn off Running Mode, click **On/Off** on the ribbon.

Manage Takeoff

Quantity takeoff in Vico Office means quantity takeoff by location. Vico Office automatically uses the locations of the used building information models and stores the quantities of takeoff items for each of these locations. An overview of the quantities per location is provided by the **Takeoff Manager** view, a grid system with takeoff items and takeoff quantities presented as rows, with the project's locations as columns.

To open the Manage Takeoff task

1. Right-click the Workflow Panel header, and then click **Takeoff Manager**.
2. In the **Takeoff** workflow group, click **Manage Takeoff**.

   The default viewset includes the Takeoff Manager view.

Creating a New TOI for a Non-Model-Based Item

In the **Manage Takeoff** task, you can investigate each takeoff quantity per location. For information on creating the location-based structure, see "Define Locations" on page 356. You can also add more non-model based takeoff items to the list.

Before you start working with takeoff items, make sure that all your relevant models have been activated in the **Model Register** view. For more information, see " Activating a Model" on page 233. Without this step, the takeoff items are not visible in the **Takeoff Manager** view.

To create a new takeoff item

1. Open the Manage Takeoff task.
2. On the **Takeoff Manager** ribbon tab, click **New TOI**.

   –Or–

   Right-click a TOI, and then click **New Takeoff Item**.

   A new TOI line is added above the currently selected line item.
3. In the **Code** and **Description** fields, name and classify the TOI as desired.
4. In the **Type** field, define the model element type for which you will manually account.

   The selected TOI element type then defines which TOQs should be applied and calculated.

		New Takeoff Item		No	0
	Name		Unit	Mappec	Project
	Count		EA	No	0.0
		New Takeoff Item (0)		No	0
		New Takeoff Item (1)		No	0
		New Takeoff Item (2)		No	0
		New Takeoff Item (3)		No	0

5. Enter the manual quantity totals as desired in the Project Total and Location Total fields.

   In this way you can account for manual quantities at the location or at the project Level.

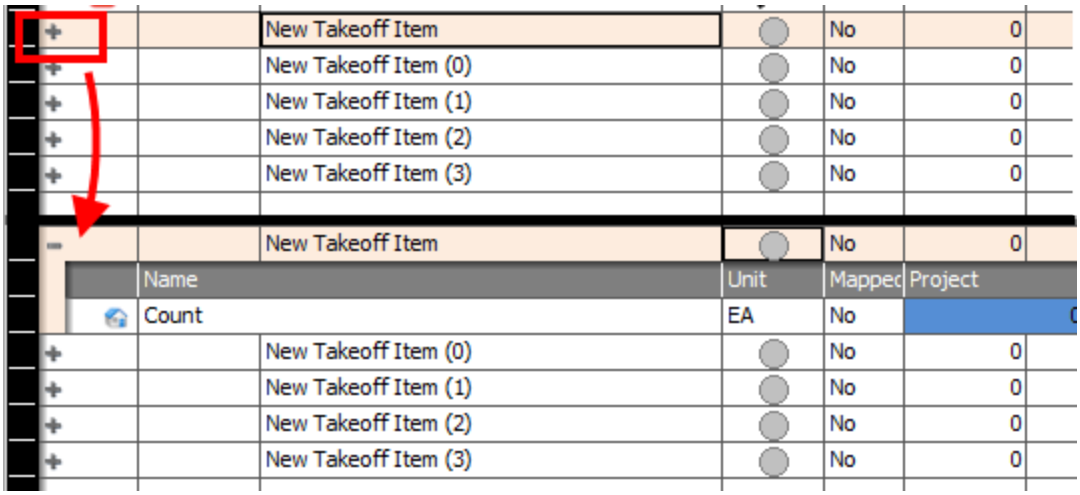
   After you manually create takeoff items, you can fill the **Count** column manually, or you can navigate to the **Takeoff Model** workflow item and assign model elements for it, using the Paint functionality on the ribbon.

Creating a New TOQ for the Input of Manual Quantities

After you activate your models, a list of the takeoff items appears in the **Manage Takeoff** task. By clicking the plus sign in the left side of each takeoff item, a spreadsheet appears to present a list of the related takeoff quantities. You can complete the list of the takeoff quantities with any individual quantity you need.

To create a new takeoff quantity

1. Open the Manage Takeoff task.
2. To the left of the takeoff item for which you want to add the takeoff quantity, click the plus sign to expand the item.



3. If you select the type of the takeoff item, the related set of takeoff quantities is displayed in a list.

   –Or–

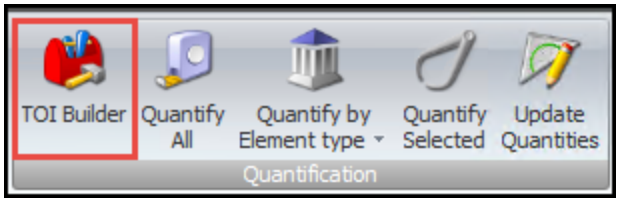
   To define a manual quantity not currently calculated in the TOI, click **New TOQ** on the **Takeoff Manager** ribbon tab, or right click the takeoff item, and then click **New Takeoff Quantity**.

   A new takeoff quantity item is added below the selected line.

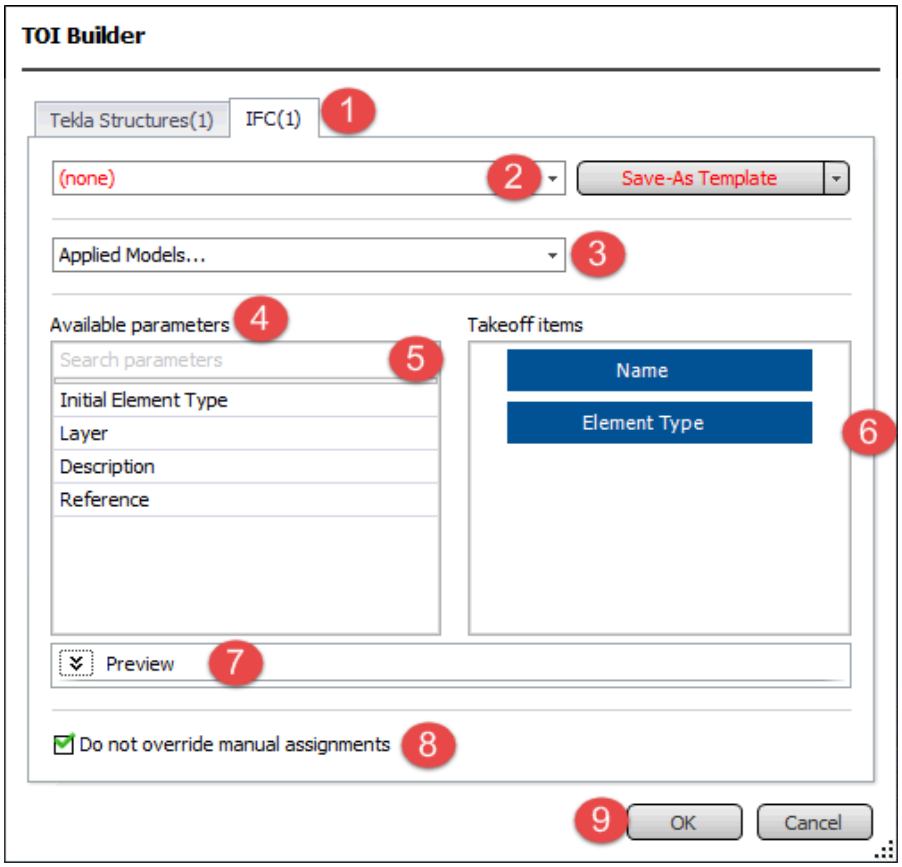
4. In the **Name** and **Code**, define the takeoff quantity.
5. Enter the manual quantities in the Project Total or in the Location Total fields.

TOI Builder

The Takeoff Item (TOI) Builder, which is available from the ribbon on the Takeoff Manager module, is designed to give you the flexibility to group your Takeoff items after the model has been activated. Once you have grouped your Takeoff items, you can quantify them.



Takeoff Manager ribbon

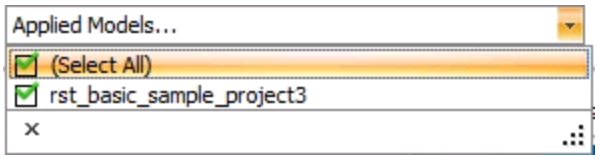


TOI Builder dialog box

1 - Platforms: The number next to each publisher tab represents the number of active models from each publisher. The TOI Builder will display a tab for each CAD platform that has published models to the current project.

2 - Template List: When you set how you want you want your Takeoff items to be grouped, Vico Office allows you to save these settings in a template that can be re-used in the future. For more information, see Templates.

3 - Applied Models: Select the active models that you wish to apply the current settings to. By default, all the active models are selected.



4 - Available Parameters: Lists all the available parameters from each publisher that can be used to group Takeoff Items. These parameters are based on the standard, advanced, and IFC parameters that you chose to include when publishing your model (see the Advanced Settings from the Publish Data dialog box) from your CAD tool. To select a parameter, simply click and drag it over to the Takeoff Items section. If you decide to remove a parameter from the Takeoff Items list, simply click the 'x' next to the parameter. The parameter is added back to the Available parameters list.
The order in which the parameters are listed on the Takeoff Items section will define the takeoff item name.

5 - When you have a long list of parameters, use the Search Parameters box to help you to quickly locate the parameters. Enter the first few letters of the parameter.

6 - Lists the parameters that will be used to group the Takeoff Items.

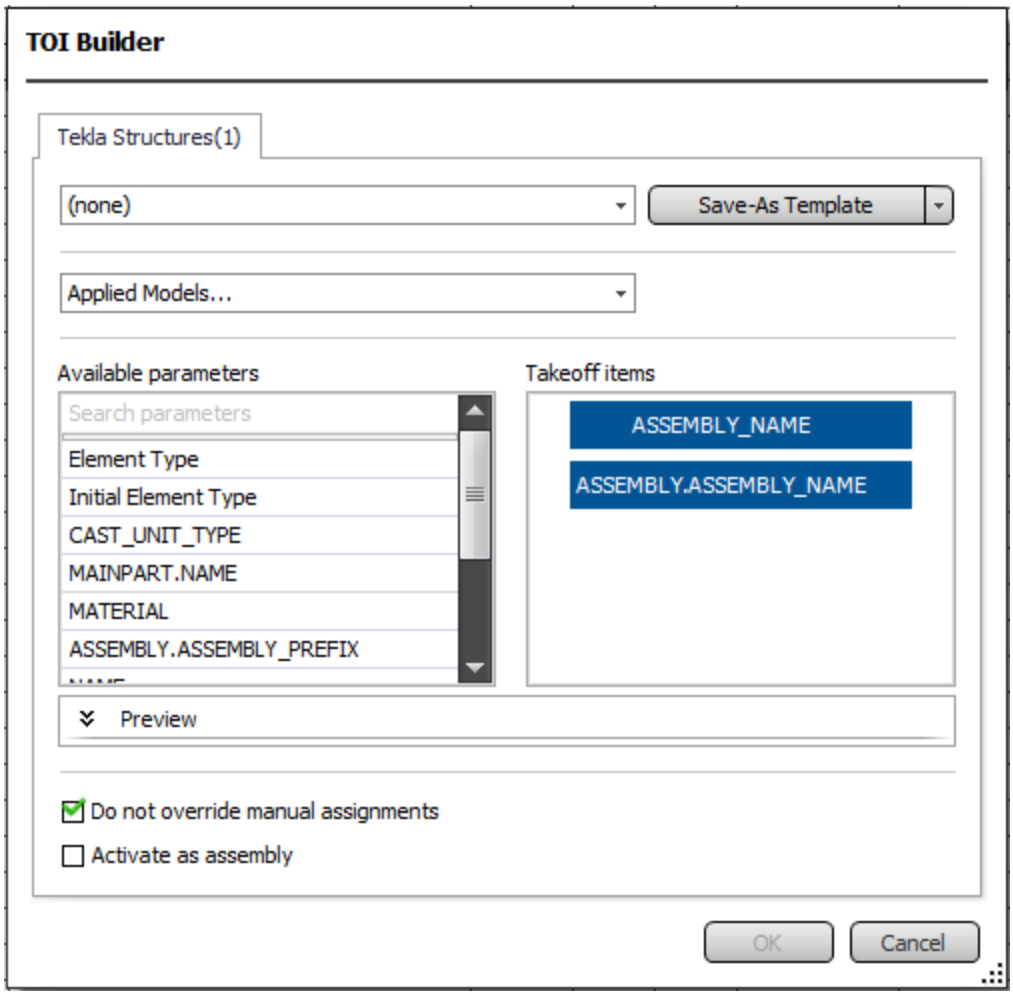
7 - Click on the down arrows to preview what the Takeoff items will look like after they are grouped.

8 - Do not override manual assignments: Select this check box if you do NOT wish to remove any previous manual assignments that were made. If a TOI was regrouped and had a manually assigned element within it, the manually assigned element will inherit the new grouping nomenclature. New elements published to the system will automatically inherit the grouping structure that is assigned for the given platform, or it will default to the standard parameter if no customization was made.

9 - Click 'OK'. The Takeoff items are automatically regrouped based on the specified settings.

Activating Assemblies - Tekla Only

If you wish to view the actual structure of an assembly, select the 'Activate as Assembly' check box. Note that this option is only available if there are published assemblies.



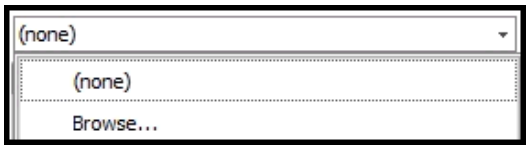
Templates

The TOI Builder has a 'template' feature that saves the parameters that were chosen.

When viewing a template, if you change the settings (i.e., select/clear an element/parameter to be published), the template name and Save button color changes to red to indicate that the template has been modified.

To open an existing template

- Click Browse and search for the template.



Template name field

The template is imported to your local machine:

c:\Program Files\Vico Software\Vico Office (x64)\ParameterTemplates

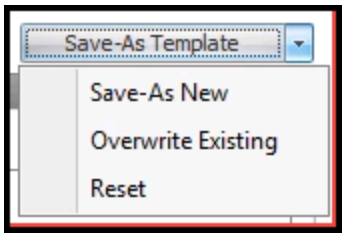
If there is a name conflict, the imported template will be appended with a number: e.g., "Architectural Template (2)".

To save your selected settings

- In a new template: Enter a unique name in the Template name field and click **Save-As New**. The template is stored in your database. It is also stored in your local machine as an XML file:

  c:\Program Files\Vico Software\Vico Office (x64)\ParameterTemplates

  The XML template file on your local machine has the server name appended to the beginning of the template name.
- To an existing template: Click **Browse** to locate that template, and click **Overwrite Existing.**



Save action button

To delete a template

- Select the template to delete and click ✘.

To rename a template

- Select the template to edit and click . Enter the new name and press Enter.

Note: When applying TOI Builder settings to a CAD model, some elements may not be assigned to a Takeoff item. In this case, they are labeled as 'Unassigned_<ElementType>'.

Quantifying Takeoff Items

Takeoff items that have not been quantified will have the CAD quantities (Basic Quantities) from the published models. Using Vico Office to quantify Takeoff items involve a more sophisticated process that includes Vico algorithm and locations.

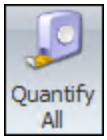
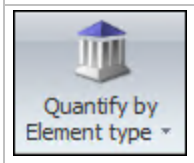
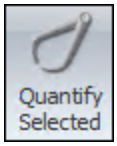
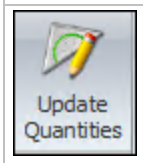
Takeoff items that have not been quantified by Vico Office appear italicized in Takeoff Manager.

Info	Code	Name	Type	Mappec	Count
		STB Stütze - rund		No	131
		Name	Unit	Mappec	Project
		CAD_Count	EA	No	131.00
		CAD_Length	FT-IN	No	1460'-2 3/8"
		CAD_Volume	CU YD	No	41.15

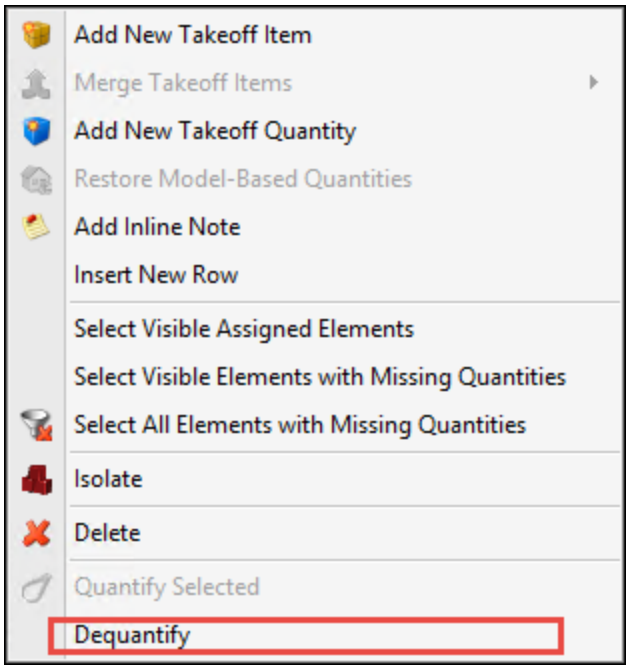
Once they have been quantified, the Premium Quantities include additional TOI components.

Info	Code	Name	Type	Mappec	Count
		STB Stütze - rund		No	131
		Name	Unit	Mappec	Project
		Count	EA	No	131.00
		Height	FT-IN	No	1460'-2 3/8"
		Vertical Surface Area	SQ FT	No	4,502.22
		Top Surface Area	SQ FT	No	98.54
		Bottom Surface Area	SQ FT	No	98.54
		Hole Surface Area	SQ FT	No	0.00
		Net Volume	CU YD	No	40.68
		Gross Volume	CU YD	No	40.68
		Joint Horizontal Surface Area	SQ FT	No	0.00
		Joint Vertical Surface Area	SQ FT	No	0.00
		Piece Count	EA	No	131.00
		Piece Height	FT-IN	No	1460'-2 3/8"
		CAD_Count	EA	No	131.00
		CAD_Length	FT-IN	No	1460'-2 3/8"
		CAD_Volume	CU YD	No	41.15

Vico Office offers various options in which to quantify your Takeoff items:

Ribbon Item	Description
	Quantifies all the Takeoff items in your list. This process may take some time depending on the number of Takeoff items.
	Quantifies only the Takeoff items with the selected element type, such as Beams, Curtain Walls, Columns, Ducts and more.
	Quantifies only the Takeoff items that are selected. Use CTRL+click to multi-select.
	Quantifies out-of-date takeoff items.

If you decide not to use Vico's premium quantities, you can 'switch back' to CAD quantities by 'Dequantifying' a Takeoff item.



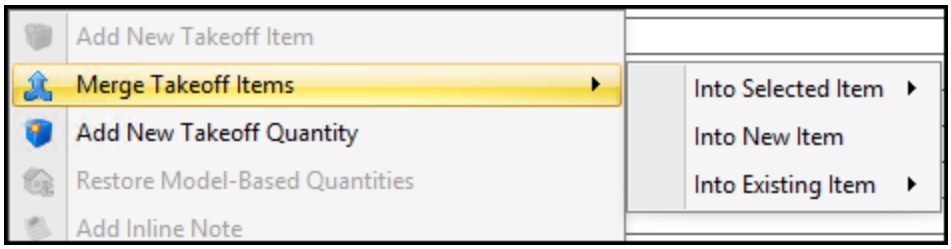
Tip: Takeoff items may need to be re-quantified if you switch to a another model version.

Merging Takeoff Items

Vico provides you with the ability to manage the level of granularity for your Takeoff items. Detailed Takeoff items can be merged into a selected Takeoff item, into a new item, or into an existing item.

To merge Takeoff items

1. Open the Manage Takeoff task.
2. On the Takeoff Manager tab, use the CTRL key to multi-select the Takeoff items that you wish to merge.
3. Right-click on the selected items to open the context menu.



4. Choose how you want to merge the selected Takeoff items:
   - **Into Selected Item:** Merges the Takeoff items into one of the selected items. The quantities are all merged into the selected TOI.
   - **Into New Item:** Merges the selected Takeoff items into a newly created Takeoff item.
   - **Into Existing Item:** Merges the selected Takeoff items into an existing one (not already selected).

   Note:
   - If you are planning to merge quantified Takeoff items with unquantified ones, you will be prompted to quantify them before the merge.
   - Merged Takeoff items are not removed from the list.

Takeoff Manager - Additional Info

Vico Office performs its own calculations on all of the elements coming into the system; it does not rely on the quantities being provided by the CAD systems, as they sometimes do not match the needs of the construction industry. Also, internal calculation is required in order for Vico Office to be able to split locations and subsequently provide split quantity values.

When performing so many internal calculations, there is a possibility that some items may not get quantified as expected. Warning icons have been added to the UI to help identify these cases:

Message	Meaning
The Takeoff item contains elements which have erroneous geometry. Quantity painting for these elements will not change the surface quantities	At least one element of the TOI has bad geometry. Possible causes: failed split or publishing problem from CAD application.
This Takeoff item contains missing quantities	At least one TOQ of the TOI has a 0 value on at least one location and this TOQ is not allowed to have 0 values. This problem is most likely caused by the previous problem (bad geometry, failed splits, etc.). The user can select from context menu the elements of the TOI with missing quantities and check them in 3D view. They could assign manual values to the 0 TOQ values, but that's generally a poor solution; Issues should be escalated to our technical support team to allow our developers to investigate the problem and solve the real cause of it.
The element splitting action has caused an overall quantity difference by more than ½% compared to the original element	This means that the safety check which compares the sum of derived element volumes to the original element volume after the element was split has found higher than expected quantities. In other words, the element splitting had an error.
Some of the associated Elements have no geometry data	This means that at least one element of the TOI was published from the CAD without geometry. This might be intentional or it might be a problem. User has to decide whether this is by design or not. If not, it needs to be fixed on the CAD side.

Additional Notes:

- Walls that contain window or door elements that span from bottom to top may result in incomplete quantities in Vico Office, because the Vico Office calculation does not recognize both sides of the window or door elements as part of the same side of the wall.
- "Units of Measurement" should be defined in the Project Settings before inserting data. Changing the "Units of Measurements" will not update the units of existing Takeoff quantities.
- When you select the quantity "Hole Surface Area" for slabs or "Opening Surface Area" for walls, no geometry will be highlighted in the model but the opening area is correctly calculated.

- Quantities for roof elements that have a hole, of which the sides are not perpendicular to the roof's top and bottom, may not be correct.

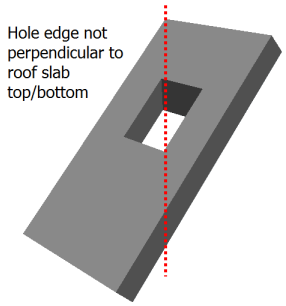


Figure 4 - Roof element with hole edges not perpendicular
to the roof element's surface.

- "Thickness" quantities are not currently calculated for Roof elements and Surface (or Mesh) elements.
- When using Revit's "Solid Element" operations to subtract a volume from a slab, the "Top Surface Area" that is returned includes the "Top Surface Area" of the element that was used to subtract the volume.

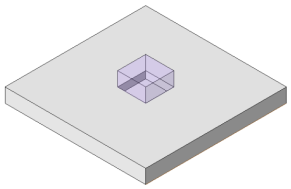


Figure 5 - Sample Slab element with solid
element operation applied to it.

- Some predefined Door and Window families from Revit contain a "Height" property that does not match the standard name for this property or a "Height" property value that equals "0." As a consequence, "Height" may be missing for instances of these specific Door Window families.
- When publishing models from ArchiCAD, geometry of elements on Layers that are not visible at the moment of publishing to Vico Office will be skipped during the publish operation and result in "Missing Geometry" notifications in Takeoff Manager.
- Slanted wall elements will not return correct surface areas.
- When a wall element has been trimmed diagonally at its bottom, there is no bottom edge that is parallel with the wall's reference line. As a consequence, none of the sides will be classified as "Refer-

ence" or "Opposite Reference" side. The result is that all vertical surfaces of the wall element are included in the "Ends Surface Area" quantity.

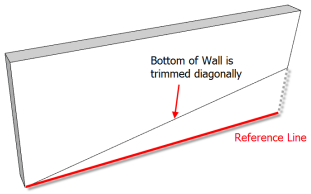


Figure 6 - Wall element trimmed along its base.

- There may be instances where a distinction between a profiled or rectangular beam and column cannot be made automatically so may not classify correctly in TOM. If you use element type to filter or sort your TOIs then you can select the incorrectly classified TOI and override the element type so it is correct. The calculations are identical for both types so your TOQs will still be correct whether you chose to correct or leave as is.
- The following quantities are missing for stair elements modeled in Revit: "Riser Surface Area," "Side Surface Area," and "Bottom Surface Area."
- Column/Wall issue: when a column element is "embedded" in a wall element (due to a specific setting in ArchiCAD), the quantities of the column can be incorrect - typically the quantities are larger than expected.
- The representation of certain Stair elements is different in Revit 2012 and Revit 2013. As a consequence, calculated surface areas and volumes in Vico Office may differ.
- When Vico Office detects geometry with nested inner loops, it marks the geometry as "incorrect". This is treated as partially bad geometry, which will not be able to supply any surface quantities. All the surface quantities of such geometry will always be 0 and TOQ painting will not be able to change these surface quantities. In the user interface, the surface TOQs that belong to such elements will all have 0 values and will appear with red text and red exclamation mark.

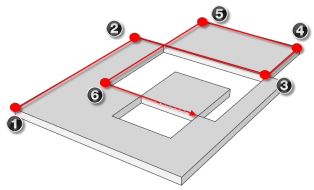


Figure 7 - "Nested Inner Loops" are created when the edge of an element intersects itself, thus creating what appear to be holes in 3D.

- When a single Slab element consists of multiple disconnected solid entities with one or more of the solids fully enclosed in the other solid, and the enclosed solid's base is on a higher level, the

calculation rules will fail to correctly return the Edge Perimeter.

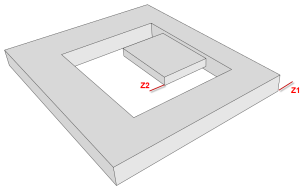


Figure 8 - Element with multiple solids enclosed in it and base levels on different elevations. In this example, “Z1” is lower than “Z2”, which will return only the perimeter of the element on the “Z1” level.

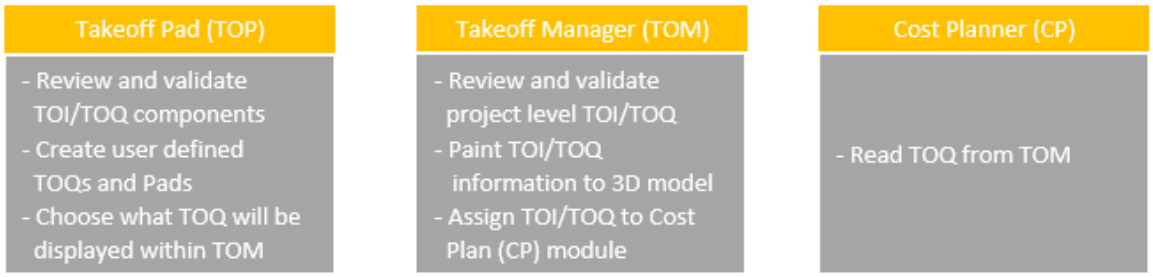
- Further information on Vico Office’s calculation rules is provided in the Help file and on our website, via this link.

Takeoff Pad

Takeoff Pad, an extension of Takeoff Manager, provides a more granular view and manageability of the individual takeoff components. Takeoff components collectively form the basis of a takeoff item.

Information that is created or manipulated in Takeoff Pad (TOP) automatically rolls up to the Takeoff Manager (TOM) without any additional action required. You can create your own sets of quantities (takeoff pads), as well as control the display of default and/or user-defined takeoff quantities (TOQ) that feed TOM.

Takeoff Pad gives you maximum flexibility in controlling your quantities, while TOM remains a streamlined UI specifically used for linking quantities to the cost plan. The following workflow is typically used:



In Takeoff Pad, you can also create non-model-based takeoffs, which can be applied to 2D drawings or 3D models. For more information, see 301, 296, and 299.

To open the Takeoff Pad task

1. Right-click the Workflow Panel header, and then click **Takeoff Manager**.
2. In the **Takeoff** workflow group, click **Takeoff Pad**.

The default viewsets include the following:

- Takeoff Pad view
- Document Register view
- Takeoff Manager view
- 3D View

Creating a Custom Takeoff Pad

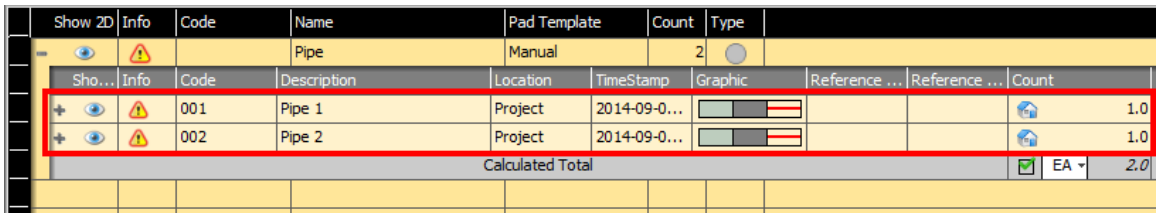
Takeoff pads are collections of quantities that are associated with project elements. Several takeoff pads for traditional elements, such as slabs or walls, ship with the program by default. You can add to those default pads by creating custom pads, which can be saved into the project and applied to other TOIs as desired. You can also share takeoff pads between projects when you transfer TOIs in the Compare & Update task.

Before creating custom pads, review 67 and 2.

To create a custom takeoff pad

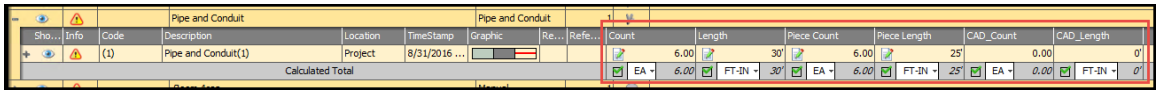
1. Open the Takeoff Pad task.
2. Click in the **Takeoff Pad** view.
3. On the **Takeoff Pad** ribbon tab, click **New TOI**.

   Tip: You can also edit an existing TOI.
4. To add components to the manually created takeoff item, click **New TOI Component** for each component.



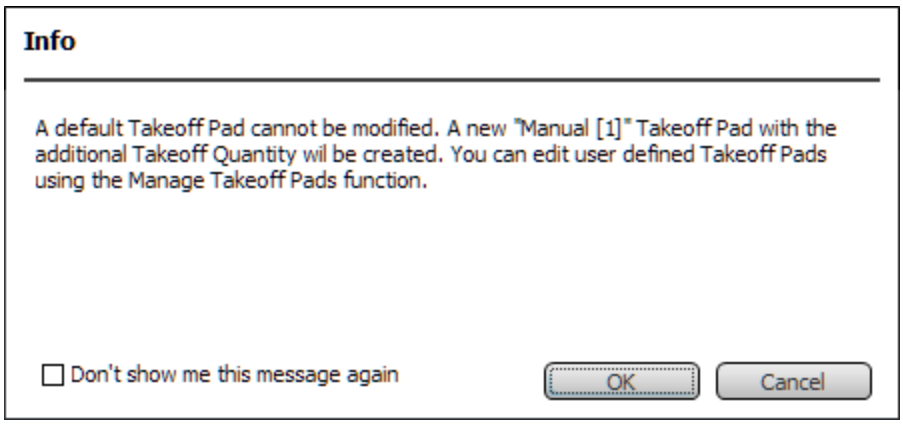
   Note: The notification icon indicates that at least one of the associated elements has no geometry data. Model elements can be associated to manually created takeoff items in the **Takeoff Model** workflow item.
5. In the **Pad Template** column, define the type of the created takeoff item.

The type of the TOI is changed automatically, and the needed takeoff quantities are automatically added under the takeoff item.



Note:

- Newly created TOIs/pads are called 'New Takeoff Item' by default. Each new pad that is created thereafter is indexed by number (for example, New Takeoff Item[1], New Takeoff Item [2], and so on).
- The **Count** column contains the default quantity applied after creating user-defined pads. A message is displayed with each new pad, so you know that the new item is managed separately from all other pads.



6. For each TOI, you can do any of the following:
   - On the ribbon, click **Manage TO Pads** to rename it, add a comment, or delete it.
   - Add a new instance of a TOI component that is to be quantified.
   - After creating a TOI component, create TOQs for each unique pad by selecting the TOI parent and clicking **New TOQ**.

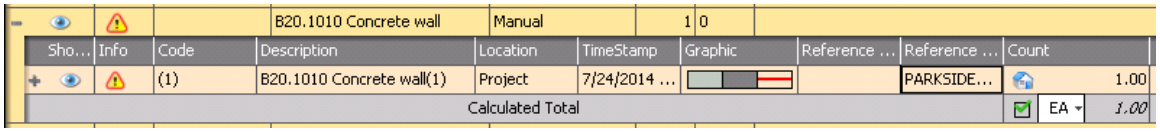
Creating a new TOI component

You can also add a new instance of a TOI component that is to be quantified. This is required if you want to add takeoff quantities.

To create a new TOI component

1. Open the Takeoff Pad task.
2. Select the takeoff item that you want to quantify.
3. On the **Takeoff Pad** ribbon tab, click **New TOI Component**.

   A TOI component is added directly below the selected TOI.



The following information is created for each TOI component:

- **Show:** A show/hide option for the display of TOQs created using onscreen takeoff functions.
- **Info:** Indicates that there is a problem with the quantities, which typically requires a model reactivation. Reactivating the model will push all of the 2D/3D quantities through the project locations.
- **Code:** A user-defined value that can be used for sorting and grouping.
- **Description:** Detailed information about the individual TOI component.
- **Location:** Project locations where the quantities will appear when they roll up to TOM. Optionally click the ellipsis button ... to change the location in the Select Location dialog.
- **TimeStamp:** The date and time when the new element was created (populated by default).
- **Graphic:** Display preferences applied to onscreen takeoff elements. Click the ellipsis button ... to display the Graphic Settings dialog and select the preferred display.

  Note: Select the 'Set as Default' check box ONLY if you wish to apply these settings to all the takeoff geometry (includes all previously calculated and future ones).
- **Reference Documents:** The name of 2D drawings onto which onscreen takeoffs are applied (populated by default).
- **Reference Models:** The name of 3D models onto which onscreen takeoffs are applied (populated by default).
- **Count:** The default takeoff quantity (TOQ) that is assigned to a takeoff component.
- **CAD_Quantities**: (Basic Quantities) The quantities from the published CAD model provide a quick way to get started.

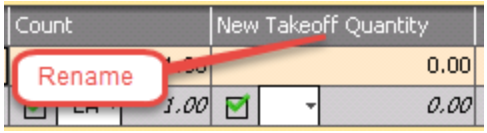
Adding Takeoff Quantities

After a new takeoff item (TOI) is created and associated with a new takeoff pad and a TOI component has been created, you can add user-defined quantities.

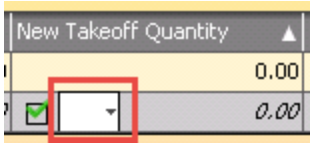
To add takeoff quantities (TOQ)

1. Open the Takeoff Pad task.
2. Select the TOI component for which you want to add a TOQ, and then click **New TOQ** on the **Takeoff Pad** ribbon tab.

   A new takeoff quantity is created next to the default **Count** TOQ. New TOQs are called 'New Takeoff Quantity' by default within the column header. It is highly recommended that you rename it before proceeding.



3. To define the unit of measurement that is associated with the TOQ, click in the white box of the new TOQ, and then select the unit from the list.



   Note: Selecting the unit of measurement enables each onscreen takeoff buttons when moving into the takeoff portion of the workflow.

   - If the component is intended to be an area-based takeoff, select **SQ FT** or **SQ YD**.
   - If the component is intended to be a length-based takeoff, select **FT** or **M**.
   - If the component is intended to be a count-based takeoff, select **EA**.

Each newly created pad can contain any subset of user-defined quantities. All the quantities that are created within a new pad are automatically applied anytime the pad template is applied to another TOI.

After TOIs, components, and pads are properly set up, you can use the onscreen takeoff commands for generating new quantities. For more information, see 295.

Switching to New Model Versions

When adding a new manual element, Vico automatically applies the default formula to the new elements because thy receive all the settings of the TOI (e.g., element type, default formula, etc.). The same behavior occurs with TOI painting: the new element receives the settings of the TOI. However, when you switch to a new model version, the default formula is not automatically applied to manually added TOQs. To apply the default formula to the TOQ, right-click on it and select 'Apply Default Formula'.

Onscreen Takeoff

3D models do not always include all the elements needed to quantify and complete the estimate, so you can add onscreen takeoffs to the project to supply the missing information.

Onscreen takeoffs can be applied in different ways:

- **2D Takeoff:** Linear, area, and count quantities can be extracted from 2D drawings that are included in the project via Document Controller.

  Note: 2D PDF drawings can only be imported in the Document Controller module, so a license is required if you wish to extract quantities from 2D drawings.
- **3D Takeoff:** Linear, area, and count quantities can be extracted from 3D models that come into the program via the Model Register.
- **Hybrid Takeoff:** Document Controller allows for a hybrid environment, whereby 2D PDF drawings can be scaled and mapped onto 3D models. Linear, area, and count quantities can be extracted from this hybrid environment.

Note: The availability of the onscreen takeoff commands on the **Takeoff Pad** tab depends on the quantity type that is assigned to a TOQ column. For more information, see 294.

Scaling Drawings

Before starting any onscreen takeoff, scale up the construction drawings, which are typically printed out at a scaled representation, so you can get proper quantities from them.

To scale a drawing

1. In the **Document Register** view, right-click the document, and then click **Define Scale**.
2. In the **Scale Document** dialog, type the values for the drawing's printed scale.

   This information is typically found in the drawing title block or in the annotations just below a drawing detail section.

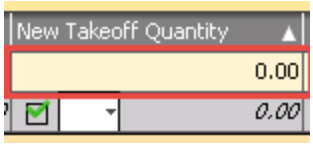
Linear Takeoff

You can extract distance information between two or more points by selecting snap points, selecting polylines, or calculating the perimeter.

Note: The **Linear** button on the **Takeoff Pad** tab is available only after you select **FT** or **M** as the unit of measurement.

To enable linear takeoff

1. Open the Takeoff Pad task.
2. After adding a takeoff quantity and selecting **FT** or **M**, click the cell directly above the white box.



The **Linear** button on the **Takeoff Pad** tab is now available.

Snap Points

Create lines between two distinct points, which can be selected from the drawing and/or model using the snapping options in the navigation tool bar.

To measure the distance

1. On the **Takeoff Pad** ribbon tab, click **Linear** > **Snap Points**.
2. In the **3D View**, click the start point, any intermediate points, and then the end point.
3. After selecting all the points, press **Enter**.

   The distance between the points is calculated.

Tip: To re-measure, simply change the quantity to '0'.

Pick Lines

Automatically detect polylines coming from 2D drawings.

To detect polylines

1. On the ribbon, click **Linear** > **Pick Lines**.
2. In the **3D View**, point to the lines.

3. To select a line, click it.
4. To trim or edit a line:
   - **Ctrl** - Continuously select multiple lines.
   - **Shift** - Divide the lines into smaller parts, When you press **Shift** and click the line, the small parts are selected.
   - **Combo** - Select multiple small parts to extend the line in increments.
5. After selecting the lines, press **Enter**.

Get Perimeter

Linear values can also be extracted from the perimeter of shapes that are created using the area takeoff tool.

To calculate the linear value from the perimeter

1. Click in the linear quantity cell that you want to populate with perimeter values.
2. On the ribbon, click **Get Perimeter**.
3. Select the shape for which you wish to calculate its perimeter.

   When the cursor hovers over the shape, the lines of the shape are bold.
4. After selecting the shape, press **Enter**.

   Using the shape perimeter will increase the linear quantity.

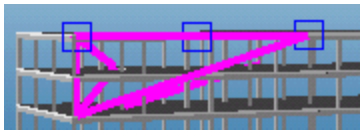
After choosing to extend a pad with this information, you should enter a number for the 'rise/fall' information, as well as the 'run' over which rise/fall will take place. This will then provide the 'Measured Length' TOQ, as well as quantifying the 'Actual Length' according to the modified third dimension of information.

Moving and Adding a Grip

After a linear takeoff has been added to the system, you can modify it by moving or adding a grip.

MOVING A GRIP

When creating the polyline for a linear takeoff, each mouse click that occurs creates a grip. Grips can be seen by first selecting inside the TOQ cell of the Takeoff Pad and then selecting the polyline in 3D. The grips appear as blue squares.



To move a grip

- Click and drag a grip to another location to move the polyline position and change the linear quantity accordingly.
- Select an endpoint grip and move it to pivot the polyline. The other end point in the original location will not move.
- Select the mid-point grip to reposition the entire polyline, including both end point grips.

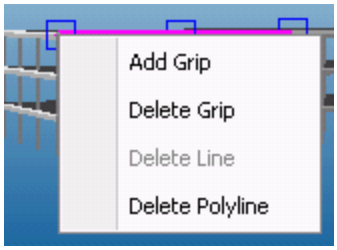
ADDING A GRIP

If the existing grips of a polyline are insufficient for the desired edits, additional grips can be added to the polyline.

To add a grip

1. Open the Takeoff Pad task.
2. Click the takeoff quantity cell.
3. Right-click inside the polyline 3D view.

   A context menu appears.



4. Click **Add Grip**.

   Another grip is added in the middle of the selected polyline for advanced editing.

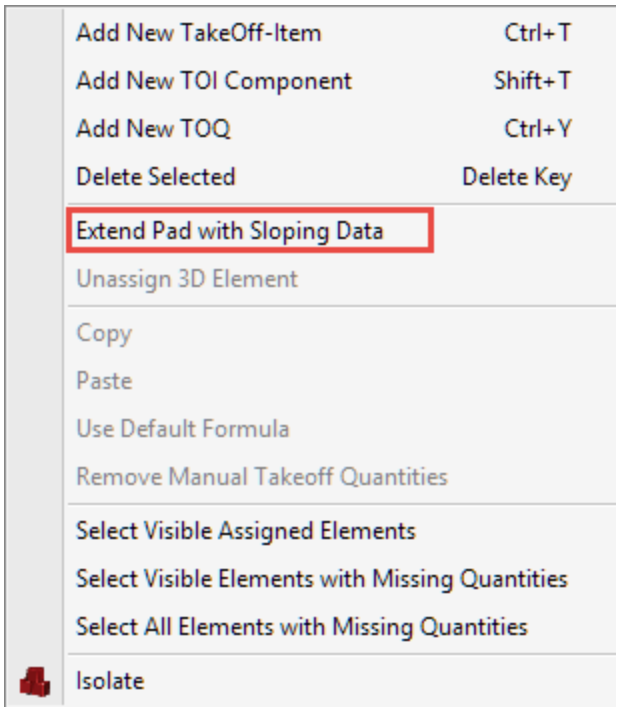
Extending Pad with Sloping Data

Construction drawings use two dimensional (2D) lines to represent things that will be built in a three dimensional (3D) space. Because of this, a line that appears to be a certain length or distance in 2D may actually represent a different length or distance in the built environment. Support for this type of representation is available using the 'Extend Pad with Sloping Data' option, which augments the initial distance extracted from a line to account for rise and run distances.

To use this functionality, right-click an existing TOI and choose 'Extend Pad with Sloping Data' from the context menu. Doing so will introduce a subset of quantities associated with sloped content:

- Rise/Fall
- Run
- Measured Length
- Actual Length
- Measured Area
- Actual Area

A-

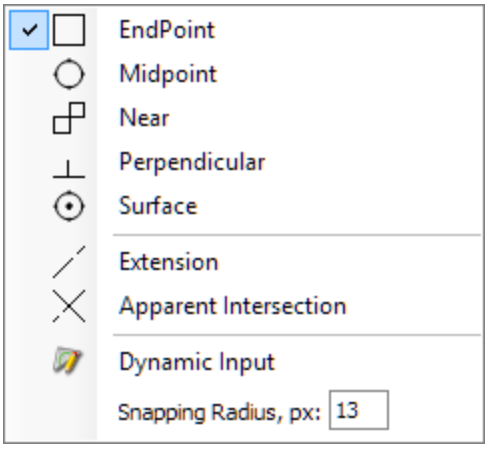


r-
ea Takeoff

You can extract region information by creating a shape based on selected snap points or lines.

You can create shapes that are attached to specific points within the 2D/3D content. The area shape starts to appear after the second point is clicked, and you can select additional points to customize the shape.

Tip: Selecting points usually works best when the proper snapping tools are chosen. Pay close attention to which snap points are selected from the 3D navigation toolbar to ensure that only the desired content is selected.



Note: The **Area** button on the **Takeoff Pad** tab is available only after you select **SQ FT** or **SQ YD** as the unit of measurement.

To enable area takeoff

1. Open the Takeoff Pad task.
2. Click a takeoff quantity cell that uses **SQ FT** or **SQ YD** as the unit of measurement.

The **Area** button on the **Takeoff Pad** tab is now available.

To create a shape using snap points

1. On the **Takeoff Pad** ribbon tab, click **Takeoff Pad** tab > **Area** > **Snap Points**.
2. Click the start point, any intermediate points, and then the end point.
3. After selecting all the points, press **Enter** to close the shape and derive the area calculation.

Pick Lines

You can generate area shapes from existing lines on the 2D documents.

To create a shape using lines

1. On the **Takeoff Pad** ribbon tab, click **Takeoff Pad** tab > **Area** > **Pick Lines**.
2. In the drawing, select the first line.
3. Press and hold the **Ctrl** key while selecting the next connected line.

   A triangle shape begins to appear.
4. To select additional lines and define the shape, repeat the previous step.
5. To complete the shape and derive the area calculation, press **Enter**.

Deducting an Area

After creating a shape, you may need to deduct an area, such as some sort of opening, from within that shape.

To deduct an area

1. Click the takeoff quantity cell from which you want to remove the deduction quantity.
2. On the ribbon, click the **Takeoff Pad** tab > **Deduct**.
3. In the drawing, click the first point of the deduction area.
4. Create the deduction area using the same method that was used to create the shape.
5. To complete the deduction area, press **Enter**.

   The area calculation is reduced.

Customizing the Display

You can customize the display of takeoff geometry.

To customize the graphics display

1. In the **Takeoff Pad** view, double-click the **Graphic** cell, and then click the ellipsis button.

   The **Graphics Settings** dialog appears.

2. Select the desired options for the line and area, and then click **OK**.
3. To see the changes, click away from the active TOI.

Note: Select the 'Set as Default' check box ONLY if you wish to apply these settings to all the takeoff geometry (includes all previously calculated and future ones).

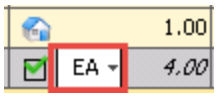
Count Takeoff

Count takeoff allows for unit-based quantities to be derived from the documents or models.

Note: The **Count** button on the **Takeoff Pad** tab is available only after you select **EA** as the unit of measurement.

To use the Count option

1. Open the Takeoff Pad task.
2. After adding a takeoff quantity and selecting **EA**, click the cell directly above it.



   The **Count** button on the **Takeoff Pad** tab is now available.

3. On the **Takeoff Pad** ribbon tab, choose a symbol from the options available to the right of **Count**.

   The selected symbol appears each time a click is made for count takeoff. When different item types are counted on the same sheet, you can use different symbols to represent each type.

4. On the **Takeoff Pad** ribbon tab, click **Count**.
5. In the **3D View**, click to indicate where the count should occur.

The selected symbol is placed in the drawing.

6. Continue clicking until the count operation is complete.
7. To finalize the count operation, press **Esc**.

Note: The TOQ increases by one each time a new selection is made, and the chosen icon appears in the active view to represent where the count was made. If the count icons appear very large, scale the drawing to a more suitable size. For information on scaling a document, see 295.

Location-based Quantities

Significant value can be found within Vico Office's ability to provide quantities by location, and the same holds true for onscreen takeoffs. You can derive quantities by onscreen takeoff on 2D documents only or in 3D environments.

2D Only Takeoff

Onscreen takeoff that is performed only on 2D documents default to the project level. In addition to the default location, you can assign quantities to one other location.

To perform 2D only takeoff

1. Open the Takeoff Pad task.
2. Double-click the location cell, and then click the ellipsis button.

The **Select Location** dialog appears with locations derived from the LBS Manager.

3. Select the location that the quantities are associated with, and then click **OK**.

   After associating quantities with a different location, the 'Manual Takeoff Model' that appears in the model register must be reactivated to associate the quantities with the new location assignment.

Note: If you want to assign similar quantities to multiple locations in the project, create a new TOI component.

3D Takeoff

Takeoffs that are done in a 3D environment, be it on a 3D model or in the hybrid mode, also default to the project location. However, they inherit the model locations immediately after the 'Manual Takeoff Model'

is reactivated.

Location assignments assigned to or derived from TOIs within Takeoff Pad roll into TOM without any additional work. TOM displays location-based quantities coming from onscreen takeoff in the exact same way that model-based quantities are displayed by location. 3D model quantities and onscreen takeoff quantities can be mixed and matched within the TOM and the Cost Planner without regard for their creation origin. That is, the Cost Planner does not behave any differently if the assigned quantities coming from TOM were created using a 3D model elements or onscreen takeoff.

Best Practice: Defining Quantities for Scheduling Purposes

Quantities do not have to be defined for every task in the schedule. However, for high priority tasks such as those that are expensive, resource-intensive, or known to be risky, it is recommended that you work with intelligent tasks, which are quantity-driven and resource-driven tasks. These are “living links” in Vico Office from takeoff quantities through the cost plan and the Location Breakdown Structure Manager to the Schedule Planner.

Quantities can be defined in the following ways:

- Based on 3D models in Vico Office
- Based on 2D documents in Vico Office
- Manually in Schedule Planner / Vico Office

For more information, refer to the PDF.

Plan Cost

Cost planning is typically an evolutionary process. Throughout the design and pre-construction phases, more specific and accurate cost information is added to replace assumptions that were made in the initiation and early design phases.

The **Plan Cost** task supports this process and provides continuous cost feedback throughout all project phases. You can start with a costing scheme at the business development phase and gradually increase granularity as more specific data and accurate quantities become available from the 3D BIM model or manually entered quantities.

The **Plan Cost** task contains an n-tiered 3D spreadsheet, a graphic scheme that emphasizes the hierarchical structure of the cost estimate. Every line item (assembly) can be further refined with additional components, providing flexibility and enabling you to gradually develop your cost plan from a basic abstract level to a highly-detailed cost estimate.

You can use the **Plan Cost** viewset in the following ways:

- As a spreadsheet, by manually entering quantity and cost information in place.
- With separated quantity takeoff, using a formula in your cost line items.
- With model-based quantity takeoff, using quantities extracted from your BIM files as input for your cost line items.

These supported cost planning techniques can be combined as desired.

Plan Cost Viewsets

In the predefined **Plan Cost** task, you can switch between different layouts, so you can perform tasks in the appropriate environment and context.

The default viewsets are:

- **Cost Planner:** The full-screen 3D spreadsheet. You can display the full set of columns that you need for cost calculation, defining markup and add-ons, and viewing tags.
- **Project & References:** A side-by-side view of the (default) reference (**Cost Reference** view) and project (**Cost Planner** view). You can rapidly copy content from your reference into your project using drag-and-drop or multi-selection.
- **Cost Planner & 3D:** A 2-view layout with the 3D spreadsheet and the 3D model(s) that provide quantity input for your cost components. 3D elements that provide input quantities for a selected component or assembly are highlighted.

The default viewsets include the following views:

- Cost Planner view
- Cost Reference view
- 3D View

To see all the views in one viewset, you can open the **Takeoff & Estimate** task (**Workflow Panel** > **Master Workflow** > **Cost Planning**).

The Plan Cost Task

To open the Plan Cost task

1. Right-click the Workflow Panel header, and then click **Cost Planner**.
2. In the **Cost Planning** workflow group, click **Plan Cost**.

–Or–

1. Right-click the Workflow Panel header, and then click **Master Workflow**.
2. In the **Cost Planning** workflow group, click **Estimate**.

The Define Targets Task

To open the Define Targets task

1. Right-click the Workflow Panel header, and then click **Cost Planner**.
2. In the **Project Setup** workflow group, click **Define Targets**.

–Or–

1. Right-click the Workflow Panel header, and then click the **Master Workflow**.
2. In the **Cost Planning** workflow group, click **Define Targets**.

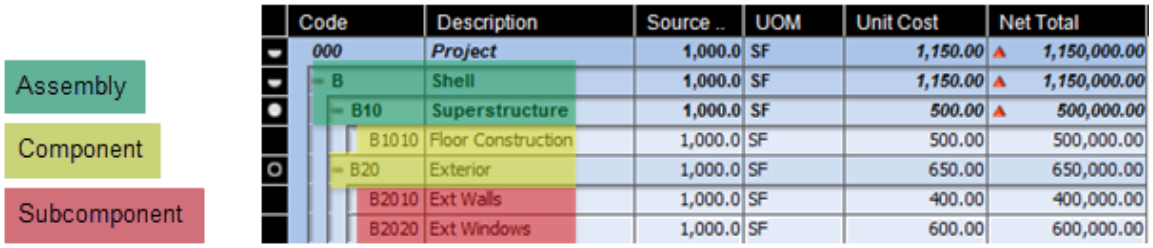
Components and Assemblies

Components and assemblies are important elements of the **Plan Cost** task.

- **Components:** Line items that actively contribute to the calculation of cost in the project. They represent parts of a construction project that can be priced or allowances for construction project parts that are not defined in enough detail in the project documentation. Components, which have attributes that are defined as tags, are always included in an assembly.
- **Subcomponents:** Non-active cost line items that do not contribute to the project cost.

- **Assemblies:** Activated containers for a group of components. Component prices are rolled up into the assembly line item price after a component is activated.The sum of the cost of the included components is calculated and presented at the assembly level.

  By including subcomponents in an existing component and subsequently turning it into an assembly, the level of detail (LOD) of the estimate, and thus the accuracy level of the estimate, increases.



Basic Cost Planning

The easiest way to start using the **Cost Planner** view is by using it as a regular spreadsheet with predefined columns.

To perform basic cost planning

1. Open the Plan Cost task.
2. On the **Cost Planner** ribbon tab, click **Layout Presets** > **Cost**.

   The columns needed for cost estimating are displayed.
3. Select a **Code** cell in the spreadsheet, and then enter the cost code of the line item you would like to calculate for the new component.

   Tip: You can create a new component anywhere in the spreadsheet by clicking a **Code** cell. Use the sorting function later to organize your cost plan.
4. To move to the next cell, press the **Tab** key, the **Arrow** key, or click the next cell.

   The new component is added with the default description to your project. You can change the description as desired.
5. In the **Source Qty**, **Qty**, **Consumption**, **Consumption Inv**, and **Waste** cells, enter the information and include matching units as required.

   The **Qty** is automatically calculated as **Source Qty** x **Consumption** x **Waste**.
6. To calculate the total cost (the price of the component), enter a value in the **Unit Cost** cell.

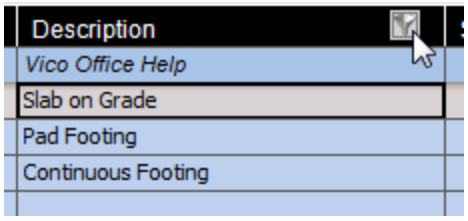
After you move to another cell, the price of the component is automatically calculated as **Qty** x **Unit Cost**

Filtering the Cost Plan

Filtering the cost plan content can be helpful to create a focused view on a subset of cost components for further analysis. You can filter the cost plan based on any of the data fields in the **Cost Planner** view.

To filter the cost plan content

1. Open the Plan Cost task.
2. On the **Cost Planner** viewset tab, point to a column header, and then click the funnel icon that appears.



A list with the content, including the project level and the blank cells, that exists in the selected column appears.

3. To quickly apply a filter, click a filtering option.
4. Alternatively, you can use a custom filter.
   a. Point to the column header, click the funnel icon > **Custom**.
   b. In the Filter Editor window, set up the filtering options.

      For example, the following filter will find items with descriptions that contain the word 'Pile'.

c. To apply the filter, click **OK**.

5. To clear the filter, click the funnel icon > **Clear all filters**.

Cost Planning with Assemblies and Components

The **Cost Planner** view supports the concept of the evolving estimate: the idea that the cost plan becomes more detailed and accurate throughout the design and pre-construction phases. This is a result of design and construction planning decisions that allow the cost planner to add more specific cost information to the project.

In the **Cost Planner** view, you can add subcomponents to components and activate them when the collection of subcomponents matches the scope of the component. At this point, the subcomponents can be activated. Then the component becomes an assembly, and the subcomponents become components.

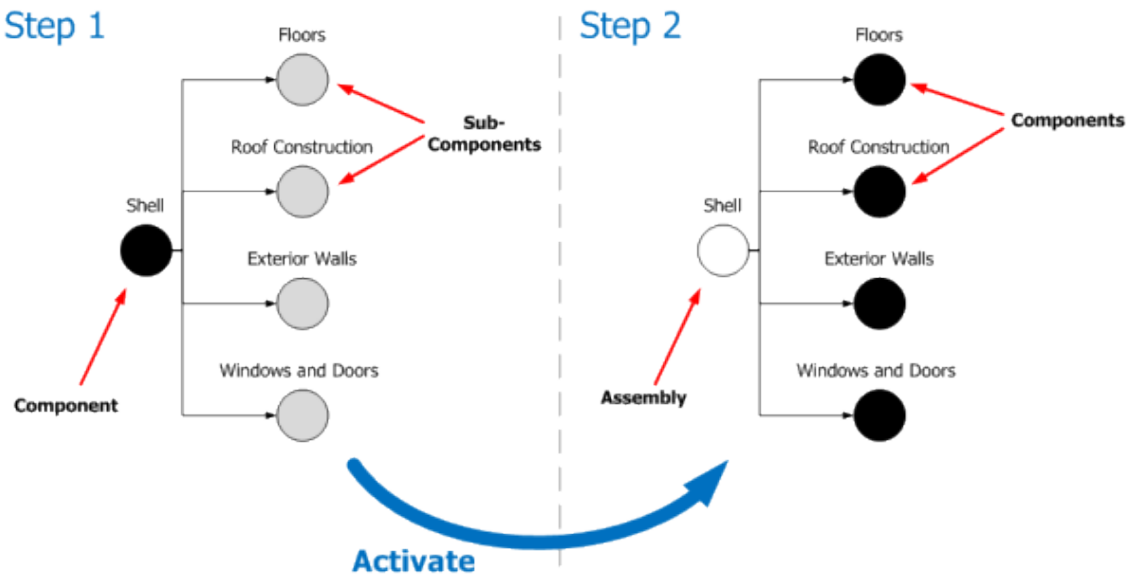
The pace at which design and construction planning decisions are made will vary per system in the building; detailed information will be available earlier for the foundation than for interior finishes.

You can add more detailed information (subcomponents) to select components in the project, and to keep other components, for which design and planning decisions have yet to be made, at the lower level of detail.

Example:

In Step 1, a component 'Shell' was defined to include the cost for the project's shell. When more information about the shell became available, subcomponents for 'Floors', 'Roof Construction' , 'Exterior Walls' and 'Windows and Doors' were added.

In Step 2, the subcomponents were activated and 'Shell' was turned into an assembly. The subcomponents were turned into components and started to actively contribute to the project's cost.



To plan cost with assemblies and components

1. Open the Plan Cost task.
2. On the **Cost Planner** viewset tab, select a component from the cost plan spreadsheet.
3. To the left of the spreadsheet, right-click the component at the row indicator, and then click **New Sub Component**

   –Or–

   On the ribbon, click **New Sub Component**.

   Office adds a new component inside the selected component. You can define the new component, including quantity and cost per unit, without affecting the calculated cost of your project.
4. Add additional components as needed, until the collection of subcomponents covers the full scope of the component.

   Note that the cost of the component in which the subcomponents are nested does not change.

Cost Planner | Project & References | Cost Planner & 3D

fx B1012_003_Reinforced Concrete Topping-ID.Top Surface Area-B1012_003_Reinforced Concrete Topping-ID.Hole Surface Area

Code	Description	Sourc..	Consump..	Waste/Fa..	Quantity	Unit	Unit Cost	Total Price
002	Vico Office Help Example	1.0	1.0	1.0	1.0		1,055,748.78	1,055,748.78
A	SUBSTRUCTURE	1.0	1.0	1.0	1.0	LS	255,748.78	255,748.78
A10	FOUNDATIONS	1.0	1.0	1.0	1.0	LS	255,748.78	255,748.78
B	SHELL	1.0	1.0	1.0	1.0	LS	600,000.00	600,000.00
B10	SUPERSTRUCTURE	1.0	1.0	1.0	1.0	LS	600,000.00	600,000.00
B1011_001	Slab on Deck-ID	87,627.6	1.0	1.0	87,627.6	SF	6.00	525,765.46
B1012_003	Reinforced Concrete Topping-ID	161.4	1.0	1.0	161.4	SF	800.00	129,103.45
B1012_004	Equipment Pad-ID	1,236.9	1.0	1.0	1,236.9	SF	12.00	14,842.56
B1012_015	Built-up Concrete Slab-ID	2,141.2	1.0	1.0	2,141.2	SF	18.00	38,540.91
B1012_025	CIP RC Wall-ID	280.5	1.0	1.0	280.5	SF	30.00	8,415.94
B1012_052	Steel Column W-ID	3,585.8	1.0	1.0	3,585.8	FT	1.00	3,585.79
B1012_062	Steel Column HSS-ID	1,793.5	1.0	1.0	1,793.5	FT	0.05	89.68
B1012_078	Steel Beam W-ID	14,351.8	1.0	1.0	14,351.8	LF	0.05	717.59
B1012_082	Steel Beam C-ID	10.8	1.0	1.0	10.8	LF	0.15	1.61
B1012_083	Steel Beam MC-ID	69.6	1.0	1.0	69.6	LF	0.05	3.48

5. When all required subcomponents are included in the component, activate the parent component by right-clicking it and, and then clicking **Activate Selected**.

   –Or–

   On the ribbon, click **Activate Selected**.

   Note: If you also want to activate every subcomponent under the parent component, click **Activate Sub-tree** in the context menu.

   Vico Office now starts using the cost calculations defined in the subcomponents, which at this moment are turned into components. The component is turned into an assembly and reflects the sum of the cost calculated in the included components.

   The row indicator changes into an assembly row indicator (a filled circle), and the data of the assembly is presented in bold letters and numbers. Calculated numbers are in bold italic.

Code	Description	Sourc..	Consump..	Waste/Fa..	Quantity	Unit	Unit Cost	Total Price
B	SHELL	1.0	1.0	1.0	1.0	LS	720,254.11	720,254.11
B10	SUPERSTRUCTURE	1.0	1.0	1.0	1.0	LS	720,254.11	720,254.11
B1011_001	Slab on Deck-ID	87,627.6	1.0	1.0	87,627.6	SF	[illegible]00	525,765.46
B1012_003	Reinforced Concrete Topping-ID	161.4	1.0	1.0	161.4	SF	800.00	129,103.45
B1012_004	Equipment Pad-ID	1,236.9	1.0	1.0	1,236.9	SF	12.00	14,842.56
B1012_015	Built-up Concrete Slab-ID	2,141.2	1.0	1.0	2,141.2	SF	18.00	38,540.91
B1012_025	CIP RC Wall-ID	280.5	1.0	1.0	280.5	SF	30.00	8,415.94
B1012_052	Steel Column W-ID	3,585.8	1.0	1.0	3,585.8	FT	1.00	3,585.79

In addition to the activated assembly row indicators, the following row indicator icons are available:

- All subcomponents/assemblies are active.
- One or more components in the included subassemblies is inactive.
- All components in the included subassemblies are inactive.

Part of the conversion of a component into an assembly is that **Unit Cost** and **Total Price** are now calculated based on the sum of the included components.

Total Price of the Assembly = Sum of included active component price values

Unit Cost of the Assembly = Sum of included active component price values divided by the assembly's quantity

Using the Assembly's Quantities for a Component

It is common practice to use the quantity is calculated for the assembly level as input for the component level as well. Typical example of this is to use the quantity for an activity (assembly) to calculate the cost of the required resources and materials (components). Office allows you to do this with a special formula called Parent.Quantity.

To create an assembly with parent quantity

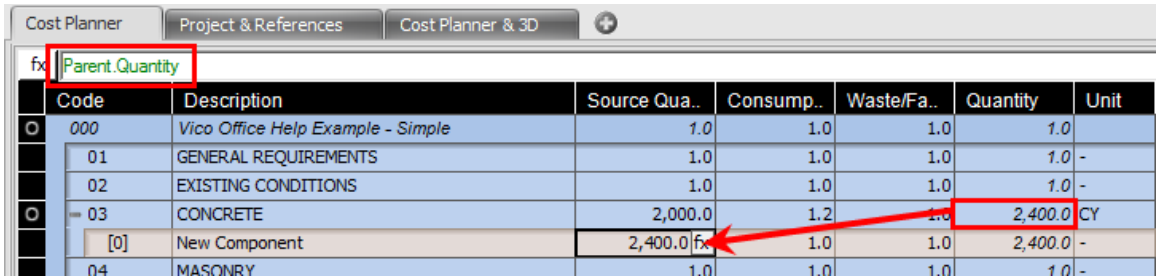
1. Open the Plan Cost task.
2. To create a new component, click **New Component** on the **Cost Planner** ribbon tab.

   –Or–

   Right-click in the spreadsheet, and then click **New Component**.
3. In the **Source Quantity**, **Consumption**, and **Waste** cells, enter the values.

   This results in a quantity value for the component.
4. Add a new subcomponent, and check the content of the **Source Quantity** cell.

   Vico Office automatically inserts a special formula (**Parent.Quantity**) that copies the content of the component's parent assembly quantity into the **Source Quantity** cell.



Note: Instead of inserting a new subcomponent, you can also enter the **Parent.Quantity** formula manually. Use the correct capitalization to ensure correct behavior of the formula.

Using a Component Multiple Times

The code of a component makes it unique in a project. When you enter a value in the **Code** cell that already exists in the project, the shared information (in the **Description** and **Cost per Unit** cells) in automatically copied.

When you change the value in the **Description** or **Cost per Unit** of a component with multiple instances in your project, the information is automatically updated throughout the project.

To use a component multiple times in your project

1. Open the Plan Cost task.
2. In a new assembly, create a new component.
3. In the **Code** cell, enter the code of the component that you want to re-use for the new assembly.

B1010.001	Concrete Column	20.00	1.00	ea/ea
L001	Iron Worker	1.00	1.00	hr/ton
L002	Carpenter	1.00	1.00	hr/sf
M001	Concrete 3000...	1.00	1.00	cy/cy
M002	Formwork	1.00	1.00	sf/sf
M003	Rebar	1.00	1.00	ton/qy
B1010.002	Concrete Wall	1.00	1.00	lf/lf
L001	New Component	1.00	1.00	-

4. Press the **Tab** key, the **Arrow** key, or click another cell.

   The information from the **Description** and the **Cost per Unit** cells is copied into the new component.

B1010.001	Concrete Column
L002	Carpenter
L001	Iron Worker
M001	Concrete 3000...
M002	Formwork
M003	Rebar
B1010.002	Concrete Wall
L001	Iron Worker

5. To change the cost of the component with multiple instances, edit the value in the **Cost per Unit** cell, and then press the **Tab** key, the **Arrow** key, or the **Enter** key to confirm the change.

The **Cost per Unit** value is updated for all instances of the component with the same code in the project.

Cost Planning with Ranges

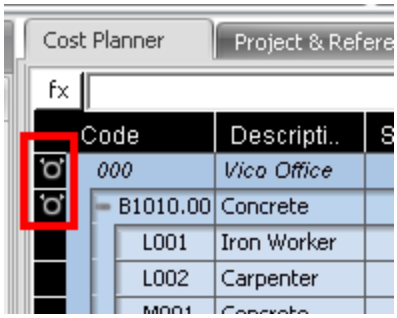
Cost ranges can be used to calculate the cost of elements when insufficient design decisions have been made to define an exact number. In the **Cost Planner** view, set a minimum and a maximum cost per unit, which then results in a minimum price and a maximum price.

To work with cost ranges

1. Open the Plan Cost task.
2. Right-click a column header, and then click **Column Selector**.
3. In the list of available columns, activate a set of minimum and maximum columns such as:
   - **Min Base Cost**
   - **Max Base Cost**
   - **Min Unit Cost**
   - **Max Base Cost**

     You can also activate other minimum and maximum columns such as variance and bid price.
4. Click **OK**.
5. In a set of available minimum and maximum columns, enter values to define the cost range.

   The values are automatically calculated after your input. A cost range icon appears in the left margin.



Managing Column Visibility

All cost plan information is entered and displayed in the 3D spreadsheet. If you want to quickly activate or deactivate sets of columns and view only the columns required for a specific task, use a layout preset.

To show or hide cost plan content

1. Open the Plan Cost task.
2. On the **Cost Planner** ribbon tab, click **Layout Presets**, and then select a preset.

   The icon for the selected preset turns orange to indicate that it is active.

   The columns included in that preset are now visible.
3. Right-click a visible column header, and then click **Column Selector**.

   The **Column Selector** dialog opens.
4. Select the columns that you want to be visible in the **Plan Cost** view, and then click **OK**.

   The selected columns appear in the spreadsheet.

Analyzing Variance

In the **Cost Planner** view, the calculated cost of active components is always displayed by default. You may, however, have entered an assumption in a line item that was later converted into an assembly. To compare it to the current active cost, use the **Variance** preset.

To analyze variance

1. Open the Plan Cost task.
2. On the **Cost Planner** ribbon tab, click **Layout Preset** > **Variance**.

   All columns related to analyzing variance are displayed in the spreadsheet.

   - **Component Unit Cost**: The unit cost that was entered for the component BEFORE it was turned into an assembly (after adding more detailed information to it).
   - **Unit Cost**: The current CALCULATED cost (sum of the included component cost divided by the assembly's quantity).
   - **Component Price**: The price that was calculated for the component BEFORE it was turned into an assembly.
   - **Total Price**: The current CALCULATED cost (sum of included component prices). The arrows indicate whether the cost went up or down.

- **Var Base Cost** and **Var Unit Cost**: The difference between the component value and current assembly value.

Creating a Custom Layout Preset

In addition to the built-in Cost Planner presets, you can define your own presets with preferred column visibility settings.

To create a custom layout preset

1. Open the Plan Cost task.
2. On the **Cost Planner** ribbon tab, click **Layout Presets** > **Manage**.

   The **Manage Presets** dialog appears.
3. Click the button, enter a name for the preset, and then press **Enter**.
4. Select the new preset, and then click **Edit**.
5. In the **Column Selector** dialog, select the columns to be included in the custom layout preset, and then click **OK**.
6. To delete a preset, select the preset, and then click the button.
7. To apply your custom layout preset, click **Apply Preset**.

Promoting and Demoting Components

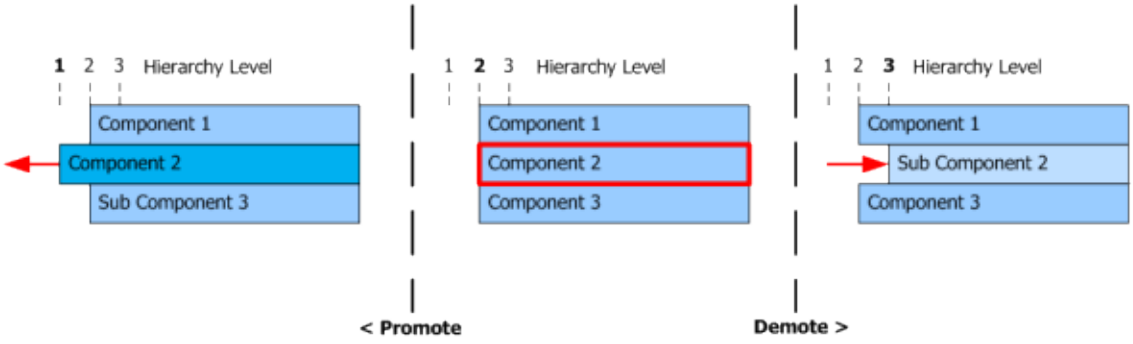
The 3D spreadsheet in the **Cost Planner** view can be developed into an n-tiered cost structure, so that it can hold an unlimited number of sublevels underneath the summary level: the project cost roll-up.

The assembly and component structure allows you to develop your cost plan gradually, by replacing assumptions with a more detailed set of cost items called subcomponents. For more information, see " Cost Planning with Assemblies and Components" on page 308.

You can move cost components up and down the component and assembly structure by promoting and demoting them, turning them into subcomponents or into a component that contains subcomponents.

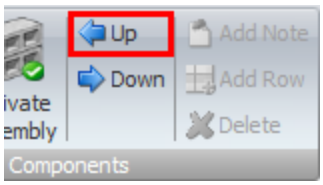
Example:

- When Component 2 is promoted (moved up in the hierarchy), Component 3 becomes a subcomponent of Component 2.
- When Component 2 is demoted, it becomes a subcomponent of Component 1.

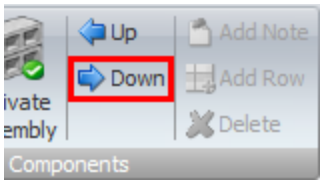


To promote and demote components in the assembly and component structure

1. Open the Plan Cost task.
2. In the cost plan spreadsheet, select the component or assembly, and then do one of the following:
   - To promote the component or assembly, click **Up** on the **Cost Planner** ribbon tab.



   - To demote the component or assembly, click **Down** on the **Cost Planner** ribbon tab.



Filtering the Cost Plan based on Quantity Type

In the **Cost Planner** view, components can have the following types of quantity input:

- Manually inserted quantity values
- Manually defined takeoff items and takeoff quantities
- Model-based takeoff items and takeoff quantities

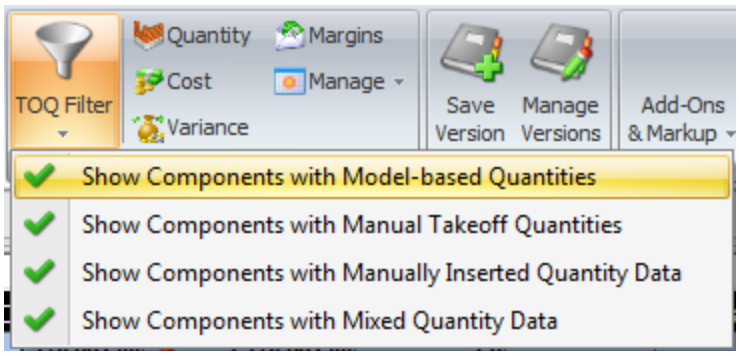
These types can be used in combination, which results in a mixed quantity type.

You can filter your cost plan based on the used quantity input using the TOQ (takeoff quantity) filter. This built-in filter helps you analyze the share of quantity information that was obtained from 3D models and how much was entered as an assumption or manual calculation.

To filter the cost plan based on the quantity type

1. Open the Plan Cost task.
2. On the **Cost Planner** ribbon tab, click **TOQ Filter**.

   A list of quantity types appears. By default, all the types are selected, as indicated by the green check marks.



3. To hide a quantity type from the **Cost Planner** view, click the quantity type.

   The check mark is removed, and the **Cost Planner** view is filtered, only showing the active components that use the selected takeoff quantity types. You can check the accuracy of your cost plan by applying this filter to determine how many quantity inputs are based on manual calculations and assumptions.

Note: For more information, see "Using the Status Tag" on page 320.

Setting the Active Copy Mode

Similar to other spreadsheet applications, in the Cost Planner view, you can decide how quantity information should be included in the copy operations that you perform using copy/paste, insert from reference, drag-and-drop or auto-complete.

The **Cost Planner** has the following quantity copy modes:

- **Descriptions and Consumptions Only:** Keep the default value for the target quantity.
- **Include Formula:** Copy the defined formula from the source and, if possible, reuse the takeoff

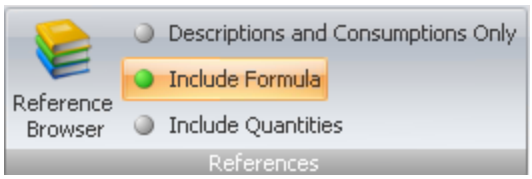
items and takeoff quantities in the current project.

- **Include Quantities:** Copy only the formula's result from the source.

Before you start a copy operation, select the desired behavior of the copy function.

To set the active copy mode

1. Open the Plan Cost task.
2. On the **Cost Planner** ribbon tab, in the **References** group, select the desired behavior of the copy function.



   The active copy mode displays a green indicator and an orange background.

3. Start one of the available copy operations.

Using Auto-Complete

The auto-complete function is useful for quickly adding component and assembly cost calculation content to your project without opening a different view or dialog.

When the auto-complete function is turned on, a search is performed in the current project and/or selected reference for content that matches (part of) the code or description while you enter it. Matching options are presented in a dialog from which you can select the assembly or component that you would like to add.

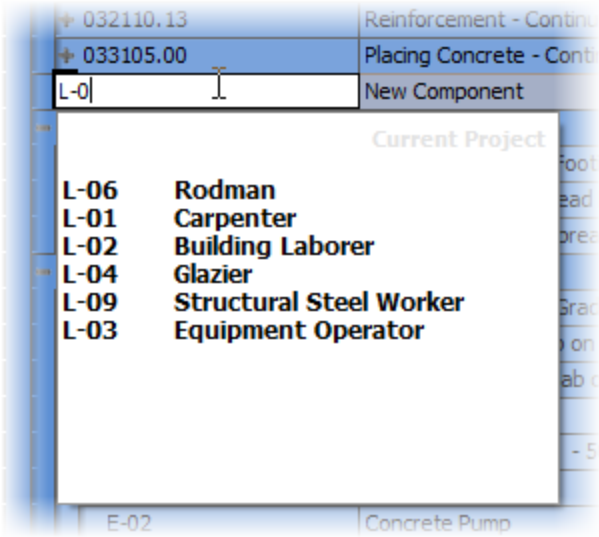
To add assemblies and components with the auto-complete function

1. Open the Plan Cost task.
2. To activate the auto-complete function, click **From Project** and/or **From Reference** on the **Cost Planner** ribbon tab.

   The button turns orange to indicate that auto-complete is now active and will search in the reference, project or both.

3. In the **Code** cell of the spreadsheet, enter at least three characters.

   A list of matching components and assemblies from the reference and/or project is displayed. If you select **From Project** and **From Reference**, matches are presented separately.



4. Select the desired component or assembly from the list.

   The component or assembly content is copied using the active Copy Mode to determine how quantities and/or formulas are included in the copy operation.

Note: If multiple instances of the same component or assembly are found in the project or reference, the number of instances is displayed in parentheses after the component or assembly name. After you select the component or assembly, you can select which instance to copy.

Using Tags

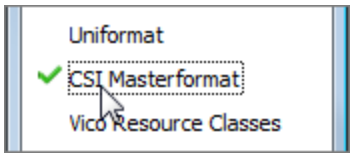
Use tags to further specify cost plan content by assigning codes, classifications, and properties to components and assemblies. Values can be assigned easily, by activating the **Tag** column in the **Cost Planner** view.

To use tags in the cost plan

1. Open the Plan Cost task.
2. Right-click a column header, and then click select **Column Selector**.

   The **Column Selector** dialog appears.
3. To make a tag visible in the spreadsheet, so you can assign values for it to components and assemblies, click the tag in the list.

   A green check mark appears to the left of the tag name.



4. To apply the changes, click **OK**.
5. To assign tag values to components in your cost plan, select them in the column of the tag.

   Note: If you cannot find the tag that you would activate as a column in the spreadsheet, make sure that the tag has been set to apply to components in the tag properties.

Using the Status Tag

The **Status** tag is a property for components and assemblies for which default values are included in Vico Office and can be used to classify your cost plan items based on the type of quantity and cost information that was used to calculate cost.

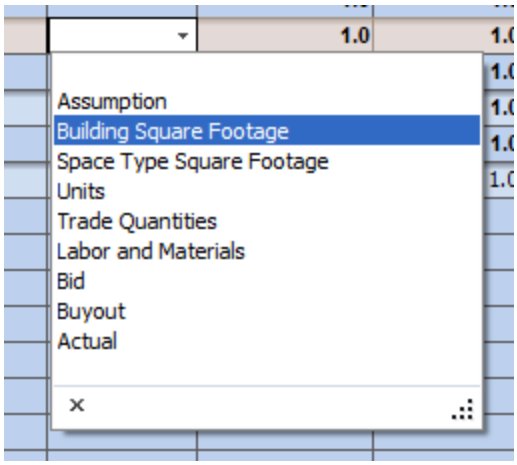
The following status values (descriptions) are included by default:

- **Assumption**
- **BuildingSquareFootage**
- **SpaceTypeSquareFootage**
- **Units**
- **TradeQuantities**
- **LaborAndMaterials**
- **Bid**
- **Buyout**
- **Actual**

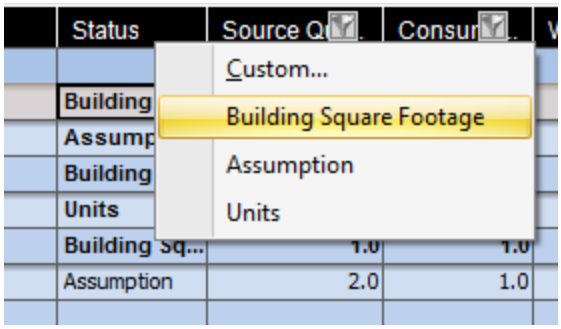
To use the Status tag:

1. Open the Plan Cost task.
2. Right-click a column header, and then click **Column Selector**.
3. In the **Column Selector** dialog, select the **Status** column, and then click **OK**.

   The **Status** column is displayed. When you select a cell in this column, a combo box appears, so you can select the desired qualification of the quantity and cost status. Alternatively, you can add a new value to the list by entering it in the cell.



Sorting and filtering, in combination with the **Status** tag, are a good way to determine the current status of cost calculation inputs in your project.



Defining Cost Types and Default Markup

In Vico Office, markup refers to the margin (profit, risk) that is applied to the active components in the project. To simplify defining and maintaining markup for the cost items in your project, you can define default markup percentages based on cost types that you recognize in your projects.

Cost types are a special type of tag for which you can define markup percentages in the **Cost Planner** view.

To define default markup percentages

1. Open the Plan Cost task.
2. On the **Cost Planner** ribbon tab, click **Markup Values**.

   The **Manage Markups** dialog appears.
3. To add a new markup value, click **Add Markup Value**.

The new markup value is also visible in the **Edit Tags** view.

4. In the new row, enter the name and markup percentage.
5. When you finish defining the cost types that are needed in the project, click **OK**.

   You can now assign markup values (and thus markup percentages) to components in your project.

Using Cost Types and Markup

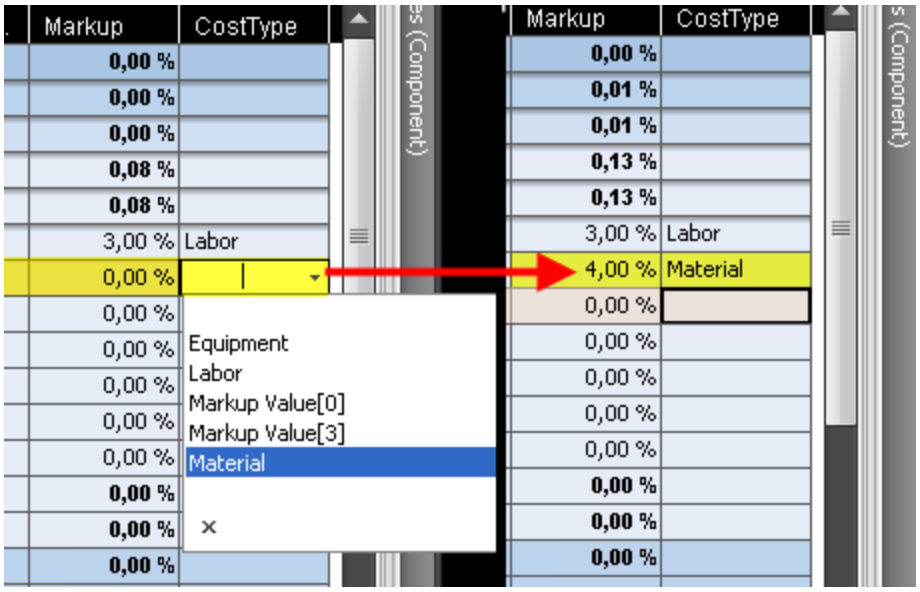
After defining the desired cost types and assigning a default markup percentage to them, you can assign cost types to the components in your project. When you assign a cost type to a component, the defined default markup percentage is automatically assigned.

To assign markup percentages per cost type

1. Open the Plan Cost task.
2. Right-click the column header, and then click **Column Selector**.
3. In the **Column Selector**, dialog, select the **Cost Type**, **Markup**, and **Markup Value** columns to the list.

   The selected columns are displayed in the spreadsheet.
4. Expand the components in the spreadsheet to display the lowest levels.
5. For a component, double-click the **Cost Type** cell.

   A list of defined cost types appears.



6. Select a cost type.
   - The default markup percentage that was defined for the selected cost type is applied.
   - The markup percentage is applied to the calculated base cost and results in the markup value. The markup value is added to the base cost and results in the gross total.
   - All the markup values and gross totals are rolled up, which results in a project-level markup value and gross total.

Saving a Cost Plan Version (Snapshot)

You can save versions of the cost plan that you are working on and then compare the saved cost plan version to earlier or later versions.

To save a cost plan version

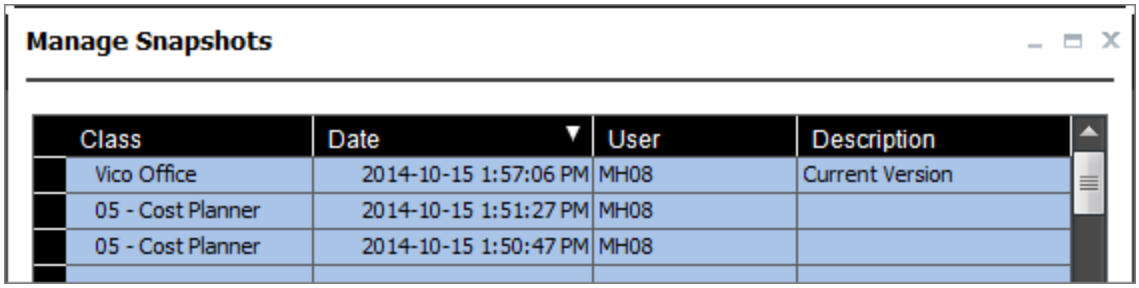
1. Open the Plan Cost task.
2. Above the **Cost Planner** ribbon tab, in the upper-left corner, click the **Create Snapshot** button  .

   The **Save Snapshot** dialog appears.
3. In the **Class** and **Description** fields, enter the information.

   The **Date** and the **User** fields are automatically completed.
4. Click **OK**.

5. To see the list of saved snapshots, click the **Manage Snapshot** button in the upper-left corner above the **Cost Planner** ribbon tab.

   The list of the saved snapshots is displayed. To differentiate between them, number the versions when you create them, or review them by the date.



   You can review the differences between each version of the cost plan in the Cost Explorer view.

Defining an Add-On

In the **Cost Planner** view, you can create add-on items to include non-direct costs, margins, and contingencies in your cost plan. Add-on values are a percentage of the total direct cost, calculated for the project using the component and assembly structure. You can add an unlimited number of add-on items, all rolling up to the bid price at the project level.

The cost price of a project is calculated by adding up all the price values of active components from the assembly and component structure in the project. The bid price is calculated as the sum of all price values, plus the sum of all markups plus the sum of all add-on margins.

To define an add-on

1. Open the Plan Cost task.
2. On the **Cost Planner** ribbon tab, click **Layout Presets** > **Margins**.

   The required columns are displayed.
3. On the ribbon, in the **Add-Ons & Markup** group, click **Show**.

   The **Add-Ons** area is opened underneath the **Project Summary** to indicate that the margins are added on top of the calculated price.

Code	Description	Source Qty	Unit Cost	PA Base Cost	Base Cost
01	01 Cost Explorer	1,0	3 153 774,27	0,00	3 153 774,27
Code	Add-Ons Description				
A	SUBSTRUCTURE	1,0	579 062,27	618 195,73	579 062,27
A10	Foundations	11 999,2	48,26	618 195,73	579 062,27
A1010	Standard	1,0	25 015,25	40 855,90	25 015,25
A1012_0	Pile Cap-ID	77,8	321,62	40 855,90	25 015,25
03.05.	Layout Concrete - Pile	700,0	1,00		700,00

4. To add a new add-on to the project, click **Add** in the **Add-Ons & Markup** group on the ribbon.

   A new add-on line is added to the project.

Code	Description	Source Qty	Unit Cost	PA Base Cost	Base Cost
01	01 Cost Explorer	1,0	3 153 774,27	0,00	3 153 774,27
Code	Add-Ons Description				
Add-On 1					
A	SUBSTRUCTURE	1,0	579 062,27	618 195,73	579 062,27
A10	Foundations	11 999,2	48,26	618 195,73	579 062,27
A1010	Standard	1,0	25 015,25	40 855,90	25 015,25
A1012_0	Pile Cap-ID	77,8	321,62	40 855,90	25 015,25
03.05.	Layout Concrete - Pile	700,0	1,00		700,00

5. Enter a name and code for the new add-on.
6. Enter the percentage of the calculated cost that you want to allocate for the add-on.

Code	Description	Source Qty	Unit Cost	PA Base Cost	Base Cost	Base Markup Group			Net Total	Net Markup Group		
						Type	%	Value		Type	%	Value
01	01 Cost Explorer	1,0	3 153 774,27	0,00	3 153 774,27		0,00 %	0,00	3 153 774,27		0,00 %	8,25
Code	Add-Ons Description										Margin %	Margin
001	GC Compensation										5,00 %	157 688,71
A	SUBSTRUCTURE	1,0	579 062,27	618 195,73	579 062,27		0,00 %	0,00	579 062,27		0,00 %	8,25
A10	Foundations	11 999,2	48,26	618 195,73	579 062,27		0,00 %	0,00	579 062,27		0,00 %	8,25
A1010	Standard	1,0	25 015,25	40 855,90	25 015,25		0,00 %	0,00	25 015,25		0,03 %	8,25
A1012_0	Pile Cap-ID	77,8	321,62	40 855,90	25 015,25		0,00 %	0,00	25 015,25		0,03 %	8,25
03.05.	Layout Concrete - Pile	700,0	1,00		700,00		0,00 %	0,00	700,00		0,00 %	0,00

7. To include the add-on in the gross total calculation, click **Activate** in the **Add-Ons & Markup** group on the ribbon.

   The defined add-on is part of the calculated gross total of the project and is ready to be used for preparation of a bid report.

Net Markup Group			Add-On	Gross Total
Type	%	Value		
	0,00 %	8,25	157 688,71	3 311 471,23
	Margin %	Margin	Value	
	5,00 %	157 688,71	157 688,71	157 688,71
	0,00 %	8,25	0,00	579 070,52

Dividing Add-Ons

You can include defined add-on values in the components of your project. Then the defined margins and compensations are part of the assembly and component cost structure and are no longer called out separately.

Dividing add-on values can be done per individual add-on. If needed, add-on values can easily be undivided again.

To equally divide add-on values over active components in the project

1. Open the Plan Cost task.
2. On the **Cost Planner** ribbon tab, in the **Add-Ons & Markup** group, click **Show**.
3. Select the add-on that you want to divide over the active components in the project.
4. On the **Cost Planner** ribbon tab, in the **Add-Ons & Markup** group, click **Divide**.

   The defined add-on value is divided by ration over all active components, based on the share of the component's price in the total project price.
5. To view the add-on value or sum of divided add-on values added to the component, right-click a column header, click **Column Selector** > **Add-On** column > **OK**.

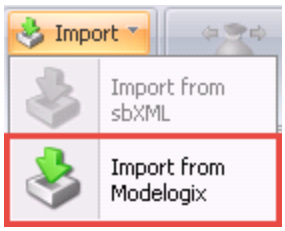
Importing from Modelogix

In the absence of 2D drawings or a 3D model from which to perform takeoffs, you can import a cost model from Modelogix, a stand-alone application for modeling preliminary project cost projects. As you receive more information regarding the scope, such as a 3D model for various parts of the building, you can then override the initial quantity values from Modelogix.

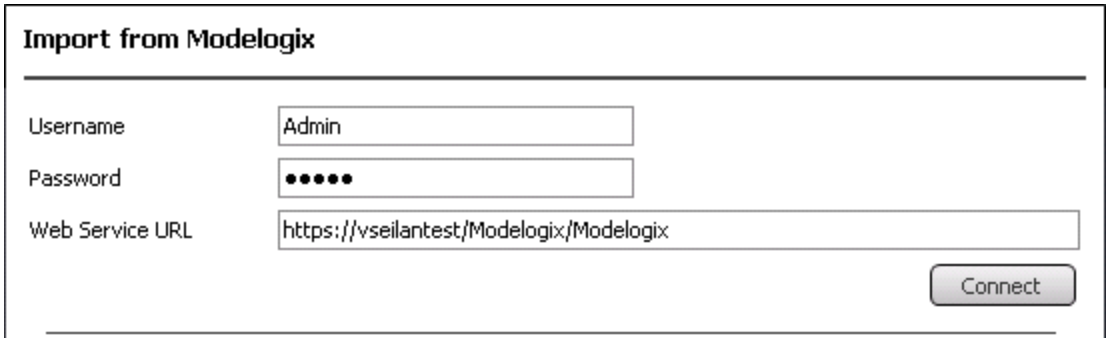
Tip: Before importing a model from Modelogix, ensure that you already have a 3D model in Vico Office from which to derive quantities. Also, this 3D model has components within it that match the cost items in the cost model.

To import from Modelogix

1. Create a new blank project.
2. Open the Plan Cost task.
3. On the **Cost Planner** ribbon tab, click **Import**, and select **Import from Modelogix.**



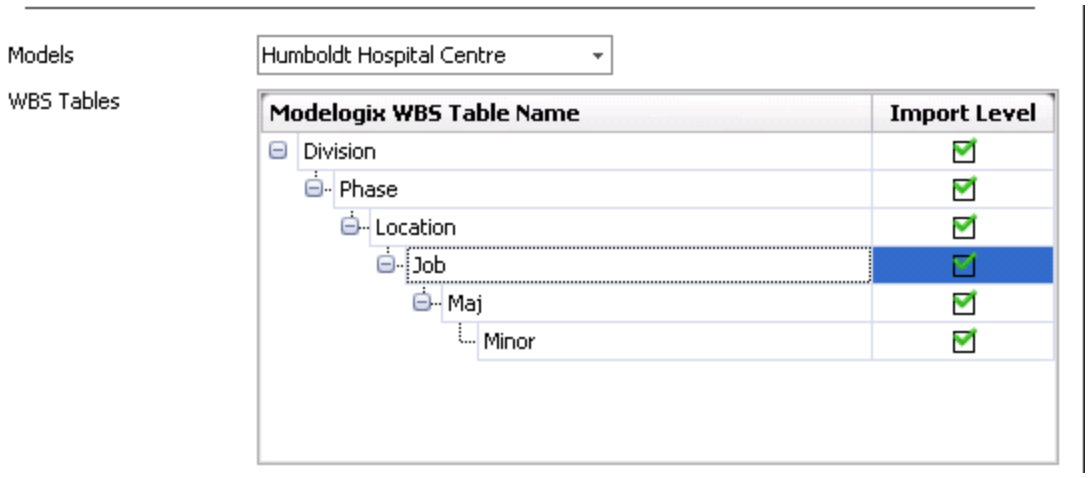
4. On the **Import from Modelogix** dialog box, enter the following details:
   - Username / Password: Enter a valid username and password. These are the credentials that were set in Modelogix (Setup > Options > Vico Import Mappings)
   - Web Service URL: Enter the Web Service URL where the Modelogix server component is installed.
5. Click **Connect**.



All the models that are available to the user (above) are listed in the **Models** list.

6. From the **Models** list, select the model that you wish to import.

   The model's WBS tables are listed.



7. Use the drag-and-drop functionality to change the order of the WBS to import.

   Tip: Keep in mind that you are determining the hierarchical order of these WBS tables. To choose a child level, the parent level must also be selected.

8. Optionally select the following check boxes:

   - **Generate Cost Items**: Any cost data from Modelogix with metrics associated with it will have a child cost item created for it in Cost planner while retaining the metric association (e.g., Material costs will remain as Material costs). Any items that match any existing Vico Office tags will be matched accordingly.
   - **Group Same Unit Costs**: All cost items with the exact same code, description, and unit cost will be considered the same cost item within Vico Office. When you change the code, description, or unit cost for one item in the group, all the items in that group are also changed. If you do not select this check box, any items with a matching code, description, and unit cost will be given an "_{#}" after the name to distinguish them from each other.

     Example:

     Two sets of matching components have the same code, description, and unit cost and are under different parents.

     The **Group Same Unit Costs** check box was selected, so the matching components are in the same group. When you change the description for one LCON003 item, the description for the other cost item in the same group is also changed.

Code	Descrip..	Source ..	Consump..	Consumption I..	Waste	Qty	UOM	Unit Cost	Base Cost
000	Test	1.00	1.000	1.000	1.000	1.00	SF	10.00	10.00
A	SUBSTRUCT	1.00	1.000	1.000	1.000	1.00	SF	17.96	17.96
A10	Foundations	0.00	1.000	1.000	1.000	0.00	SF	0.00	0.00
A1010	Standard	11,999.17	0.120	8.333	1.000	1,439.90	SF	28.37	40,849.97
A1012_003	Pile Cap-ID	1,400.00	1.000	1.000	1.000	1,400.00	CY	29.18	40,852.00
03.11.00.061.0	Strip Forms	1,680.00	1.000	1.000	1.000	1,680.00	SF	1.15	1,932.00
M03.11.00.061	Strip Forms -	1,680.00	1.000	1.000	1.000	1,680.00	SF	0.00	0.00
LCON003	Formwork	1,680.00	0.023	43.478	1.000	38.64	HR	50.00	1,932.00
03.11.00.060.0	Erect Forms	1,680.00	1.000	1.000	1.000	1,680.00	SF	8.00	13,440.00
M03.11.00.060	Erect Forms	1,680.00	1.000	1.000	1.000	1,680.00	SF	1.00	1,680.00
LCON003	Formwork	1,680.00	0.140	7.143	1.000	235.20	HR	50.00	11,760.00
03.05.10.060.0	Fine Grade	1,400.00	1.000	1.000	1.000	1,400.00	LF	0.25	350.00
LCON006	Concrete	1,400.00	0.005	200.000	1.000	7.00	HR	50.00	350.00
03.05.00.060.0	Layout	1,120.00	1.000	1.000	1.000	1,120.00	LF	1.00	1,120.00
LCON006	Concrete	1,120.00	0.020	50.000	1.000	22.40	HR	50.00	1,120.00

9. Click **Import**.

   Tip: After importing the model, you will need to activate it.

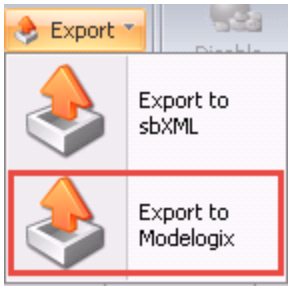
Exporting to Modelogix

After creating cost plans in Vico, you can export your projects into Modelogix, a stand-alone application for modeling preliminary project cost projects. Modelogix enables companies, large and small, to capture and store historical cost projects and as-built project costs efficiently in a standard Microsoft SQL database.

Tip: Before you can export your projects, ensure that Modelogix metrics are mapped to Vico tags. This setup is done from Modelogix (Setup > Options).

To export to Modelogix

1. Open the project that you wish to export to Modelogix.
2. Open the Plan Cost task.
3. On the **Cost Planner** ribbon tab, click **Export**, and select **Export from Modelogix.**



4. On the **Export to Modelogix** dialog box, enter the following details:

- Username / Password: Enter a valid username and password. These are the credentials that were set in Modelogix (Setup > Options > Vico Import Mappings).
- Web Service URL: Enter the Web Service URL where the Modelogix server component is installed.

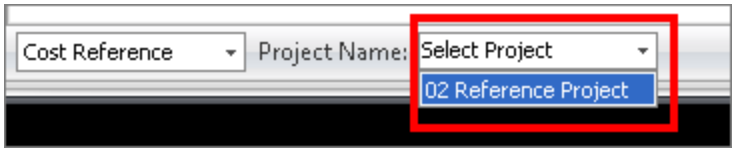
5. Click **Export**.
   The cost plan is exported to Modelogix and ready to be used for their cost models.

Copying Content from a Reference to a Project

In the **Project & References** viewset, you can quickly copy multiple assemblies and components from your reference to the project.

To copy content from reference project

1. Open the Plan Cost task.
2. Click the **Project & References** viewset tab.
3. From the **Project Name** list at the bottom, select the project that you want to use as the reference.



   The cost plan of the reference project appears in the left side with the color you defined in the Project Settings.

4. Select the row indicator of the component you want to copy from the reference project, and then drag and drop it to the right place in your cost plan.
   Based on where you move the copied content, arrows indicate where it will be copied. A down arrow indicates that the content will be copied underneath the component that you are pointing at. A left arrow indicates that the content will be copied inside the component that you are pointing to.
   The component is added to the current project with all the included subcomponents.

Conditional Formatting

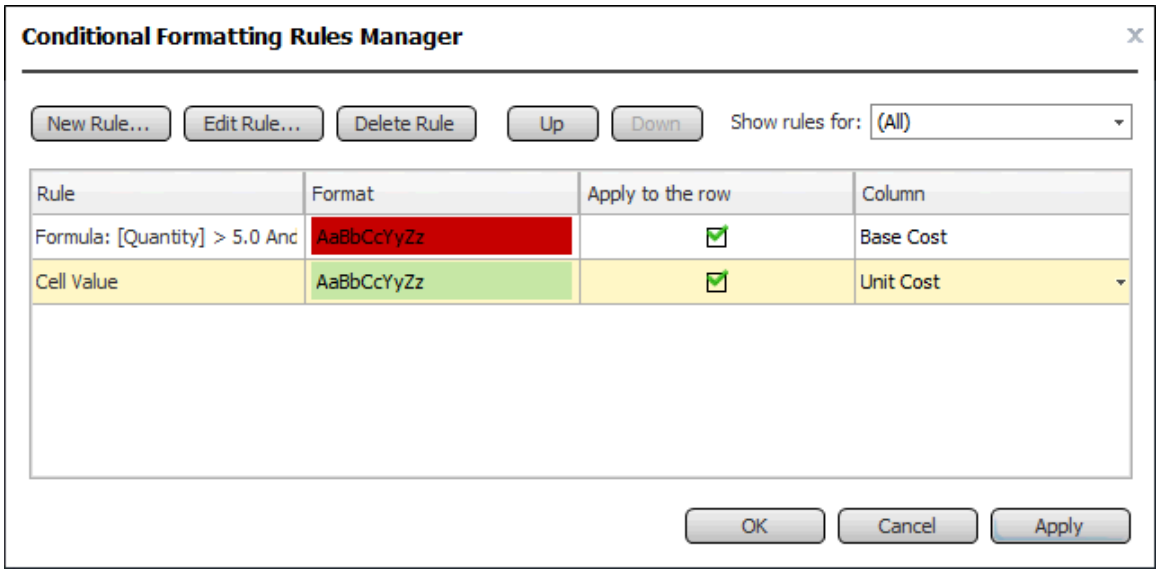
Vico Office offers you the ability to change the appearance of individual cells or rows of a Cost Planner grid based on specific conditions. This feature helps to highlight critical information, identify trends, and

compare data. Multiple formatting rules can be created and applied to a Cost Planner grid. These rules apply to all the Cost Planner views in any project that you open with Vico Office.

To create a formatting rule

1. Right-click on a Cost Planner column header and select **Conditional Formatting** > **Manage Rules**.
2. On the **Conditional Formatting Rules Manager** dialog box, click **New Rule**.
3. In the **New Formatting Rule** dialog box, choose one of the following rule types:
   - Format only cells that contain:
     - Cell value: Applies a format if a cell's value meets a specified condition (E.g., Equal To, Less Than, Between).
     - Dates Occurring: Applies a format if a column's date has a specific date and/or date interval relative to today. These days and intervals include Today, Yesterday, This week, Earlier this month, and Prior to this year.
   - Use a formula to determine which cells to format: Use this option to apply multiple format rules to a cell.

     Example: To highlight in red text all the items related to 'Floor' construction that exceed a 'Base Cost' of '$2 million', you would enter two conditions, Keep in mine that your formatting rules need to honor Vico's default formatting rule. For more information, see '"Important: Formatting Rules" on page 333
4. Click **Format,** specify how you want to format the cells and click OK.
5. On the **Conditional Formatting Rules Manager** dialog box, you can click on any of the following:
   - Edit Rule: Edit the currently selected rule.
   - Delete Rule: Delete the currently selected rule.
   - Up / Down: Use these buttons to determine the order of your rules. The lowest rule in the list has the lowest priority.
   - Apply to the row: Select it to apply the formatting to the entire row.
   - Column: Select the column to which you want to apply the formatting rule.



Applying a Predefined Style Format

For ease of use, Vico Office contains a list of predefined style formats.

To apply a predefined style format

1. Right-click on a Cost Planner column header and select **Conditional Formatting** > **Highlight Cell Rules**.
2. Select one of the predefined formatting rules.
3. Enter the value and the formatting style to be applied to this rule.
4. Optionally select the check box to apply the formatting rule to the entire row.
5. Click **OK**.

Deleting Conditional Formatting Rules

If you have already applied one or more rules to columns, the Clear Rules submenu becomes available. It allows you to delete rules from one or all columns.

To delete the conditional formatting rules

1. Right-click on a Cost Planner column header and select **Conditional Formatting** > **Clear Rules**.
2. Choose to either clear the formatting rules applied to the selected column or to all the columns in the grid.

Sharing Formatting Rules

The formatting rules are saved in the *CP_FormatingRules* XML file, which is located in the following folder path:

C:\Users\<user_profile>\AppData\Roaming\Vico Software\Office\ConditionalFormattingRules

To share your formatting rules, simply copy the xml file to the new user's folder path. If the new user does not have a 'ConditionalFormattingRules' folder, simply create one.

Important: Formatting Rules

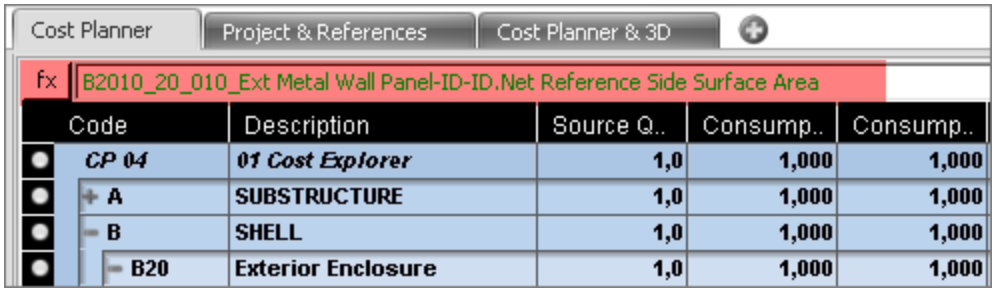
The format that you choose for your rules may be affected by Vico Office's default grid formatting. For example, the following default formatting is applied to:

- Assembly names: **bold**
- add-on headers: **bold**
- non-editable/calculated fields: *italics (Example: Price, Net Total)*
- Markup value or Markup Percentage: *Italics*
- Mapped component - grey font (mapped to task or to Work Package)

When selecting a formatting style for your grid, keep in mind the default rules as they will take precedence over your own conditional formatting rules.

Cost Planner Formula Editor

Source quantities for the cost components can be defined manually by entering the value or by using formulas that are given by the generated takeoff quantities. The defined formula appears in the formula bar above the cost plan (highlighted in red in the screenshot below).



To edit formula for the source quantity

1. Open the Plan Cost task.
2. Click the **Source Qty** cell of the component for which you want to define the new formula.

   The fx button appears in the cell.
3. To open the **Formula Editor**, click the fx button.

Areas in the Formula Editor:

Takeoff Manager

The Takeoff Manager displays the list of takeoff items and takeoff quantities that were defined in the project using the Takeoff Manager module.

Associated Location System: -

Code	Descript..	Value	Unit
	A1031_001_Slab on Grade-ID		
	A1012_003_Pile Cap-ID		
	A1021_001_CIP RC Pile-ID		
	B1012_005_CIP RC Slab-ID		
	B1012_046_CIP RC Column-ID		
	B1012_069_CIP RC Beam-ID		

Enter Formula

The Enter Formula section shows selected takeoff items and takeoff quantities. You can modify the formula using mathematical functions and symbols.

Enter formula

fx= A1012_003_Pile Cap-ID.Edge Perimeter

For more information on entering formulas, see "Cost Planning with Takeoff Items" on the next page.

Quantities per Location

The Quantities per Location section shows the outcome of the defined formula per location. The defined formula is evaluated on each location and then rolled up to the project level.

WBS	Quantity
Project	1,120.0
Foundation	1,120.0
Zone A	320.0
Zone B	560.0
Zone C	240.0
Superstructure	0.0

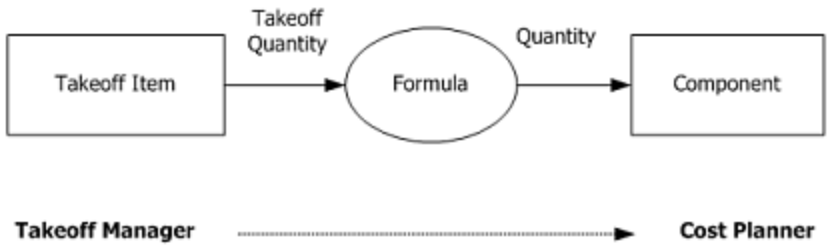
Formula Preview

The Formula Editor automatically corrects the formula that is entered in the Formula Editing section. Parentheses are added to make sure that the formula is evaluated correctly. The result of the automatic correction is presented in the Formula Preview section.

Cost Planning with Takeoff Items

The integrated environment provided by Vico Office makes it possible to use information that is created in one module or view as input for information in another module or view.

You can use the quantity takeoff information from the **Takeoff Manager** view for quantity input for the components in the **Cost Planner** view.

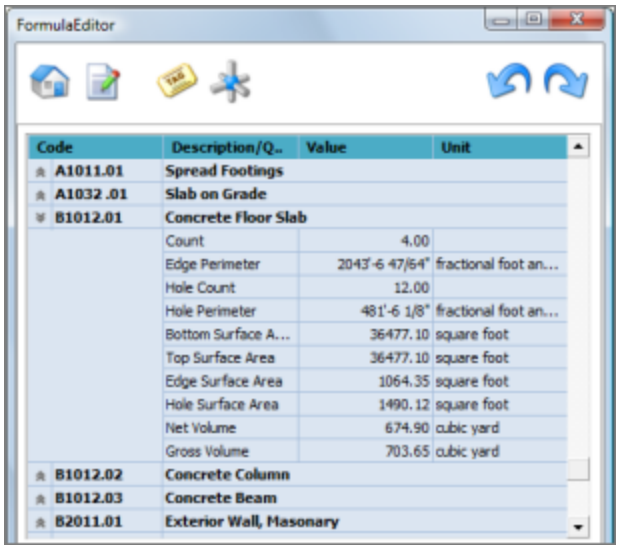


Quantity management, changing project variables, and using a specific quantity multiple times is made easier by using takeoff items and takeoff quantities. If you want to use takeoff items and takeoff quantities in your cost plan, use a formula for the input.

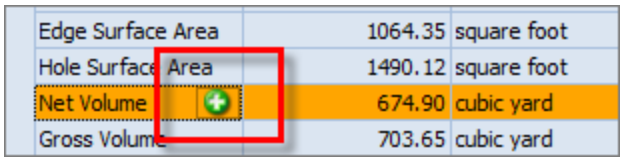
To plan cost with takeoff items for quantity input

1. Open the Plan Cost task.
2. Click the **Source Qty** cell of the component for which you want to use a quantity that you defined in the **Takeoff Manager** view.
3. To open the **Formula Editor**, click the fx button.

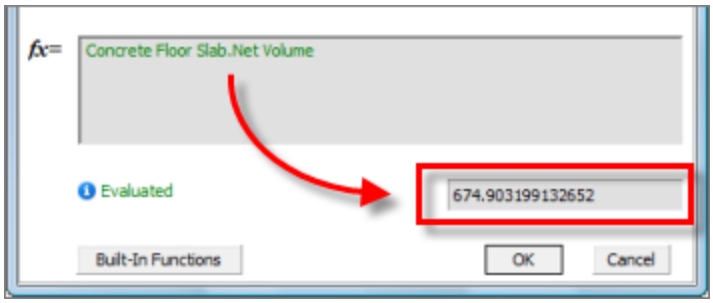
   The **Formula Editor** displays the list of takeoff items and takeoff quantities that you prepared in your project in the **Takeoff Manager** view.



4. To see the list of available takeoff quantities, expand the takeoff item that contains the quantities that you want to use as input for the selected component.
5. To include the value as a variable in the **Enter formula** box, select the desired quantity, and then click the **+** button.



The selected takeoff item and takeoff quantity appears in the **Enter Formula** box. The resulting value appears in the **Preview** box.

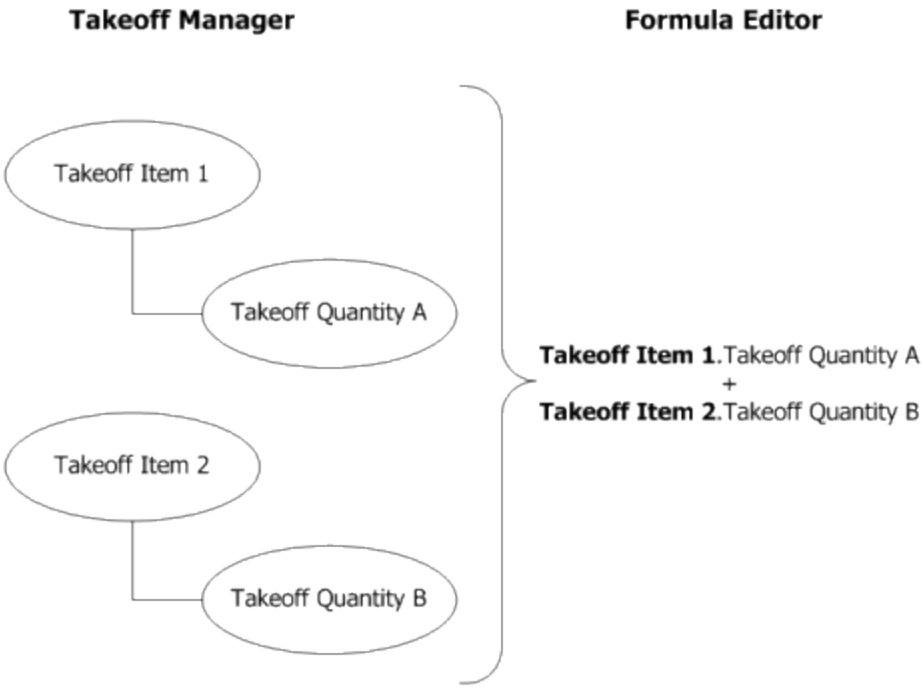


Combining Multiple Takeoff Quantities

You can combine quantities that you defined manually or that you extracted from BIM elements and were stored in different takeoff items.

Example

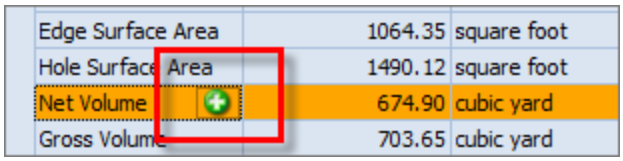
Takeoff Item 1 is Wall Type A, and Takeoff Item 2 is Wall Type B . Takeoff Quantity A and B is the net volume. In the **Formula Editor**, you can calculate the sum of the net volume values for both wall types as one quantity that can be used as input for your cost component.



To combine multiple takeoff quantities in a single formula

1. Open the Plan Cost task.
2. Click the **Source Qty** cell of the component for which you want to define the new formula.

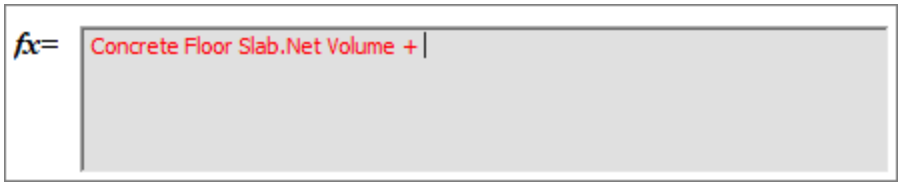
   The fx button appears in the cell.
3. To open the **Formula Editor**, click the fx button.
4. From the list of takeoff items and takeoff quantities, select the first quantity that you want to use in the formula, and then click the **+** button to add it.



The takeoff item and takeoff quantity are displayed in the **Enter Formula** box.

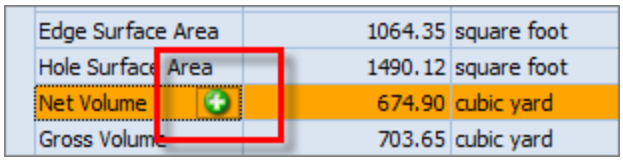
5. Click the **Enter Formula** box to activate the cursor, and then move the cursor to the end of the formula.

6. Type the **+** symbol.

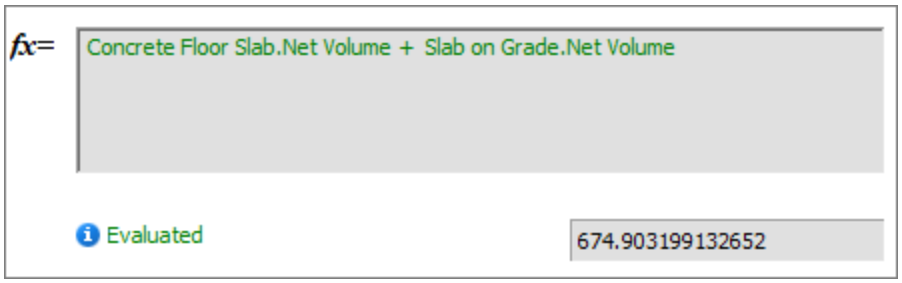


The font color of the formula changes to red because the formula is no longer complete; a variable is missing after the **+** symbol.

7. Leave the cursor after the **+** symbol, and then include the next takeoff quantity by selecting the takeoff quantity and clicking the **+** button.

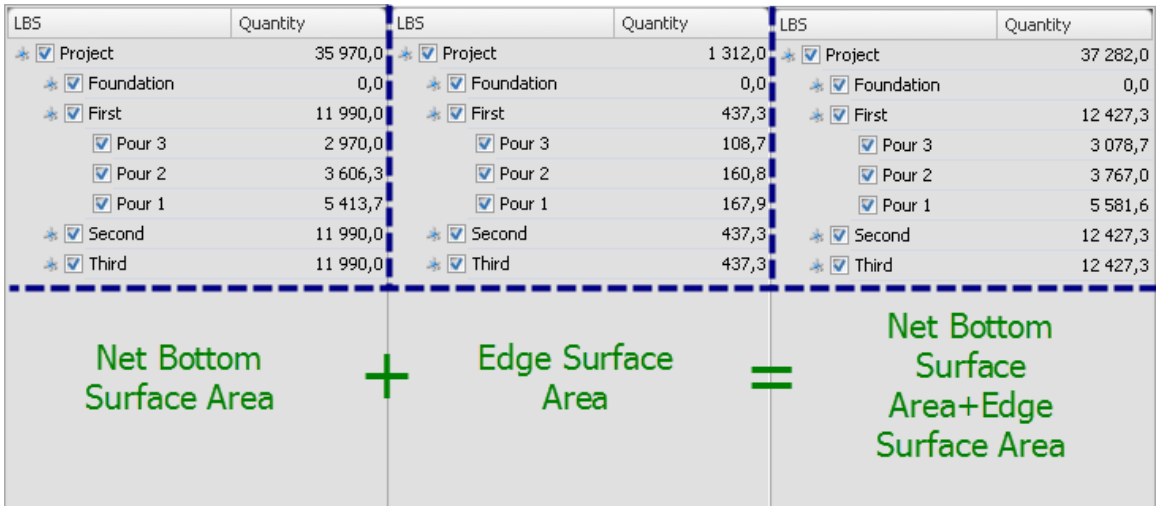


The takeoff quantity is added to the formula, and a preview of the calculated value is displayed. The font color of the formula is green again.



Example (Adding Quantities)

You want to calculate the value for the formwork activity. In this case, you want to add the edge surface area to the bottom surface area.

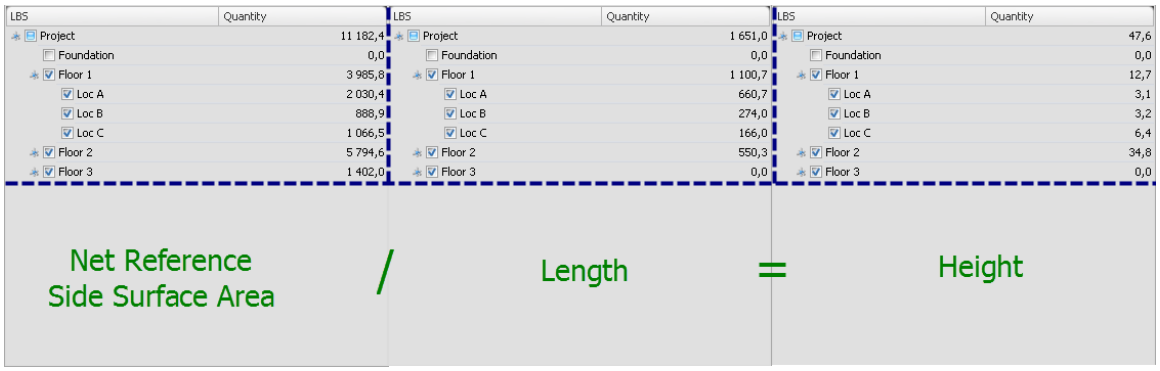


Observe how Vico Office adds the appropriate quantities per locations and then rolls them up to the higher level.

If you multiply the appropriate takeoff quantities, Vico Office starts the calculation on the lowest level, and then rolls the results up to the higher (parent) level. In this case, the quantity on the project level will not be equivalent with the one that comes from multiplying the quantities on the project levels.

Example (Dividing Quantities)

You want to calculate the height of the wall by dividing the side surface area by the length.



Observe how Vico Office divides the quantities on the lowest level and then rolls them up to the higher level.

Floor 1 - Loc A: 2 030.4/660.7=**3.1**
Floor 1 - Loc B: 888.9/274.0=**3.2**
Floor 1 - Loc C: 1 066.5/166.0=**6.4**

Floor 1 - Total Height: 3.1+3.2+6.4=**12.7**;
Project - Total Height: 12.7+34.8+0.0=**47.6**;

Defining Advanced Formulas

You can embed advanced functions in formulas to combine takeoff quantities for cost calculation in a component.

The functions are available in the following categories:

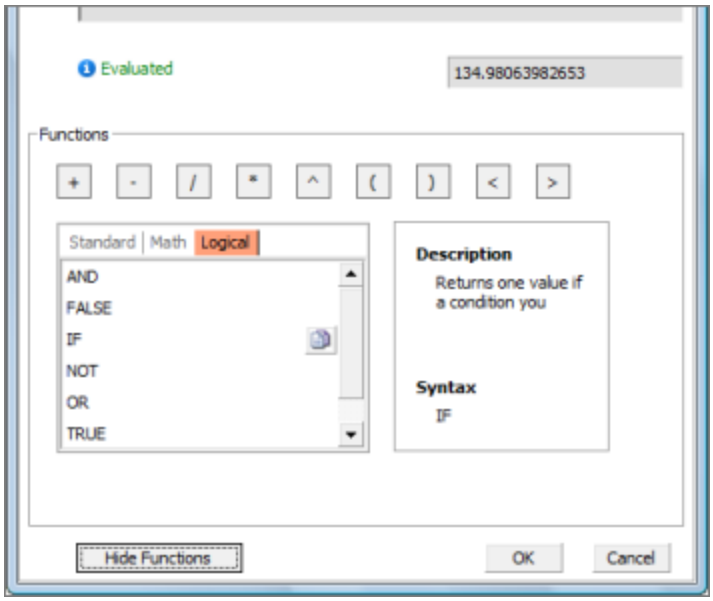
- **Standard:** Includes basic mathematical functions such as **+**, **-**, and **/**.
- **Math:** Includes geometrical functions such as **SIN**, **COS**, and **TAN**.
- **Logical:** Includes **IF**, **NOT**, **TRUE**, and **FALSE** statements for defining conditional calculations.

To use the advanced functions in the Formula Editor

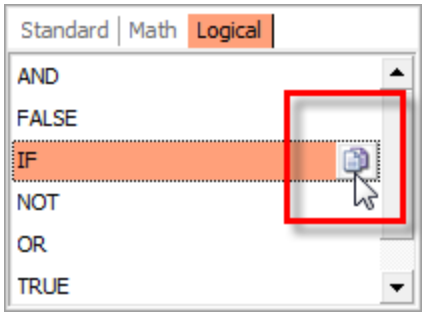
1. Open the Plan Cost task.
2. Click the **Source Qty** cell of the component for which you want to define the new formula.

   The fx button appears in the cell.
3. To open the **Formula Editor**, click the fx button.
4. To open the built-in functions, click **Built-In Functions**.

   The **Functions** section appears at the bottom of the **Formula Editor**.



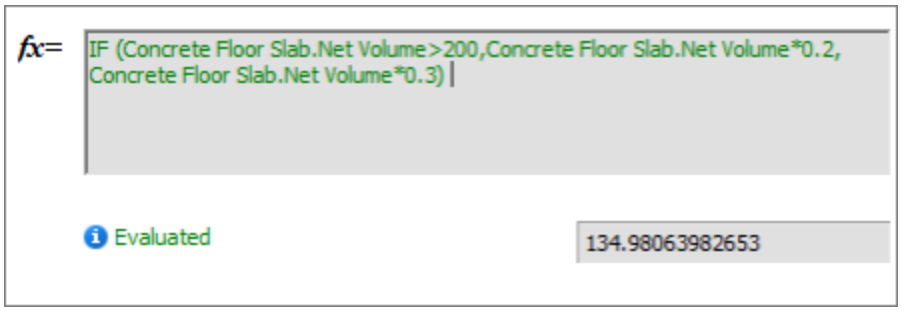
5. Select the function that you want to use in your formula, and then click the copy icon.



6. In the **Enter Formula** box, move the cursor to the position where you want to insert the function.
7. To insert the function, press **Ctrl** + **V**.

Because the formula is incomplete, it appears in red font, and a message '**Error within the formula**' is displayed.

8. Complete the function by adding parentheses, mathematical functions, and takeoff quantities.



When the formula is complete, a preview value is presented, and the message **Evaluated** appears.

Adding Constant Values

By default, constant values that are added to a formula are divided over all locations that have an evaluated formula result that is larger than 0.

Example:

In the project, the Wall.Count takeoff item and takeoff quantity are:

Project	30.0	PCS
Floor 1	10.0	PCS
Floor 2	0.0	PCS
Floor 3	20.0	PCS

If the formula is defined as **Wall.Count**, the evaluated result per location will be equal to these values. However, if you add a constant value, that value will be subdivided over all locations with a formula outcome larger than 0.

For example, the formula Wall.Count + 10 results in:

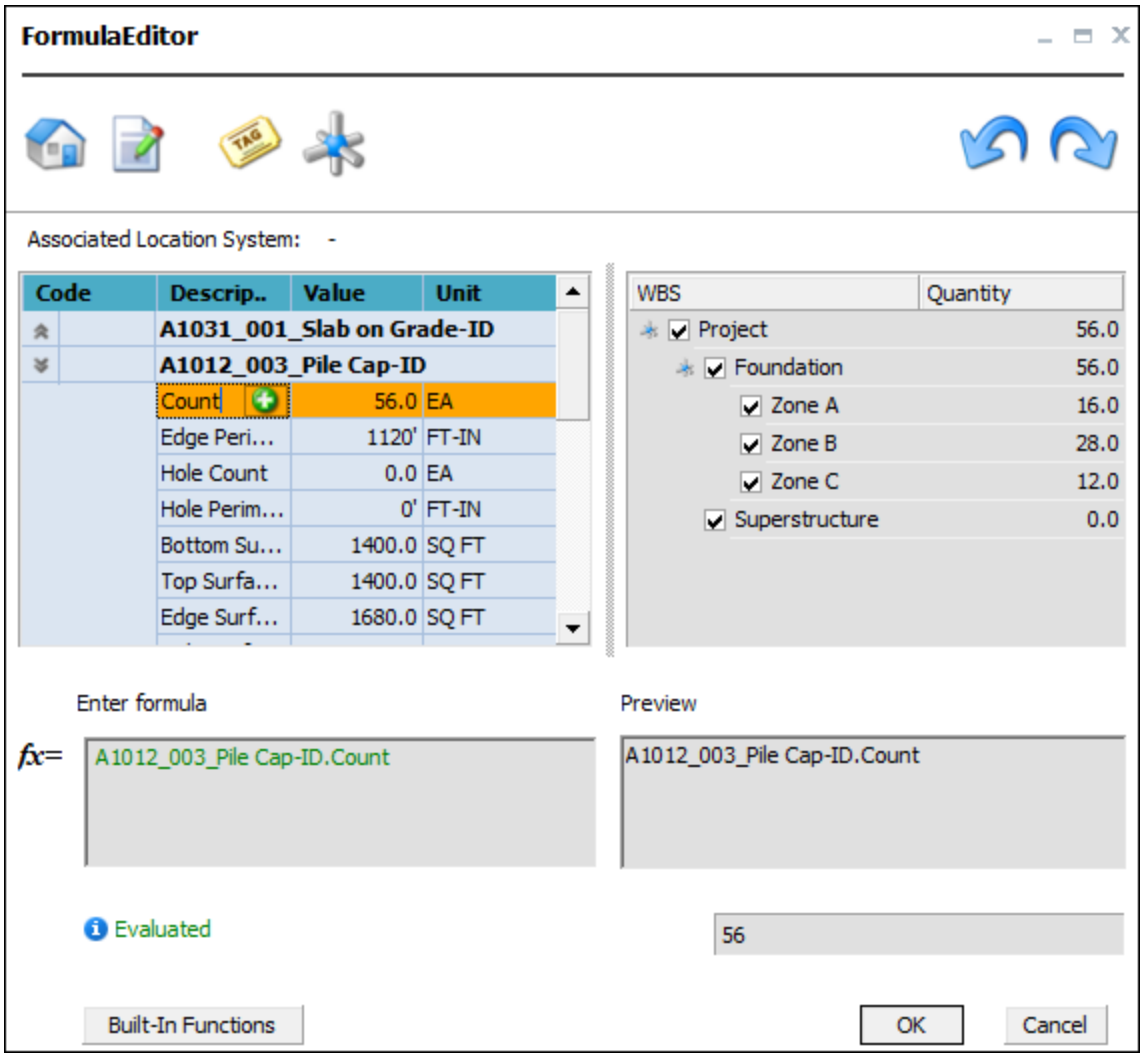
		Constant Value	**Formula Total**
Project	30.0 PCS	*10.0*	**40.0**
Floor 1	10.0 PCS	*3.3*	**13.3**
Floor 2	0.0 PCS	*0.0*	**0.0**
Floor 3	20.0 PCS	*6.7*	**26.7**

If you do not want the constant value to be distributed, the **FOREACHLOC** function can be used.

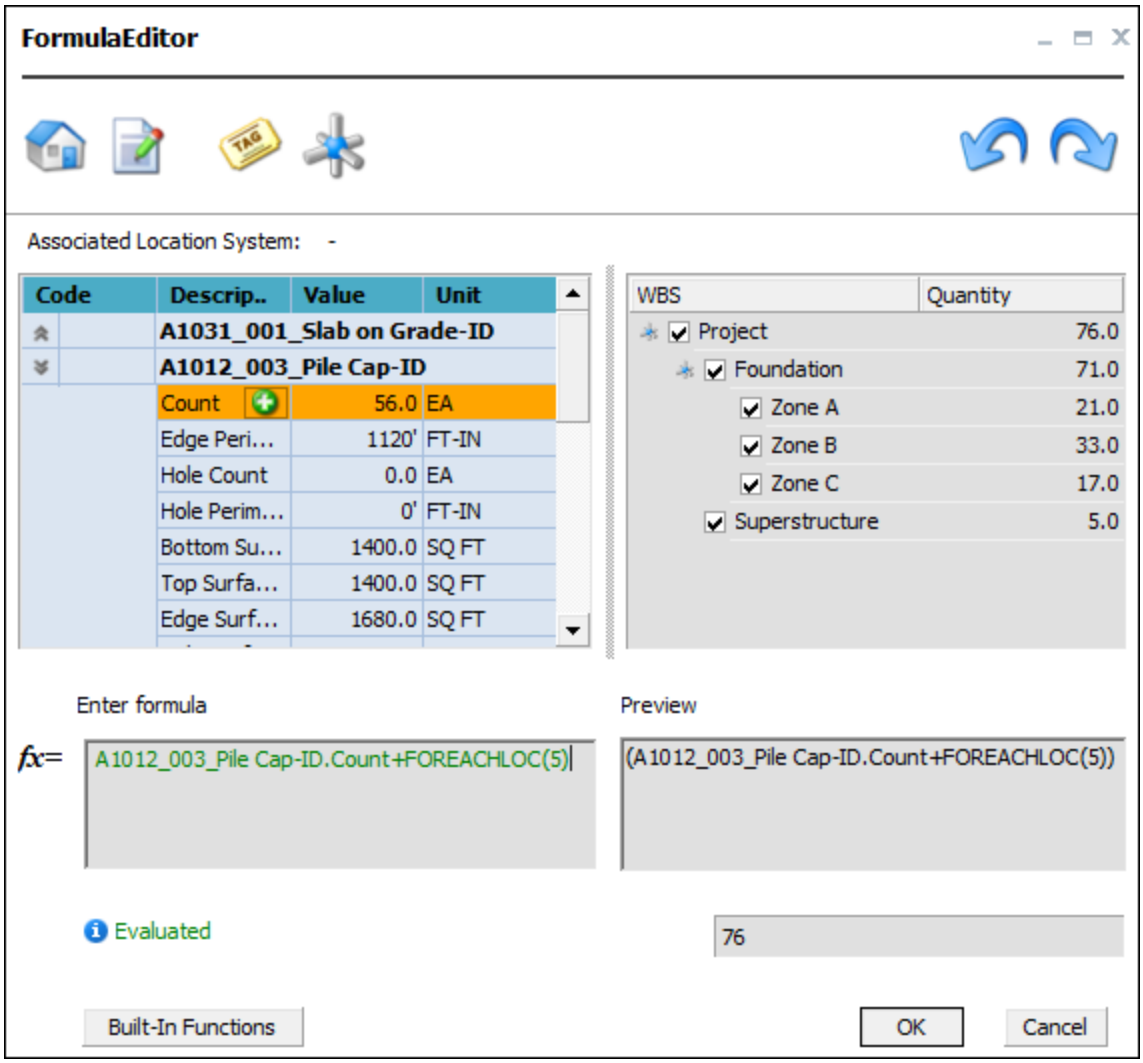
To add a constant value for each location

1. Open the Plan Cost task.
2. Click the **Source Qty** cell of the component for which you want to define the new formula.

   The fx button appears in the cell.
3. To open the **Formula Editor**, click the fx button.
4. Enter the takeoff item and takeoff quantity names with the desired mathematical expressions and functions.



5. In the **Enter formula** box, type **+FOREACHLOC**, followed by the constant value in bracket that should be added to each location's evaluated value.



Define Key Figures

The process of creating model-based cost items consists of creating cost items and then defining the formula. Using the **Define Key Figures** task, you can easily define formulas for the cost components and assemblies by dragging and dropping the takeoff quantities to the cost items.

To open the Define Key Figures task

1. Right-click the Workflow Panel header, and then click **Master Workflow**.
2. In the **Project Setup** workflow group, click **Define Key Figures**.

Mapping Takeoff Quantities to Cost Items

To create cost items and map TOQs

1. Open the Define Key Figures task.
2. Click in the **Cost Planner** view.
3. On the **Cost Planner** ribbon tab, click **New Component**.

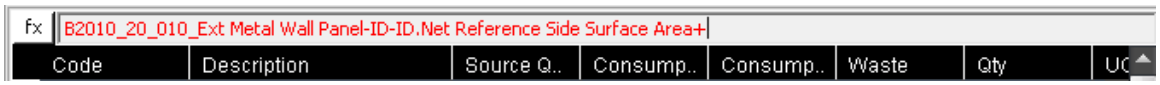
   –Or–

   Double-click a cell in the **Description** column, and then type the name of the cost item manually.
4. Expand the takeoff item to be mapped to the newly created cost item.
5. Select the takeoff quantity you want to add to the cost item formula, and then drag and drop it on the line item.

   The formula appears in the formula bar, and the quantity appears in the **Qty** column.

6. To combine multiple takeoff quantities, type the mathematical symbol (for example, **+**, **-**, *****) after the existing TOQ in the formula bar, and then add the other TOQ to the cost line item.

   After you type the mathematical symbol, the font color of the formula changes to red because the formula is no longer complete.



   When the formula is complete, the font color of the formula changes to green.

Explore Cost

Project teams often struggle with communicating cost and cost variance in a project. Traditional communication means are printouts of both cost estimate (versions) and design plans, both of which are disconnected and voluminous. It is difficult to explain an occurring cost variance between two versions in meetings. As a result, much time is spent on creating a common understanding of the project information, which leaves insufficient time for analysis and decision making.

Most cost comparisons are done at the project level, so there is a misunderstanding of where budget overruns occur in the project. This often results in an inability to define accurate and targeted project changes to bring the project back on track.

The **Explore Cost** task in Vico Office helps project teams visualize and analyze project cost and cost variances. The color-coded Cost Explorer and 3D model integration is a powerful way to communicate the cost of a specific group, where it exists in the project, and how it compares to the budget and previous versions.

The default viewset includes the following:

- Cost Explorer view
- Cost Planner view (read-only)
- 3D View

The **Cost Explorer** view contains the **Cost Explorer Tree**, and all assemblies are shown as nodes. When you click a circle or square in the tree, the corresponding cost data appears in the **Cost Planner** view. You can see the collection of assemblies and components that were used to calculate the cost of the project.

To open the Explore Cost task

1. Right-click the Workflow Panel header, and then click **Cost Planner**.
2. In the **Cost Planning** workflow group, click **Explore Cost**.

Comparison Modes and Versions

The **Cost Explorer** view has the following comparison modes:

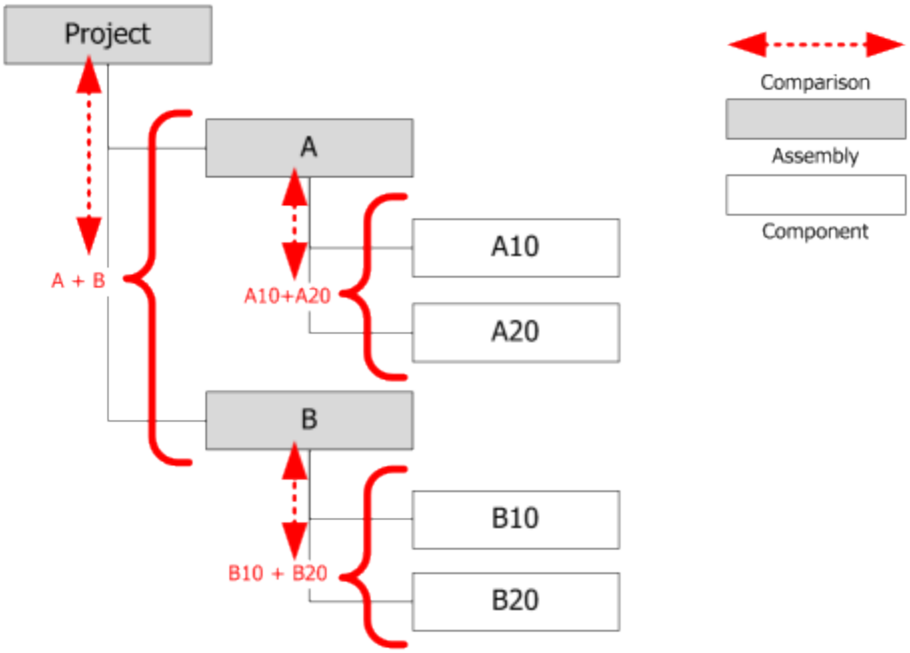
- Assemblies to Components: Compare each assembly's calculated cost to the sum of the included components and/or assemblies.
- Cost to Target: Compare the costs of two selected versions to the defined targets.

The results of the comparison is reflected in the Cost Explorer Tree.

Assemblies to Components

In the **Assembly to Component** comparison mode, the cost that was calculated for each assembly is compared to the sum of the cost of the components and/or assemblies on the level below it. Each assembly is presented as a node in the **Cost Explorer Tree**. The node color is based on the comparison of the assembly's included assemblies and components to the assembly's original cost.

Example:



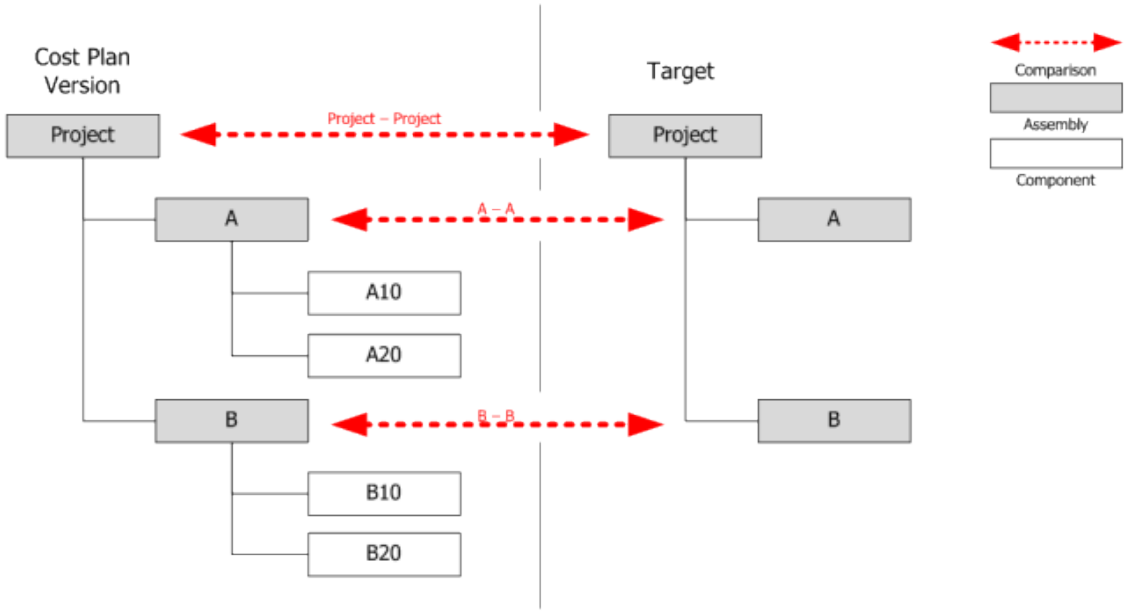
Project, **A**, and **B** are assemblies and are displayed in the **Cost Explorer Tree**.

- The **Project** cost value is compared to the sum of **A** and **B**.
- The cost in **A** is compared to the sum of **A10** and **A20**
- The cost in **B'** is compared to the sum of **B10** and **B20**

Cost to Target

In the **Cost to Target** mode, the sum of the assemblies' costs in the project is compared to the defined target values for the matching assemblies in the target cost set. You can use a target cost set to define a budget or baseline for the cost of your project. In the target cost set, you can define a total budget for the project, and then allocate it to the cost divisions defined with the assembly and component structure.

Example:



The project's assembly cost is compared to the assembly's target value.

- **Project** in the cost plan version is compared to the **Project** in the target cost set.
- **A** in the cost plan version is compared to **A** in the target cost set.
- **B** in the cost plan version is compared to **B** in the target cost set.

Cost Explorer Tree

The **Cost Explorer Tree** is a tree structure that matches the assembly and component structure that was set up in the **Cost Planner** view. All assemblies are shown as nodes in the tree, and two cost plans (plus a target depending on the comparison mode) can be active at the same time.

Nodes can contain the following shapes that represent the active versions in the comparison:

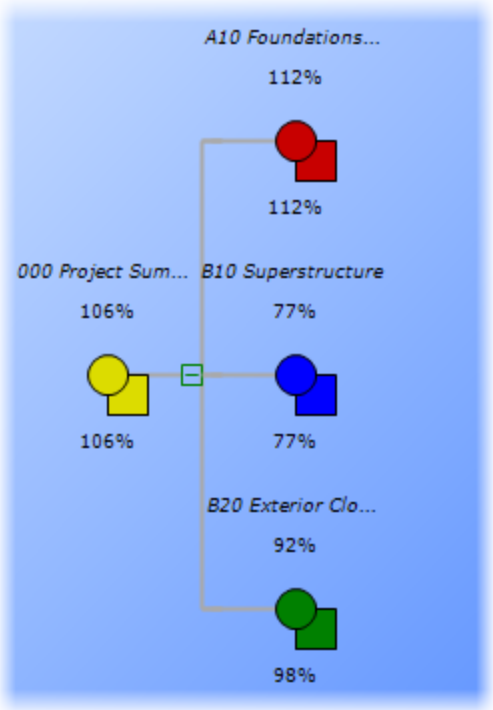
- **Square:** Represents the older version in the pair.
- **Circle:** Represents the newer version in the pair.

The color of the node indicates its cost status:

- **Red:** Higher than the target.
- **Yellow:** At risk.
- **Green:** Within the set target range.
- **Blue:** Too low compared to the target.

For information on setting up the cost comparison ranges, see "Defining Comparison Ranges" on page 354.

Example:



In the **Assemblies to Components** comparison mode:

- The sum of all assemblies and components in this project (**000 Project Summary**) is at risk when compared to the cost that was defined for the project on the project-level assembly.
- The cost calculated as the sum of the content in the **A10 - Foundations** assembly is too high when compared to the allocation that was entered for the foundations initially.
- The cost calculated as content for the **B10 - Superstructure** assembly is considered too low.
- The cost calculated for the **B20 - Exterior Closure** assembly is within budget.

Defining a Target Cost Set

The target cost set can be used to define a budget or baseline for the cost of your project. The structure of the target cost set is automatically created with the assembly and component structure and allows you to define a total budget for the project, which can subsequently be allocated to the several cost divisions in your project defined with the assembly and component structure.

To define the target cost set for your project

1. Open the Define Targets task.
2. To define an overall target for the project in the project summary line (the first row), enter a value in the **Cost** cell.

Target Cost Editor

Code	Description	Rate	Cost
01	01 Cost Explorer	0,00 %	6 000 000,00
A	SUBSTRUCTURE	0,00 %	600 000,00
A10	Foundations	0,00 %	600 000,00
A1010	Standard	0,00 %	1000
A1012_003	Pile Cap-ID	0,00 %	0,00
A1020	Special Foundations	0,00 %	0,00
A1030	Slab on Grade	0,00 %	0,00
B	SHELL	0,00 %	5 400 000,00
B10	Superstructure	0,00 %	0,00
B20	Exterior Enclosure	0,00 %	0,00
#1000	Alternatives	0,00 %	**0,00**
#0000	Adjustments	0,00 %	**0,00**

3. Allocate the budget (top-down) to the individual line items in your project.

   You can enter a budget allocation either as a percentage of the budget on a level or as a currency value.

The completed target cost set is ready for use immediately, and changes in the target cost set are directly reflected in the **Cost to Target** comparison mode.

Comparing Cost Plan Versions

The **Cost Explorer** view has the following comparison modes:

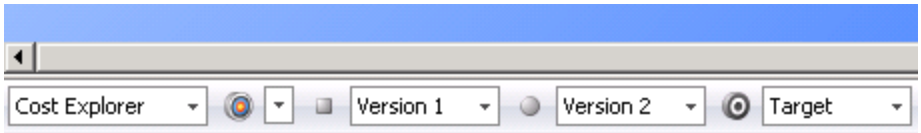
- Assemblies to Components: Compare each assembly's calculated cost to the sum of the included components and/or assemblies.
- Cost to Target: Compare the costs of two selected versions to the defined targets.

For more information, see "Comparison Modes and Versions" on page 347.

To compare cost plan versions

1. Open the Explore Cost task.
2. From the **Comparison Mode** list, select the desired comparison mode.

Based on the selected comparison mode, the taskbar shows two version lists (**Assemblies to Components**) or two version lists and a target list (**Cost to Target**).



3. From the version lists, select up to two cost plan versions that you want to compare.

   If you want to show the current state of the cost plan in the comparison, select the **Current Version** option.

   In the version lists, the following icons appear to the left of the selected versions or target:

   - Green square: The older cost plan version.
   - Green circle: The newer cost plan version.

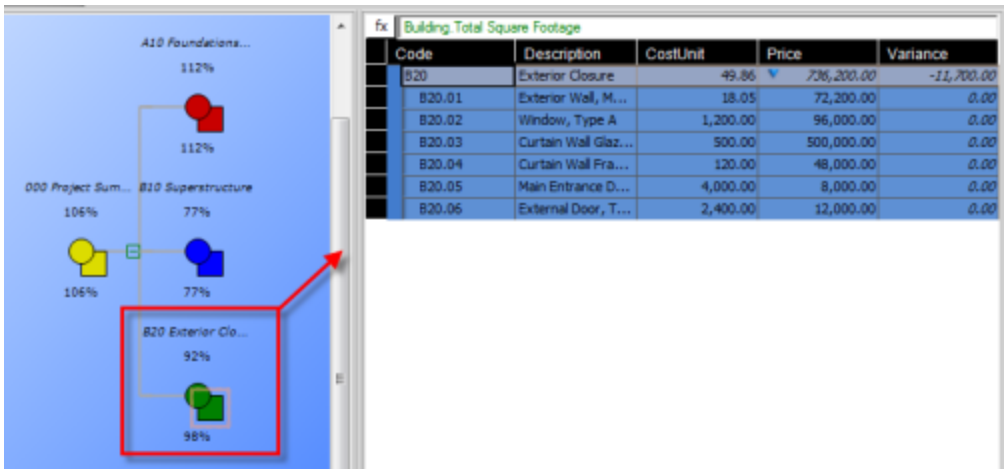
   The selected versions are displayed in the **Cost Explorer** view and are represented in the Cost Explorer Tree by circles and squares.

4. If you selected the **Cost to Target** comparison mode, select the defined target cost or another cost plan version as the target for comparison from the target list.

   In the target list, the target icon appears to the left of the selected target cost set or cost plan version for comparison.

5. To view the cost plan data, click a circle or square in the **Cost Explorer Tree**.

   The cost plan version is displayed in the **Cost Planner** view. You can use the Highlight and Filter modes to view the data.



Using the Highlight and Filter Modes

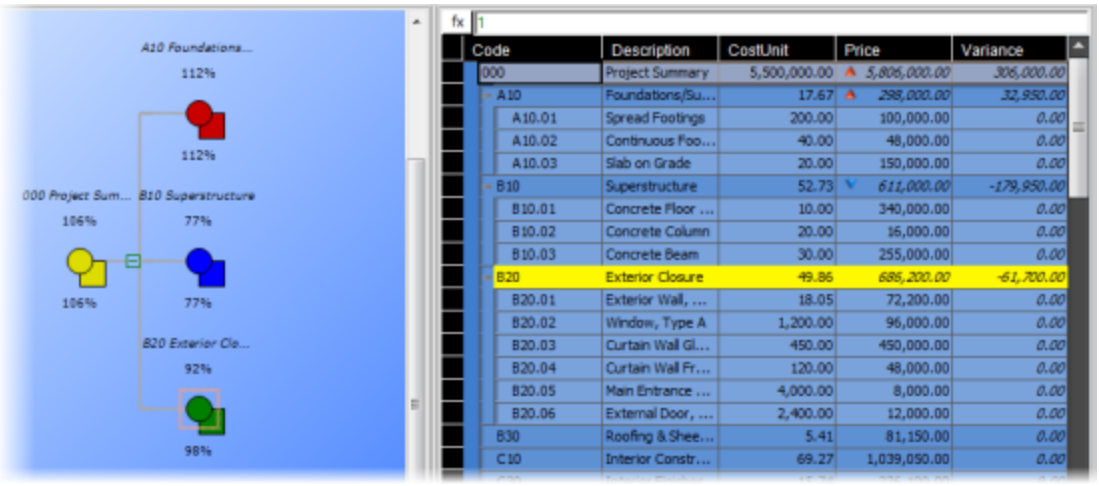
When you click an assembly in the **Cost Explorer Tree**, its associated cost plan version appears in the **Cost Planner** view. By default, the **Highlight** mode is activated, so the items associated with the selected assembly are highlighted in the view.

To hide the all the items that are not related to the selected assembly, you can activate the **Filter** mode.

To use the Highlight and Filter modes to explore cost

1. Open the Explore Cost task.
2. In the **Cost Explorer Tree**, click a version of an assembly.

   The selected assembly is highlighted in the unfiltered view.



3. On the **Cost Explorer** ribbon tab, click **Filter Selected**.

   The **Filter** mode is activated.

   The assemblies and components that are part of the selected assembly are filtered in the **Cost Planner**.

4. To deactivate the **Filter** mode (and implicitly activate the **Highlight** mode), click **Filter Selected** on the ribbon.

Defining Comparison Ranges

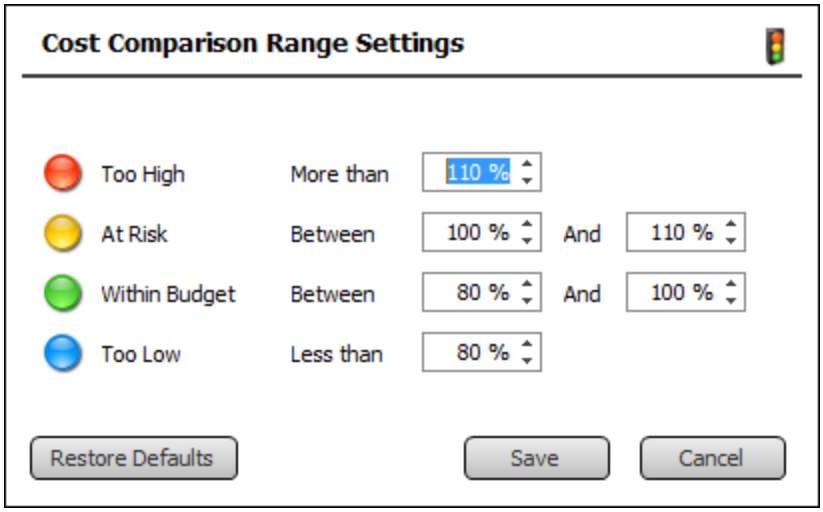
Comparison ranges determine the color of assemblies, which are displayed as circles and squares in the **Cost Explorer Tree**.

The variance of an assembly, which is calculated as a percentage of either the sum of included components (**Assemblies to Components** comparison mode) or the target (**Cost to Target** mode) can fall in one of the following comparison ranges:

- Too High (Red)
- At Risk (Yellow)
- Within Budget (Green)
- Too Low (Blue)

To define comparison ranges

1. Open the Explore Cost task.
2. On the **Cost Explorer** ribbon tab, click **Range Settings**.
3. In the **Cost Comparison Range Settings** dialog, define the top and bottom margins for the available comparison ranges.



4. Click **Save**.

   The changes are applied immediately to the **Cost Explorer Tree**.

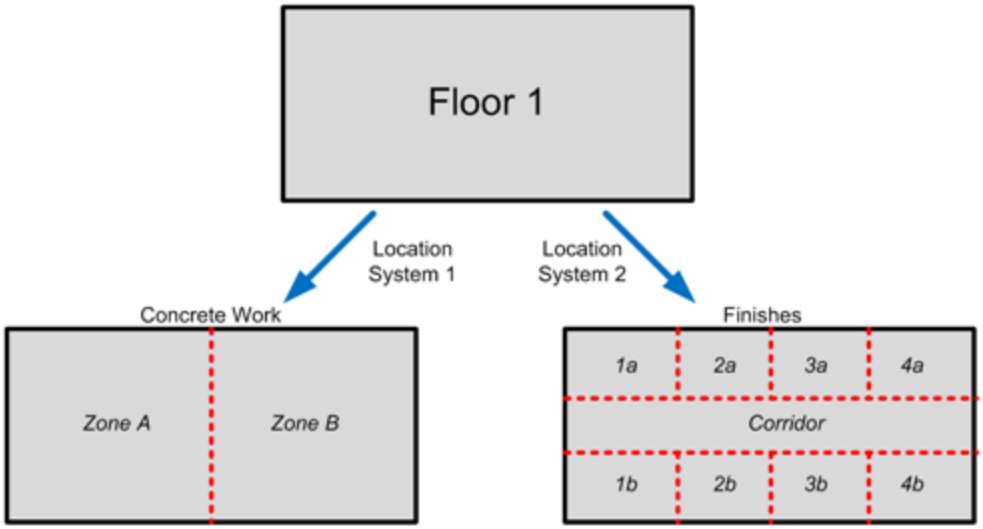
Define Locations

In the **LBS Manager** view, you can define locations inside the Vico Office environment to drive the location-based quantity takeoff, the starting point for location-based cost and schedule planning.

The cost and schedule planning modules in Vico Office use quantities per location to calculate labor, material, and equipment amounts and subsequently for determining number of work hours per location.

The **LBS Manager** view makes it possible to change locations (floors and zones) in Vico Office, without having to go back to the authoring BIM application. Quantities are recalculated and updated at the end of the location editing process, which makes it possible to analyze and optimize the phasing and zoning of a project to get to the best schedule for the project.

Location systems enable creation of alternative location breakdowns, defined per trade, without the need to maintain separate schedules or separate models.



To open the Define Locations task

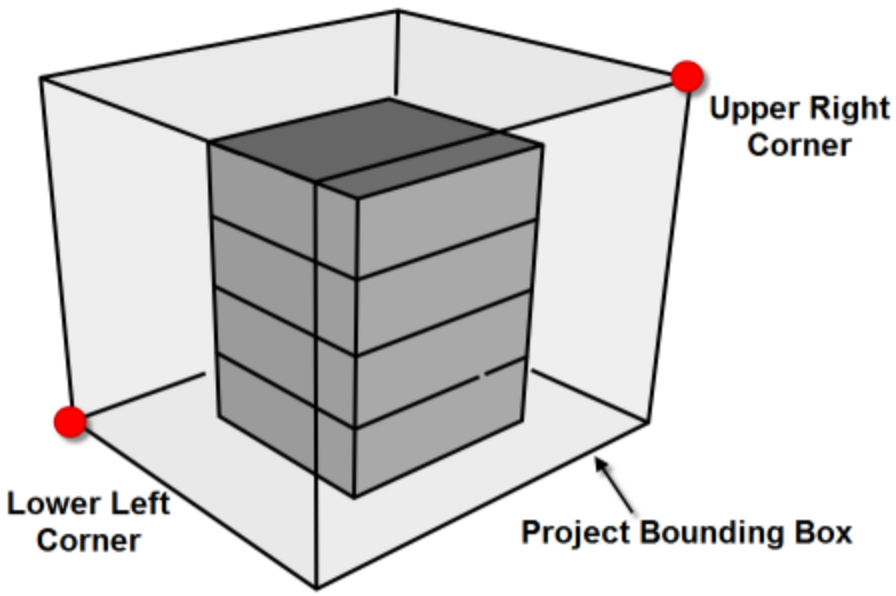
1. Right-click the Workflow Panel header, and then click **LBS Manager**.
2. In the **LBS** workflow group, click **Define Locations**.

   The default viewset includes the LBS Manager view and 3D View.

Defining the Project Bounding Box

The project's spatial boundaries need to be specified in order to determine the volume that needs to be analyzed by Vico Office to find 3D elements for which quantities should be calculated. It is recommended to define the project bounding box at the beginning of the project and to define it in such a way that the full project will fit in it, to make sure that adjustments are not needed when additional models are included in the project.

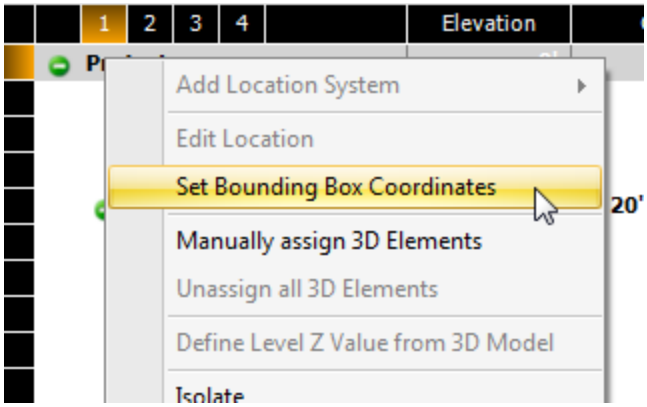
The project bounding box is defined by entering X, Y, and Z coordinates for a lower left corner and an upper right corner, as illustrated in the image below.



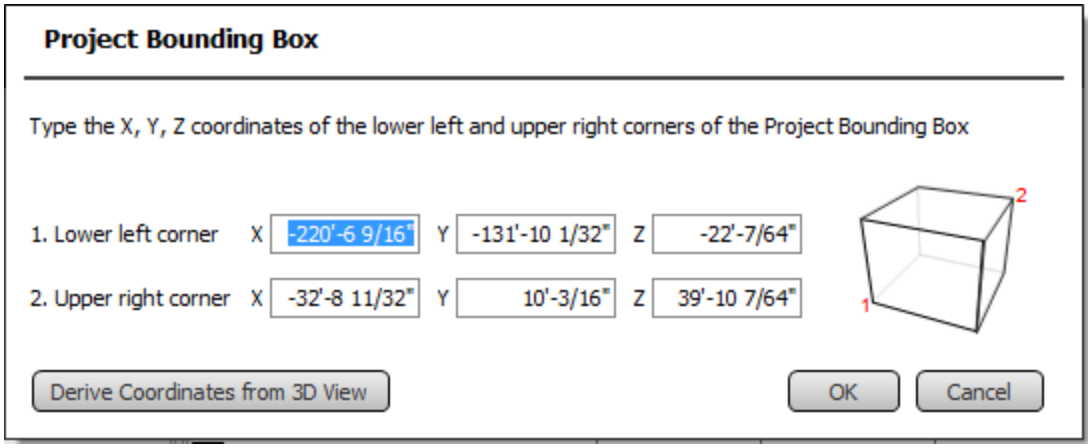
Project bounding box: a building with four stories is fully contained in the first location.

To define the project's spatial boundaries

1. Open the Define Locations task.
2. Right-click the **Project** node, and then click **Set Bounding Box Coordinates**.



The **Project Bounding Box** dialog appears.



3. In the **Lower left corner** and the **Upper right corner** rows, enter the **X**, **Y**, and **Z** coordinates.

   –Or–

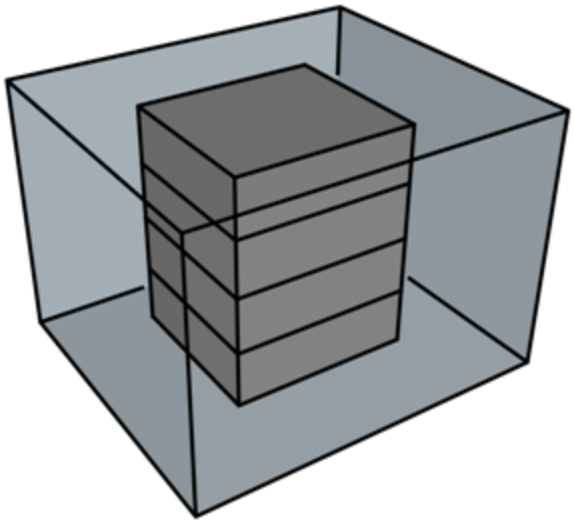
   To return the coordinates after determining the lowest and highest points in the activated models and applying an offset of 30ft / 10m from these points, click **Derive Coordinates from 3D View**.

Note: If you use the **Derive Coordinates from 3D View** function when some of the project's models are not published and/or activated, you may need to redefine the bounding box later, which typically results in reorganizing the defined LBS.

Adding a Floor

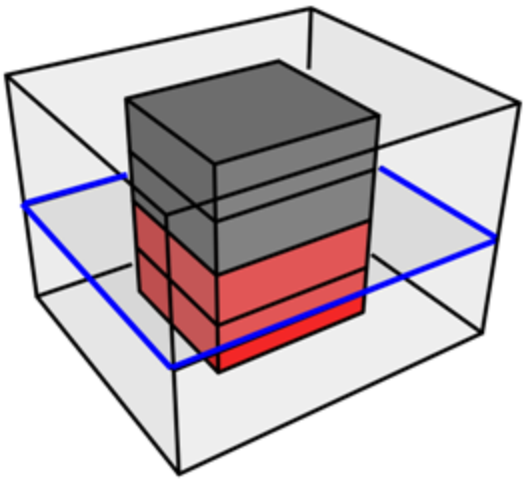
Locations are defined in Vico Office by virtually cutting the project bounding box into smaller boxes. Each location has a bounding box, and elements are included in a location if they exist within the spatial boundaries of it.

The project bounding box contains the entire model and is automatically generated. It is linked to the default project location and becomes visible when the Project LBS node is selected.



Initial Project Bounding Box: a building with four stories is fully contained in the first location.

By adding floors to the proclass="Caption"ct bounding box is split into two pieces: the bottom half contains the lower two stories, the top half contains the upper two stories. By repeating this process, and setting the elevations correctly, floors are defined for the Vico Office location breakdown structure.

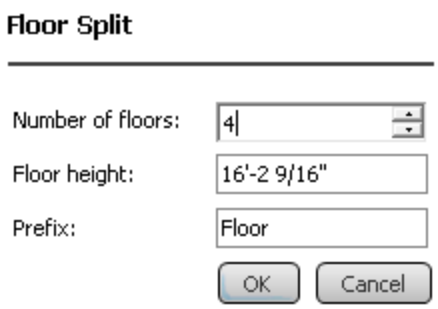


Project bounding box split into two floors. Elements are automatically assigned to the location in which they are contained.

To define a floor location in the project

1. Open the Define Locations task.
2. Right-click the **Project** node, and then click **Floor Split**.

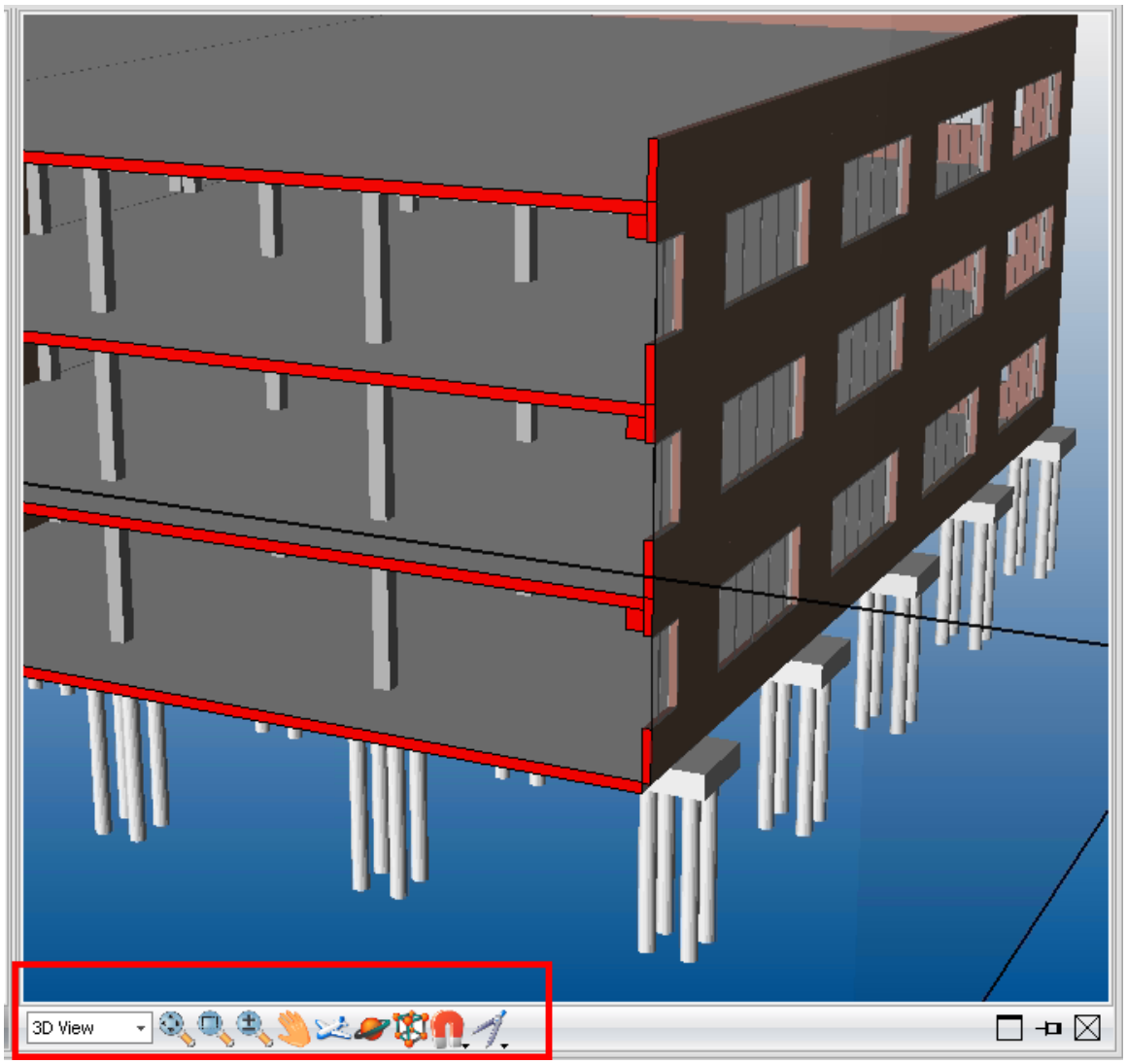
   The **Floor Split** dialog appears.



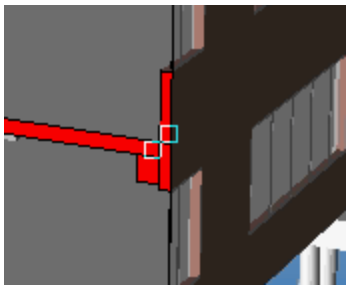
3. Set the number of floors and their height and name, and then click **OK**.

   The floors in the project are displayed with the same elevation, which can be modified later.

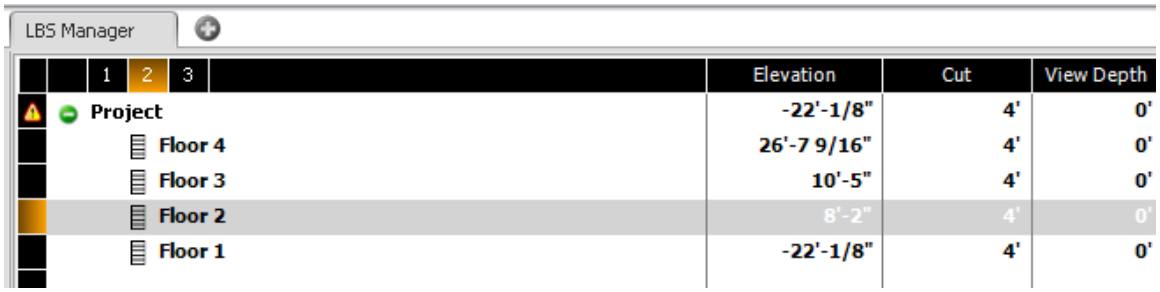
4. If required, for the best view for setting up the floors, use the 3D toolbar.



5. Right-click the floor for which you want to edit the height, and then click **Define Level Z Value from 3D Model**.
6. To define the bottom of the level, select a point of the 3D view.



Vico Office adds the new elevation for the current level.

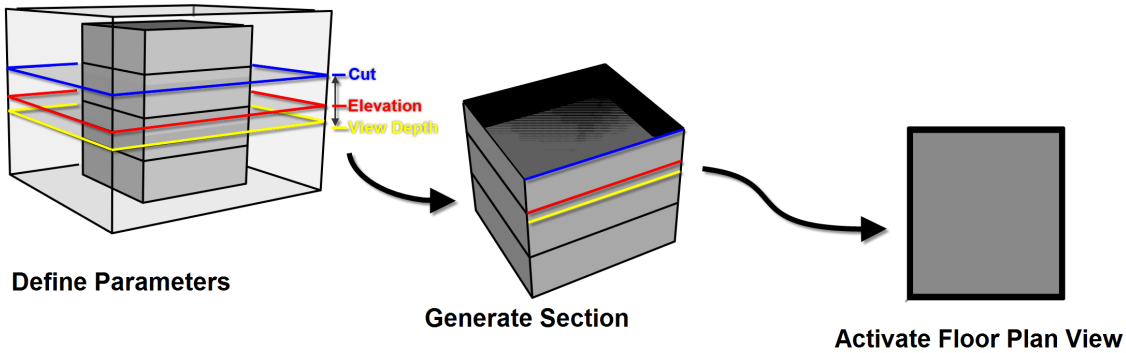


Defining a Zone

You can draw horizontal boundaries on a floor to define a subdivision into zones of the higher level location. Boundaries are defined in the floor plan view, which makes it easy to draw line work in the selected location.

When the floor plan view is activated, a 2D section is created dynamically. The 2D section has the following parameters:

- **Elevation:** The vertical (z) position of the floor, represented as the bottom of the floor's bounding box.
- **Cut:** The distance above the elevation where the section will be generated to create the floor plan view. The default value is 4ft / 1.20m. The cut height can be adjust dynamically while in the floor plan view by using **Shift + Scroll Wheel**.
- **View Depth:** The distance below the elevation that defines how far below the elevation floor plan view should reach. Increasing this value means that elements from the floor below will become visible where openings in the floor slab exist. The view depth can be adjusted dynamically while in the floor plan view by using **Ctrl + Scroll Wheel**.



The parameters are defined as part of the LBS:

1 2 3 4	Elevation	Cut	View Depth
Project	0'	4'	0'
Floor 3	18'-2"	4'	0'
Floor 2	8'-2"	4'	1'
Floor 1	-8"	4'	0'
Foundation	-22'-7/64"	20'-29/32"	0'
Zone A	-22'-7/64"	4'	0'
Zone B	-22'-7/64"	4'	0'
Zone C	-22'-7/64"	4'	0'

To define a construction zone

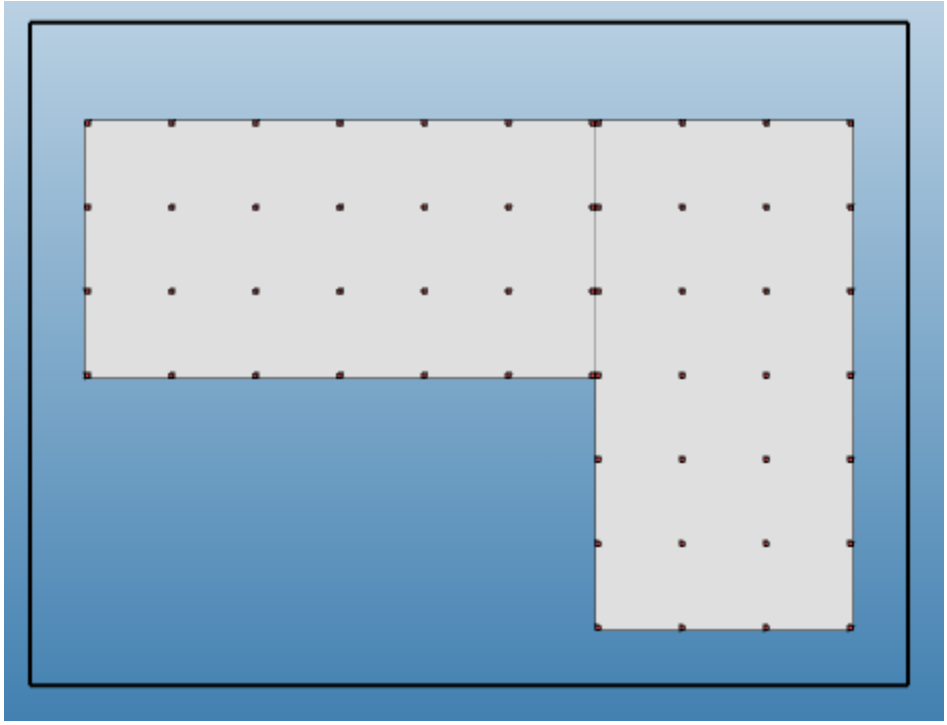
1. Open the Define Locations task.
2. Select the location (either floor or zone) in which the zone should be created.

   Make sure to check the elevation, cut, and view depth parameters for correct representation of the floor plan view.
3. On the **LBS** ribbon tab, click **Floor Plan View** button.

   –Or–

   Right-click, and then click **Floor Plan View**.

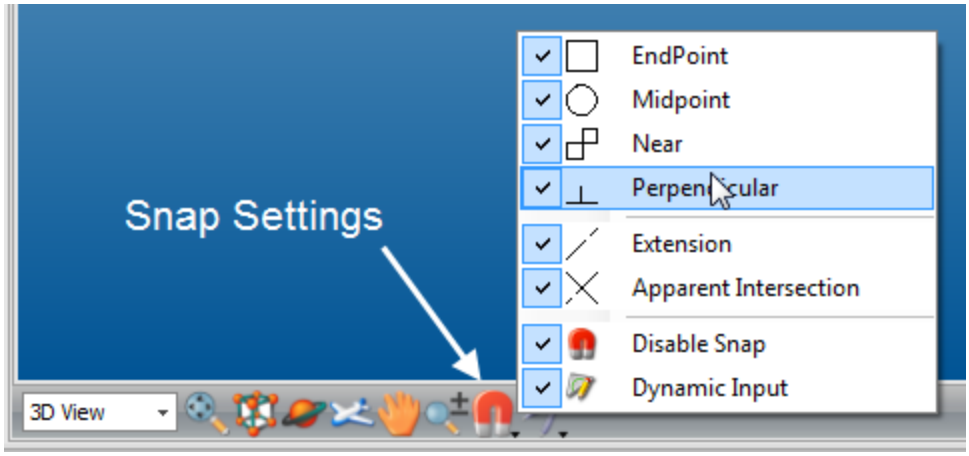
   The 3D view changes to a floor plan view based on the selected location and defined elevation, cut and view depth parameters.



4. On the **LBS** ribbon tab, click **Add Polyline**.

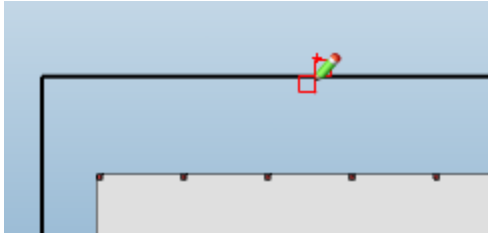
   The cursor in the **3D View** changes into a pencil.

5. From the **Snap Settings** in the **3D View**, select the desired snapping tools.

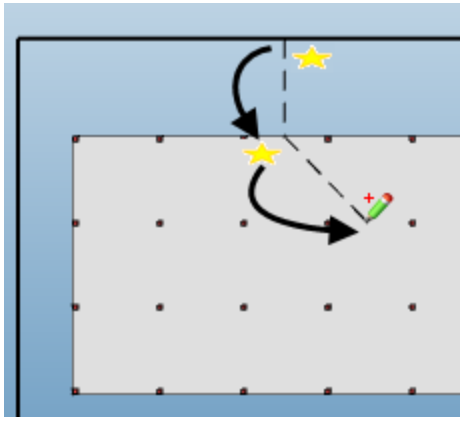


6. To ensure that the new zone can be generated by splitting the parent location, start the new polyline outside or on the location's boundary.

   Failing to do so will result in a discarded polyline after completing the 2D editing work.

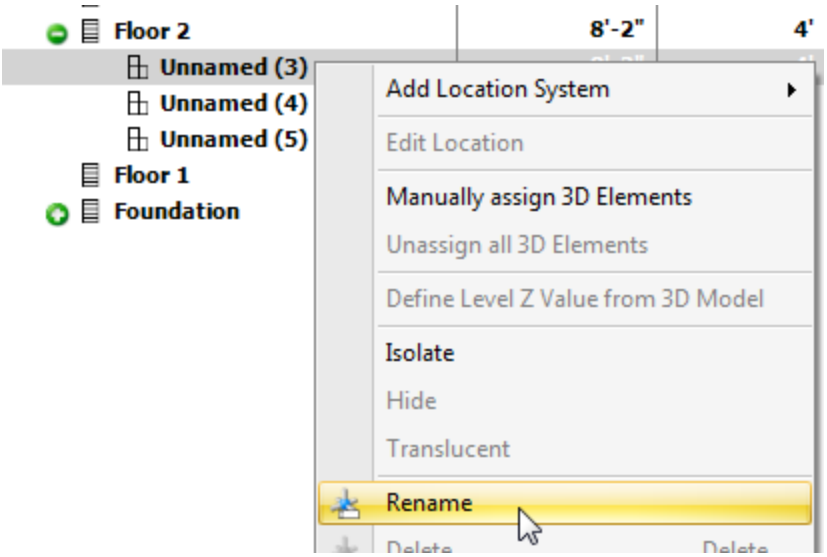


7. To define the new zone boundary, add subsequent points to the polyline by clicking in the floor plan view and snapping to the model geometry as needed.



8. To complete the new zone boundary, click on or outside the parent location's boundary, and then press the **Enter** key.

   Note that new locations are added in the LBS tree. You can rename a new location by right-clicking it and then clicking **Rename**.



9. To define additional zone boundaries, repeat steps 6 to 9 as needed.

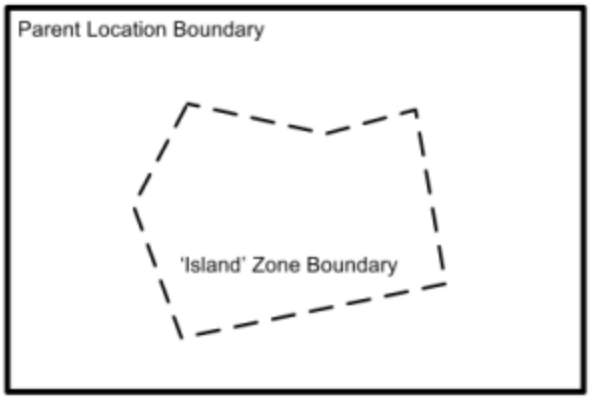
   Additional polylines can be connection to newly added polylines.

10. After completing all required zone boundary polylines, click **Finish Editing**.

    The defined zone boundary polylines are saved, and the 3D model is restored.

Important: For instructions on how to activate the new zones and to update project quantities, see "Updating the Project" on page 371.

Note: Instead of defining zone boundary polylines that connect to other polylines or the parent location's boundary, you can also define 'islands'.



After you create a zone structure for a level, you can insert it easily into the other levels.

To copy a zone structure

1. In the LBS Manager view, right-click the level that you have defined the zone structure for, and then click **Copy Child Nodes**.
2. Right-click the level you want to paste the zone structure to, and then click **Paste Child Nodes**.

Colorizing a Zone

Created zones and floors can be colorized in the **3D View** to make the view more representative. It could help you to assign the model elements to the right locations.

You should create the location structure before the colorization. For more information, see "Adding a Floor" on page 358 and "Defining a Zone" on page 362.

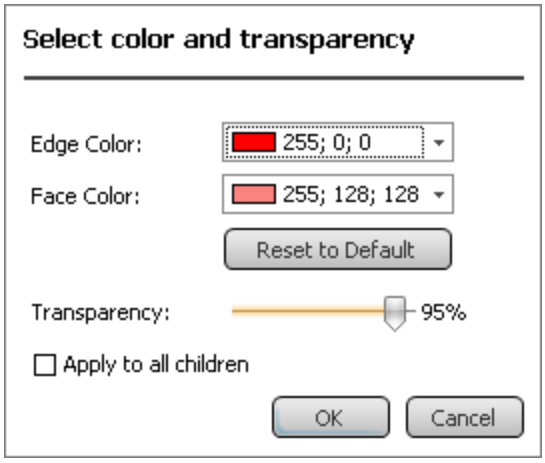
To colorize a zone

1. Open the Define Locations task.
2. Right-click the location (either floor or zone) that you want to set the color for, and then click **Set Color**.

   The **Select color and transparency** dialog appears.
3. For the selected location:
   - From the **Edge Color** list, select a color.
   - From the **Face Color** list, select a color.
   - Using the **Transparency** slides, set the transparency.

   Note: To apply the color settings to the child nodes of the selected location, select the **Apply to**

all children check box.

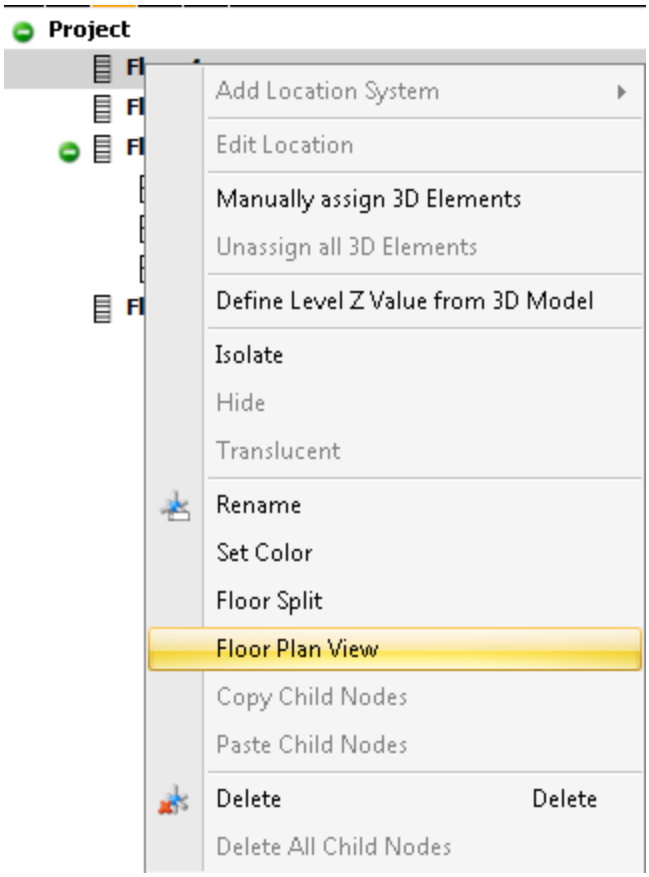


Editing a Zone

Part of the location-based schedule optimization process is to optimize the size of work locations in such a way that a continuous flow of work can be achieved. Location optimization can be performed in the **LBS Manager** view by adding or removing floors and zones or by changing the boundaries of existing zones.

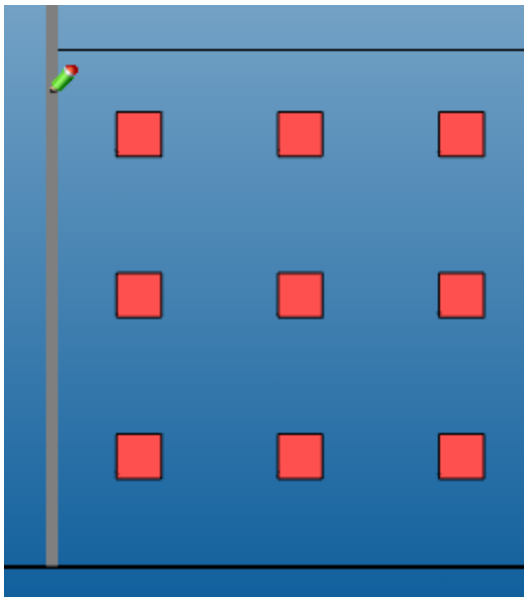
To modify the boundaries of a previously defined zone

1. Open the Define Locations task.
2. Select the location that contains the zone boundaries that should be edited, and then activate the floor plan view.



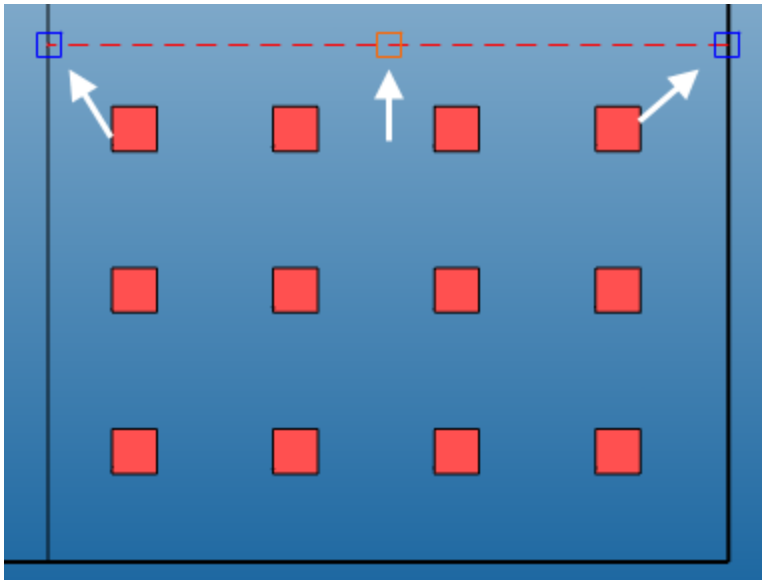
3. In the floor plan view, point to an earlier defined zone boundary polyline.

   The polyline is highlighted.

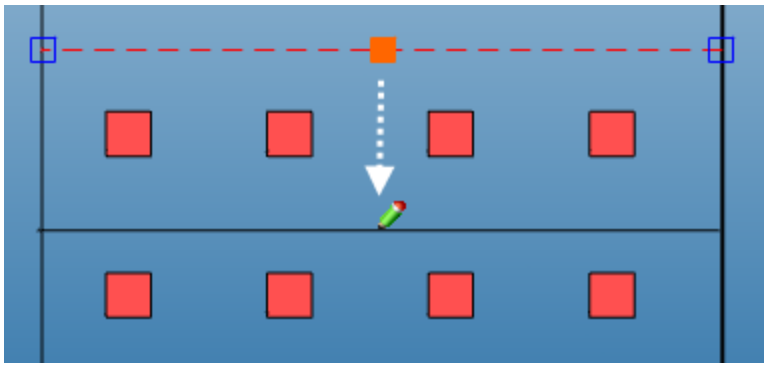


4. Click the highlighted polyline.

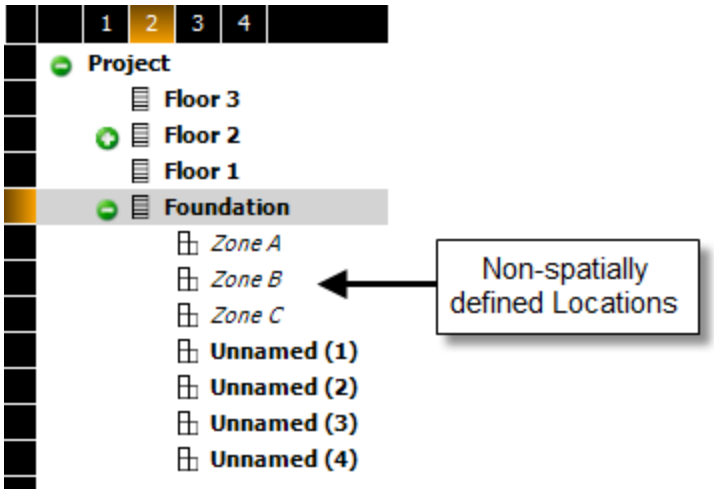
   Three grip points appear.



5. Move or stretch the boundary.
   - To move the line, click the red grip point.
   - To stretch the boundary line, click the blue grip points.
   - To confirm the new position of the grip point, click the line again.



All existing zones that were defined by the previous position of the moved polyline turn into non-spatial locations, which is indicated by showing these location names in *italics* in the LBS. This can be corrected later by following the steps in "Assigning a Bounding Box to a Location" on page 375.



6. To update the location-based quantities, deactivate and reactivate the models in your project.

   For more information, see "Updating the Project" below.

Updating the Project

After adding new locations to the project, elements in the project must be reactivated to determine to which location or to which locations they belong. Deactivate all the models, or at least all the models affected by the location edits in the project.

To update location-based quantities after adding new locations

Open the Model Register task.

2. To deactivate a model, click **Deactivate Selected Models** on the **Model Register** ribbon tab.

   –Or–

Right-click a model, and then click **Deactivate Selected**.

The model is deactivated.

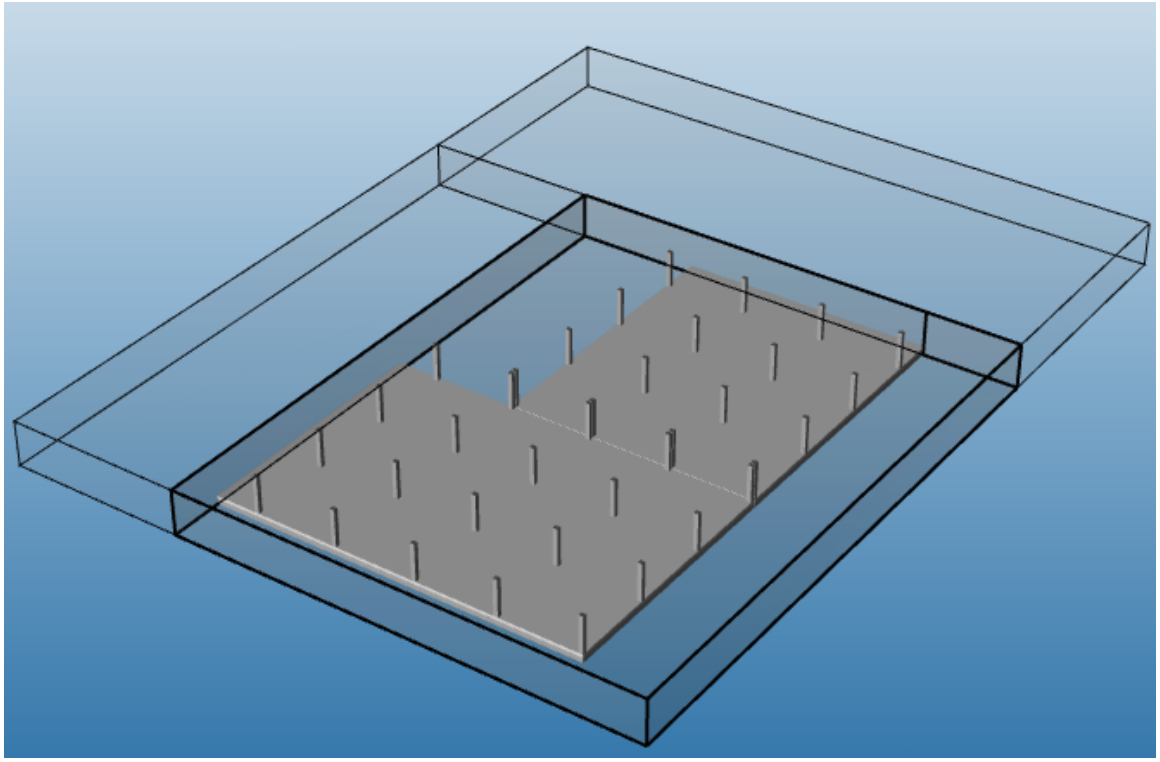
3. To reactivate the model, click **Activate Selected Models** on the **Model Register** ribbon tab.

   –Or–

   Right-click the model, and then click **Activate Selected**.

4. In the Workflow Panel, click **Define Locations**, and then select a new zone.
5. To review or split the elements that are included in the new location, right-click the element, and then click **Isolate**.

   The new zone's bounding box is shown in the **3D View**, and included elements are isolated.



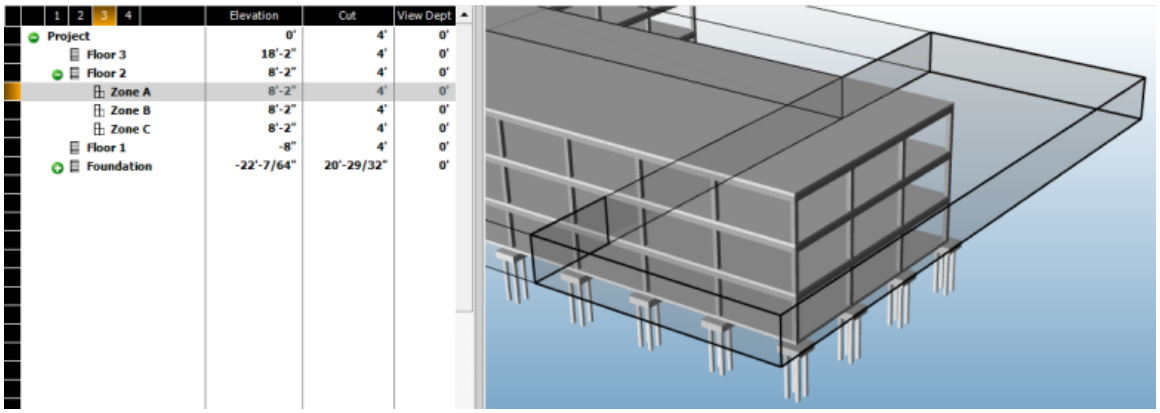
Assigning an Element Manually

You can manually assign an element if you want assign a whole element to a specific location rather than split it.

To manually override the automatic location assignment of an element

1. Open the Define Locations task.
2. Select the location in the LBS to which you want to assign elements.

   The corresponding bounding box is highlighted in the **3D View**.

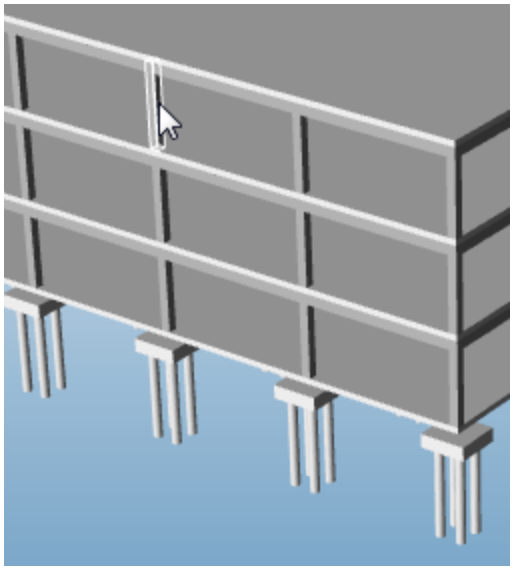


3. On the **LBS** ribbon tab, click **Manually Assign**.

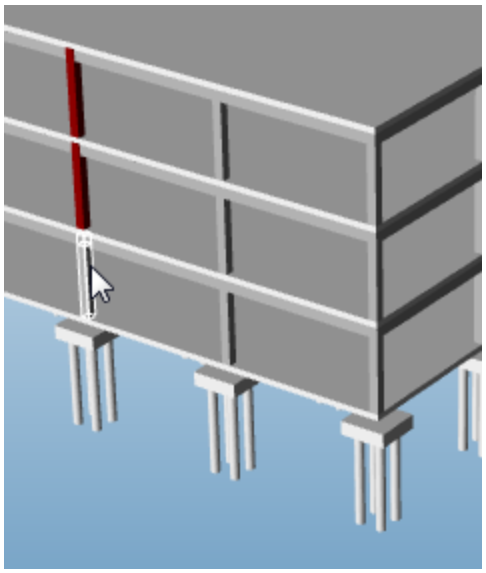
   –Or–

   Right-click the model, and then click **Manually assign 3D elements**.
4. Click the element or elements that are to be assigned to the selected location in the 3D model.

   To assist with the selection of the correct element, elements are highlighted wwhen you point to them.

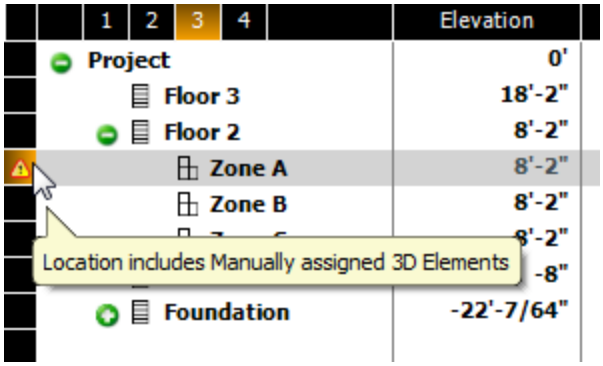


Selected elements are shown in red.



5. To complete the selection, press the **Enter** key.

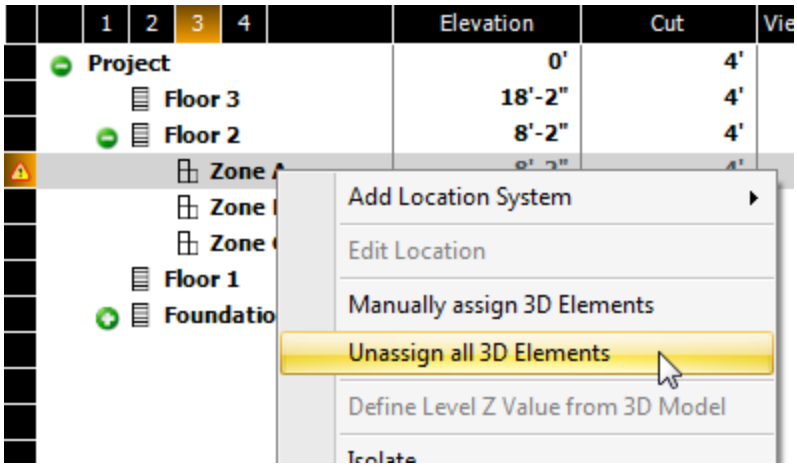
   A notification icon appears in the LBS tree to indicate that the location includes manually assigned 3D elements.



6. Deactivate and reactivate the models in your project to recalculate the project's location-based quantities.

   For more information, see "Updating the Project" on page 371.

7. To remove manually assigned elements from a location, right-click the location, and then click **Unassign all 3D Elements**.



Assigning a Bounding Box to a Location

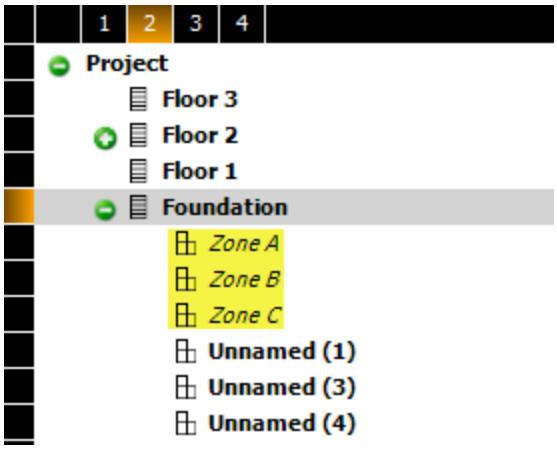
Locations can be added to the Vico Office project as non-spatially defined locations, which means that the location name is included in the LBS, but no floor or zone definition is associated with it. Non-spatially defined locations can be added from the **Manage Takeoff** view or from the **Plan Schedule** view, or can result from changes in existing zone locations by moving boundaries. For more information, see "Editing a Zone" on page 368.

Note: It is strongly recommended that you complete this step before opening the **Plan Schedule** view because activities (tasks in LBS locations) are removed from the schedule if the quantities are equal to zero.

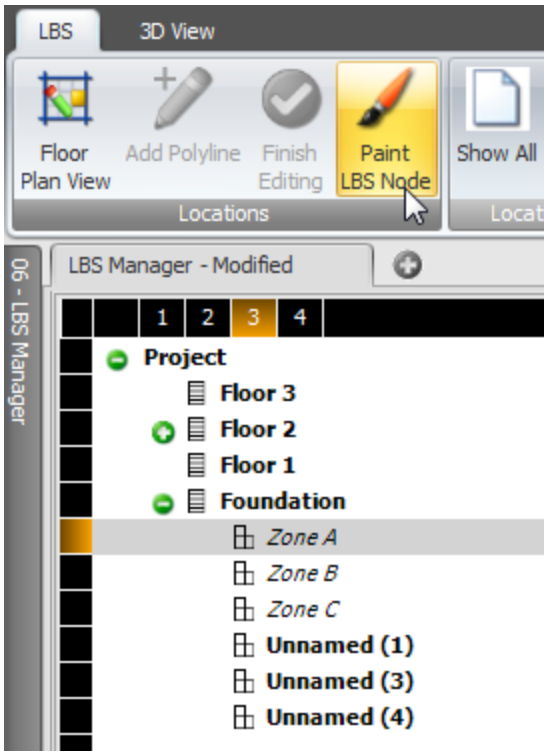
To assign a location bounding box to a non-spatially defined location

1. Open the Define Locations task.
2. Expand the floors in the LBS that contains non-spatially defined locations.

   The name of these locations are *italicized*.

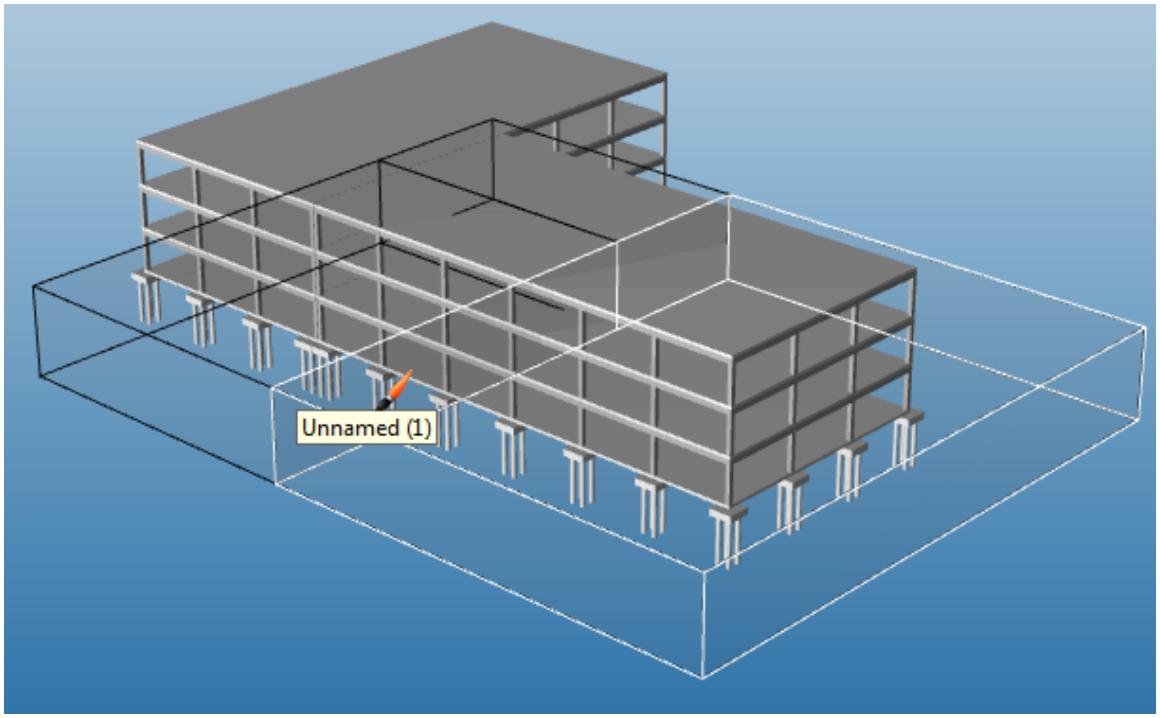


3. Review the new (unnamed) locations and decide which unnamed location's bounding box should be assigned to the selected non-spatial zone.
4. On the **LBS** ribbon tab, click **Paint LBS Node**.



The cursor changes to a paint brush. As you point to the available bounding boxes, the boxes are highlighted. The names are displayed in tooltips.

5. To select the bounding box that should be assigned to the selected non-spatially defined location, click it.



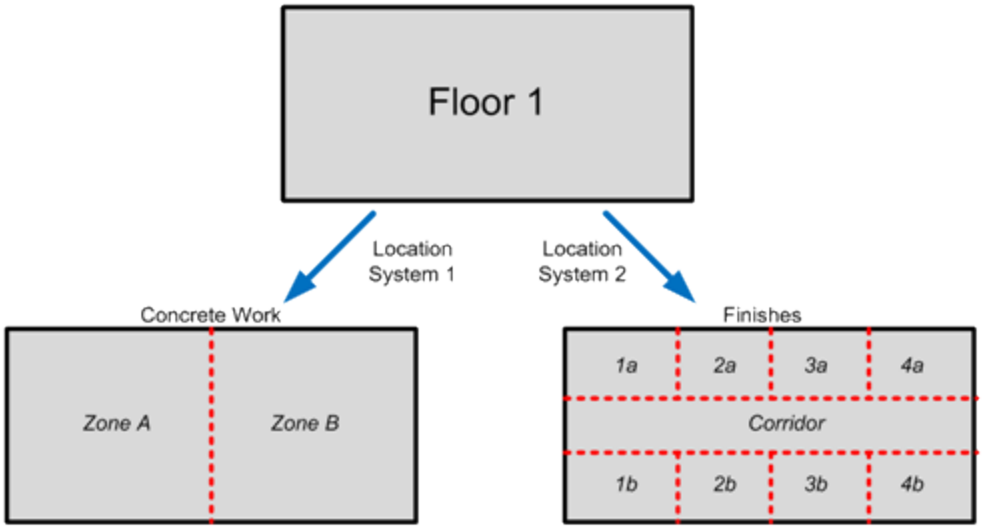
The previously non-spatially defined location is now shown in **bold**, and the location from which the bounding box was obtained is shown in *italics*.

Define Location Systems

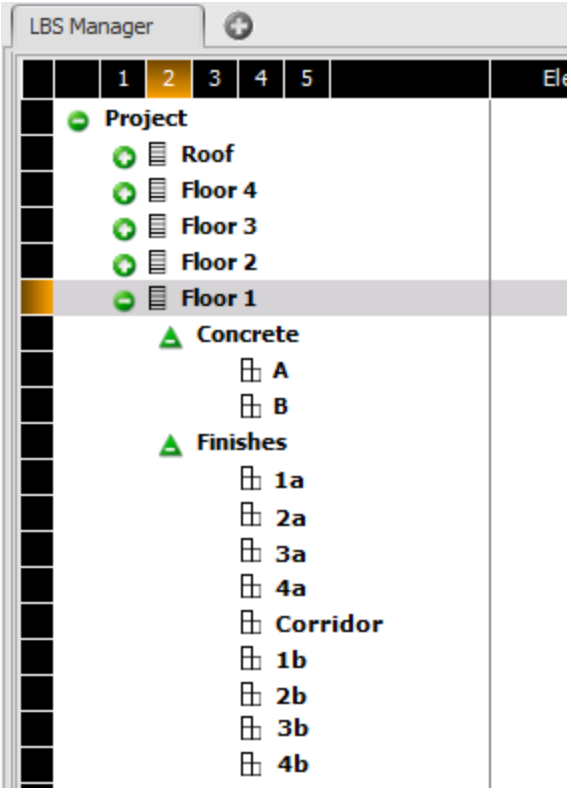
Location systems are alternative location breakdown structures for the same location in the project's location breakdown structure. The ability to maintain parallel alternative location breakdown structures within the same parent location makes it possible to use the optimal location size for each trade.

Example:

Floor 1 will be broken down into Zone A and Zone B for all Concrete Work, whereas a subdivision into the individual rooms on the floor is more appropriate for the trades involved with Finishes.



Two location systems will be created in this case: one that is broken down in the optimal way for Concrete Work, and another one that is broken down optimized for Finishes.



To open the Define Location Systems task

1. Right-click the Workflow Panel header, and then click **LBS Manager**.
2. In the **LBS** workflow group, click **Define Location Systems**.

   The default viewset includes the Location Systems and Task Manager.

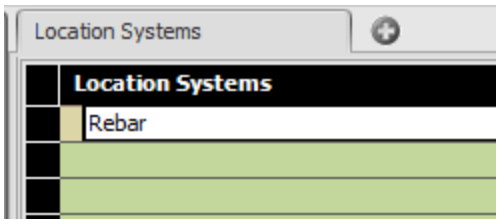
Creating a Location System

You can create a location system for trade-specific location breakdown structures.

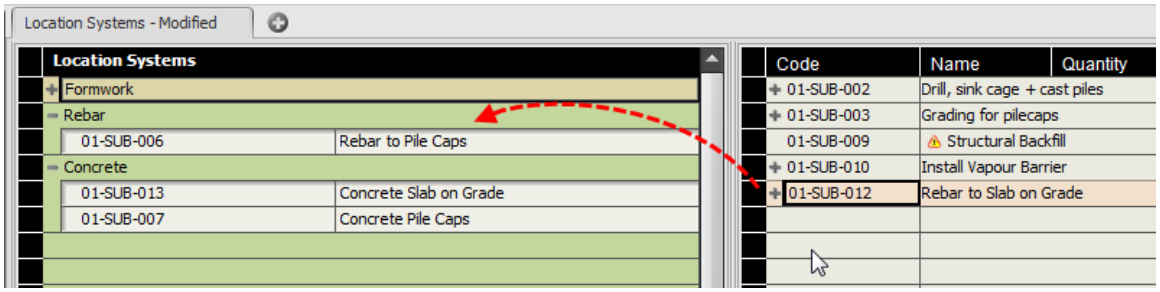
To create a location system

1. Open the Define Location Systems task.
2. To create a location system for each trade or group of trades that requires a unique location breakdown, click **New Location System** on the **Location Systems** ribbon tab.

3. Name the new location system as required.



4. To set up how the locations are defined for mapped tasks, associate tasks with the new location system by dragging and droppng tasks to the appropriate location system.



After mapping tasks to location systems, the formula of the components that are mapped to the tasks are updated so that they are evaluated only in the assigned location system's locations. You can check this by opening the Formula Editor for the components that are mapped to tasks that are mapped to a location system.

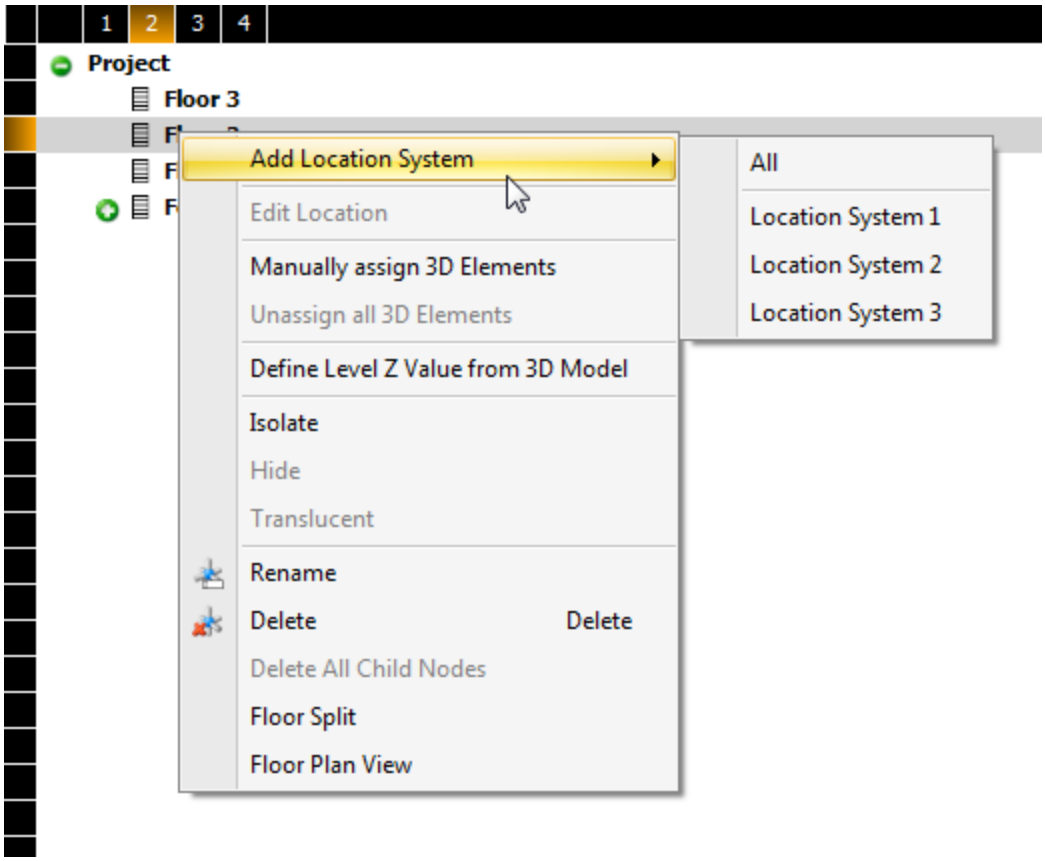
Including a Location System in the LBS

When one location should be broken down in more than one way to accommodate for optimal location sizes for all trades, location system nodes should be included in the LBS to allow for that.

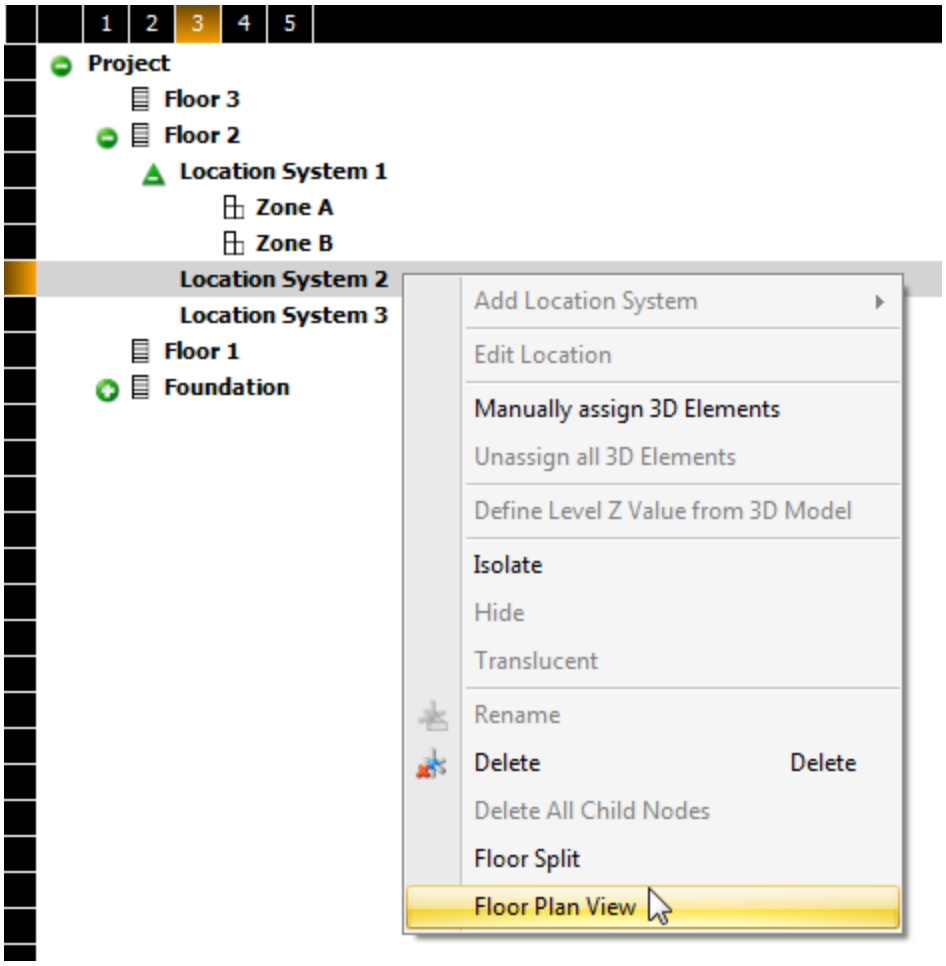
Several location systems can be inserted below a location as needed to allow for alternative breakdowns. Each location system creates an exact copy of the parent location.

To define trade-specific location breakdown structures

1. Open the Define Locations task.
2. Right-click the location for which multiple location breakdowns should be defined, and then click **Add Location System**.
3. Insert the desired location systems one-by-one, or insert all location systems by clicking **All**.



For each inserted location system, you can define a location breakdown by either defining zones in the floor plan view (see "Defining a Zone" on page 362) or by inserting floor levels (see "Adding a Floor" on page 358).

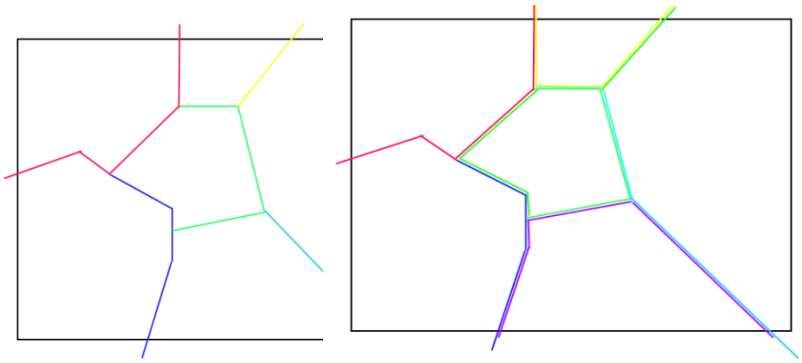


Best Practice: Workflow Summary

Models must always be reactivated after adding or modifying LBS locations and/or nodes. Doing so will analyze the geometry through the new locations and provide proper quantities by location. Failing to do so will result in quantities that are not calculated per the LBS.

Locations should be made with the fewest polylines possible in LBS manager to avoid “ghost” locations (see sketch below). Overlapping polylines that are used to represent a single location may produce unpredictable results and location creation during the model reactivation process.

Correct Method Incorrect Method



A workflow summary for properly handling the above scenario would be:

- Make sure Schedule Planner remains closed
- Reactivate project models
- Go to LBS manager and find all nodes which have lost their geometry
- Use location painting to assign the (empty/italicized) nodes to the corresponding 'Unnamed' (bold) nodes
- Delete the unneeded (now italicized) notes
- Reactivate the models again (to generate correct quantities)
- Open Schedule Planner

Best Practice: Creating Locations

Construction caliber quantities can be used for accurate location-based management on construction projects. This also results in a more accurate and transparent estimating process. After the model is published to Vico Office, a unique geometry analysis algorithm is used to scan the 3D model content and automatically create the takeoff items and their quantities.

In Vico Office, quantities can be defined in the following ways:

- Manually in Schedule Planner / Vico Office
- Using 2D takeoff in Vico Office
- Using 3D takeoff in Vico Office

When you set up the locations in Vico Office, the software calculates accurate quantities per location, which are available for location-based project management and for location-based estimating.

For more information, refer to the PDF.

Best Practice: Copying Locations

Before copying locations, a specific set of circumstances is required for it to work properly:

- The source node (copy from) has to be a floor or location system node.
    - The source node cannot be a zone node.
- The source node (copy from) and destination (copy to) must be under the same parent node, which refers to a floor split or a location system.

  For example: A zone breakdown from location system 1 cannot be copied across to the corresponding floor split of location system 2 because each location system is considered to be a different parent node.
- The source node (copy from) may only contain zones under it – it cannot include any additional floor splits under it.
- The destination node (copy to) can only be a floor or location system node – it cannot be a zone node.
- The destination node (copy to) cannot already have existing zone nodes below it.

Manage Tasks

The **Manage Tasks** task, part of the Schedule Planner module, is used to establish the link between cost and schedule information by mapping cost assemblies and components to defined tasks. Cost assemblies and components contain quantities for labor, material and equipment. The **Manage Tasks** task allows for using this information to calculate the amount of work that is associated with a task by applying a production rate to one or more of the mapped assemblies or components using the following equation:

Component Quantity x **Production Rate** = **Hours of Work**

To open the Manage Tasks task

1. Right-click the Workflow Panel header, and then click **Schedule Planner**.
2. In the **Task Management** workflow group, click **Manage Tasks**.

   The default viewset includes the Task Manager view and Cost Planner View.

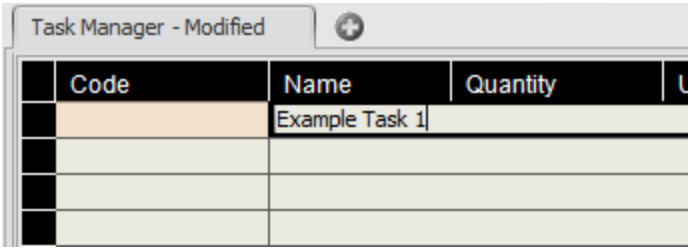
Creating Tasks and Mapping Cost Items

In the **Manage Tasks** task, the process of creating tasks comprises the following steps:

- Define tasks
- Map cost assemblies and components

To create schedule tasks and map assemblies and components

1. Open the Manage Tasks task.
2. In the **Name** column, enter a name for the new task, and press **Enter**.

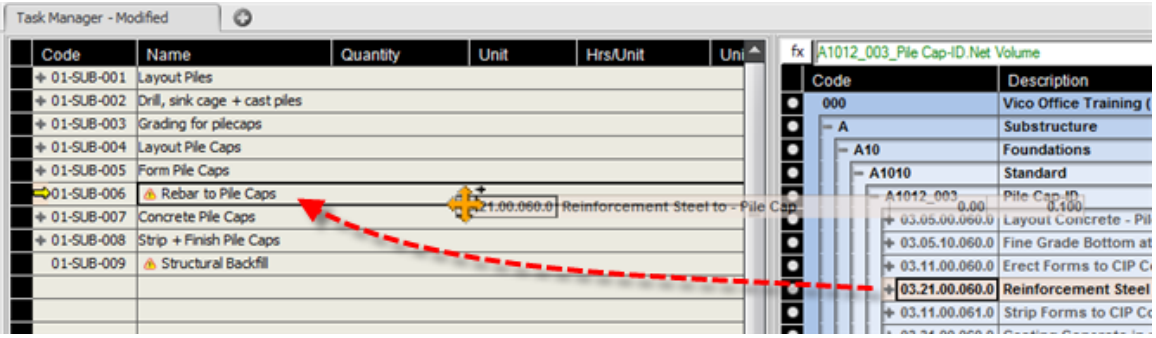


–Or–

On the **Task Manager** ribbon tab, click **New Task**.

After creating the required set of tasks, labor, material and equipment data calculated with assemblies and components can be assigned.

3. Look up the relevant components and assemblies, and drag them to the appropriate task.



4. To ensure that all labor, material and equipment is part of the schedule, repeat steps 1 to 3 until the **Cost Planner** view on the right side of the viewset is empty.
5. To highlight the tasks that have been mapped to takeoff items, click **Show Mapped** on the **Task Manager** tab.

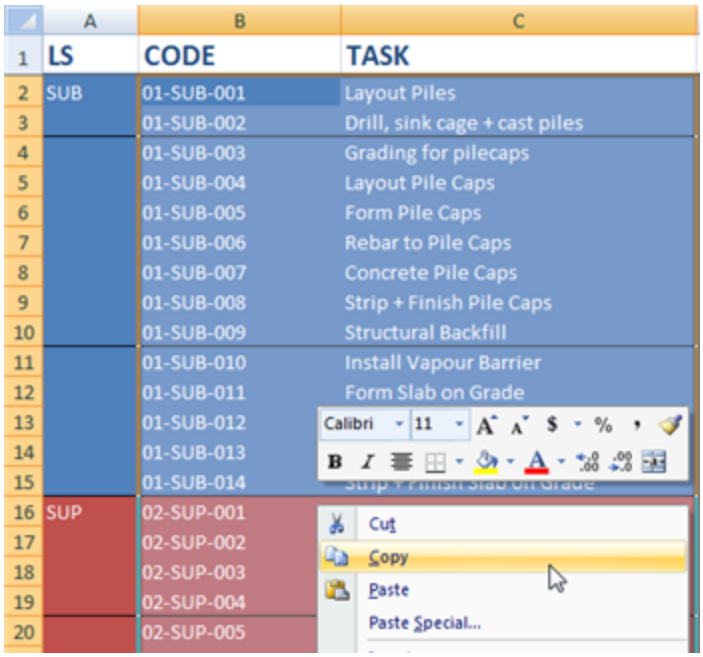
After completing the list of tasks with mapped assemblies and components, the labor, material and equipment data can be used to calculate the number of work hours that are required to complete the task. For more information, see "Calculate Hours of Work" on page 389.

Copying Tasks

A quick way to create the task list for a project is by copying content from an existing schedule or from a standard list of task names maintained in a spreadsheet.

To use the Windows Clipboard to quickly populate the task list

1. In the program that contains the set of task information to be copied, select the task names and/or task codes, and copy them to the **Windows Clipboard**.



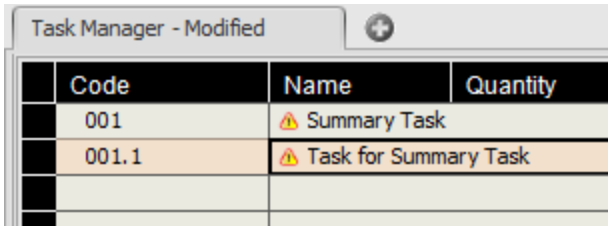
2. Open the Manage Tasks task.
3. Select the position where the copied content should be inserted, and then click **Insert Copied Tasks** on the **Task Manager** ribbon tab.

Creating Summary Tasks

Tasks can be grouped into summary tasks to organize the schedule information. The number of summary levels is unlimited, and tasks can freely be included in or excluded from summary tasks.

To create a summary task from an existing task

1. Open the Manage Tasks task.
2. Select the task to be included in a summary task, and ensure that the summary task is above the selected task.



3. On the **Task Manager** ribbon tab, click **Demote Task**.

The task is indented and included in the task above it, which is automatically converted into a summary task.

Note: Summary tasks cannot contain any task duration calculations. Existing calculations are removed when a task is converted into a summary task.

To create a new summary task

1. Open the Manage Tasks task.
2. Select the task or tasks that should be included in a summary task.
3. On the **Task Manager** ribbon tab, click **New Summary Task**.

   A new summary task, which includes the selected tasks, is created.

Calculate Hours of Work

In Vico Office Schedule Planner, the amount of work for a task is calculated as the sum of all work hours for components or assemblies assigned to a task that are identified as task drivers. The quantity of a task driver component is multiplied by a production rate, which results in a number of hours of work needed to complete the scope for which the component is the task driver.

In summary:

Hours of work for a task = SUM (Component Quantity x Production Rate) for all task driver components.

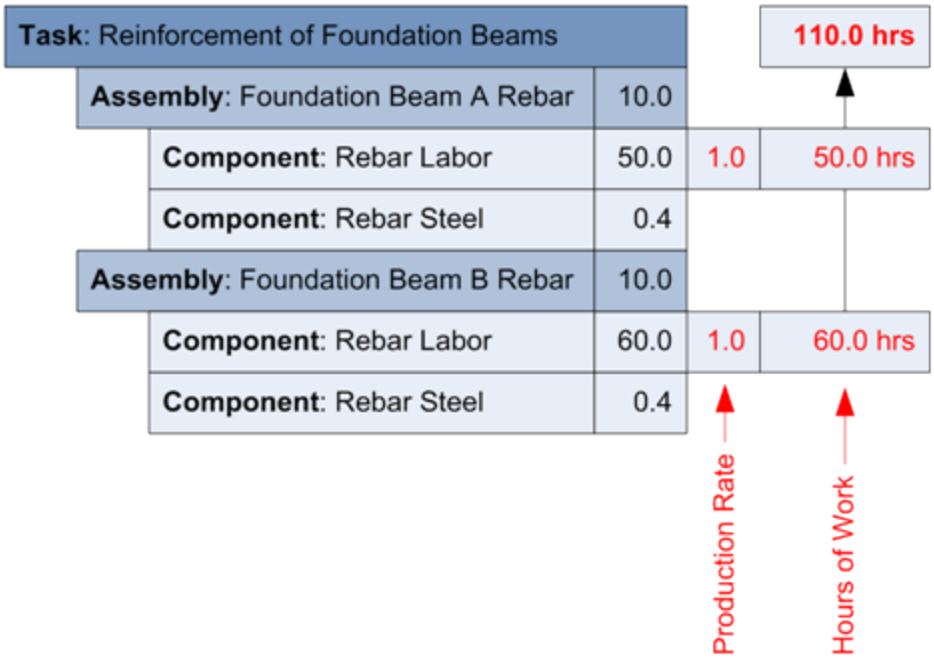
Example

The task "Reinforcement of Foundation Beams" has two assemblies mapped to it, both with two components in it, used to calculate labor and material required for the assemblies.

Task: Reinforcement of Foundation Beams	
Assembly: Foundation Beam A Rebar	10.0
Component: Rebar Labor	50.0
Component: Rebar Steel	0.4
Assembly: Foundation Beam B Rebar	10.0
Component: Rebar Labor	50.0
Component: Rebar Steel	0.4

The labor components are considered task drivers and are therefore assigned a production rate. The pro-

ducting hours of work are summed for the task, which results in the hours of work for the task.



The value for hours of work is divided by the assigned crew's output in Schedule Planner, which results in the task's duration.

To use assembly and component quantities to calculate hours of work in a task

1. Open the Manage Tasks task.
2. First create tasks and map cost assemblies and components.
   A notification icon indicates that there is missing information for the successful calculation of task duration.
3. To view the details of the missing information, point to the icon.
   In this case, a production rate has not been defined yet.

Task Manager - Modified

Code	Name	Quan..	Unit	Hrs/Unit	Units/Hr	Work
01-SUB-001	Layout Piles					28.00
01-SUB-002	Drill, sink cage + cast piles					392.00
01-SUB-003	Grading for pilecaps					7.00
01-SUB-004	Layout Pile Caps					22.40
01-SUB-005	Form Pile Caps					235.20
01-SUB-006	Rebar to Pile Caps					
03.21.00.060.0	Reinforcement Steel to - Pil...	7.78	TON			
LCON004	Rodman	124.44	HR			
M03.21.00...	Re Steel - Pile Cap - Materials	8.17	TONS			
01-SUB-007	Concrete Pile Caps					46.67

4. To define the production rate for the component identified as the task driver, click the **Hrs/Unit** or **Units/Hr** column, and enter the experience-based number.

   For a calculation of labor in hours, the production rate can be left as 1, because the number of man hours was already calculated in the cost plan.

Task Manager - Modified

Code	Name	Quan..	Unit	Hrs/Unit	Units/Hr	Work
01-SUB-001	Layout Piles					28.00
01-SUB-002	Drill, sink cage + cast piles					392.00
01-SUB-003	Grading for pilecaps					7.00
01-SUB-004	Layout Pile Caps					22.40
01-SUB-005	Form Pile Caps					235.20
01-SUB-006	Rebar to Pile Caps					
03.21.00.060.0	Reinforcement Steel to - Pil...	7.78	TON			
LCON004	Rodman	124.44	HR	1		
M03.21.00...	Re Steel - Pile Cap - Materials	8.17	TONS			

The amount of work hours for the component is calculated and rolled up to the task level. An icon in the row indicator shows which component is used as the task driver.

01-SUB-006	Rebar to Pile Caps					124.44
03.21.00.060.0	Reinforcement ...	7.78	TON			
LCON004	Rodman	124.44	HR	1.00	1.00	124.44
M03.21.00...	Re Steel - Pile ...	8.17	TONS			
01-SUB-007	Concrete Pile Caps					46.67

After completing the previous steps, the tasks have a number of hours of work. You can then add the schedule logic, crew assignments, and schedule optimization in the Schedule Planner view.

Best Practice: Creating Tasks

Tasks should be defined during the pull planning session, but in the pre-construction phase, a standard company task list can be applied. Tasks should NOT be location-based because Vico generates the locations in the LBS module.

When defining tasks, consider the following points:

- Are you using the same unit for the quantities included in this task?
- Will you have the same crew (type) working on this task?
- What level of detail would you like to have in your schedule?
- What are your summary tasks?
- Is there any coding structure that you would like to follow?

For more information, refer to the PDF.

Plan Tasks

The **Plan Tasks** task, part of the Schedule Planner module, is used to open the Task Manager and the Takeoff Manager views. Having these two views open side-by-side will allow you to directly map Takeoff Quantities to schedule Tasks.

To open the Plan Tasks task

1. Right-click the **Workflow Panel** header and then click **Schedule Planner**.
2. In the **Task Management** workflow group, click **Manage Tasks**.

   The default viewset includes the Task Manager and Takeoff Manager views.

Creating Tasks and Mapping Takeoff Quantities

In the **Plan Tasks** task, the process of creating tasks comprises the following steps:

- Define tasks
- Map takeoff quantities

To create schedule tasks and map to takeoff quantities

1. Open the Plan Tasks task.
2. In the **Name** column, enter a name for the new task, and press **Enter**.

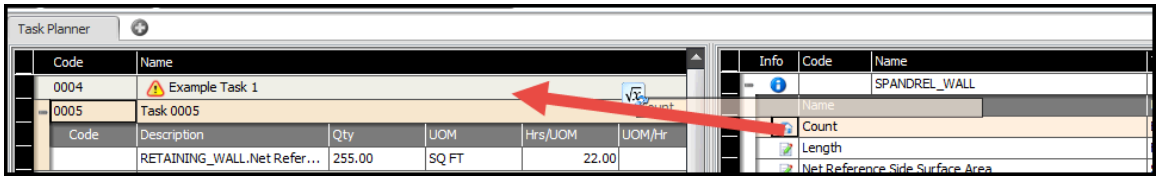
   –Or–

   On the **Task Manager** ribbon tab, click **New Task**.

   -Or-

   On the Takeoff Manager view, right-click on the takeoff quantity for which you are creating a task and select **Create Quick Task**.

   After creating the required set of tasks, takeoff quantities can be assigned.
3. Look up the relevant takeoff quantity, and drag them to the appropriate task.



4. Repeat the above steps until all the necessary takeoff quantities have been mapped to a task.

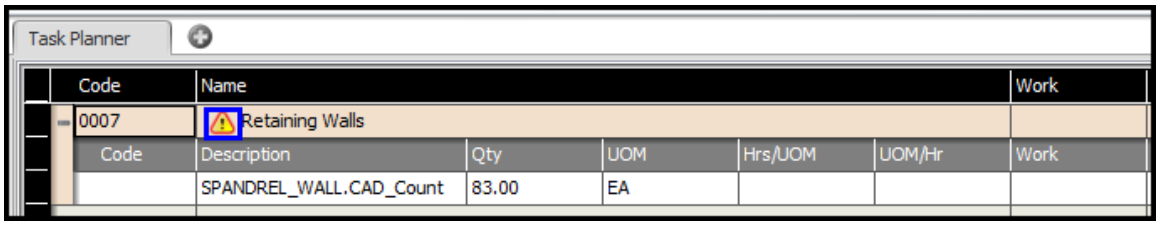
Calculate Quantities in Task Planner

In Vico Office Schedule Planner, the amount of work for a task is calculated as the sum of all work for takeoff quantities assigned to a task per location system. If a task is not mapped to a location system, it will belong to the default location system (the root location - Project value)

To use takeoff quantities to calculate hours of work in a task

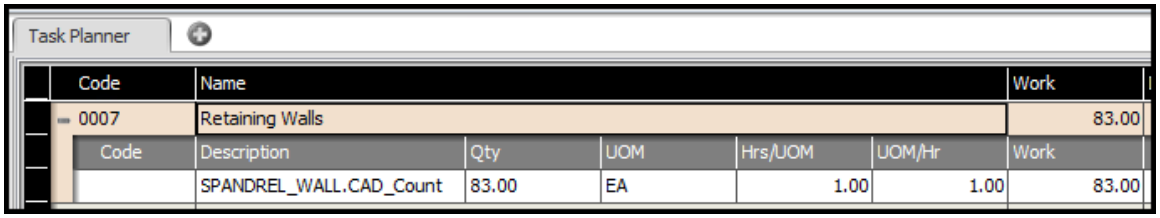
1. Open the Plan Tasks task.
2. Create tasks and map them to takeoff quantities.

   Note: A notification icon indicates that there is missing information for the successful calculation of task duration. To view the details of the missing information, point to the icon.



3. To define the production rate for the takeoff quantity, click the Hrs/UOM or UOM/Hr column, and enter the rate.

   The amount of work hours is calculated and rolled up to the task level.



The tasks now have a number of hours of work. You can now plan the schedule (e.g., crew assignments, schedule optimization) based on the takeoff quantity information in the Schedule Planner view.

Project Settings

The first step in creating a project schedule is to set up the project parameters via the **Project settings** dialog box.

Items	Description
Project Name, Project Code, Company, Responsible person, Planner	The project name reflects the name of the project given to it in the Vico Office Dashboard.

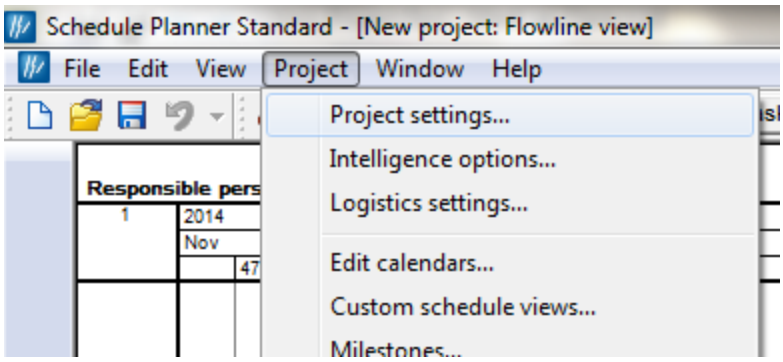
Items	Description
Start	The fixed point for the start of the project.
Deadline	The estimated completion date. This is used for risk analysis, which assesses the likelihood of achievement.
Shift Length	Used to define the length of the default work day for the project. The total number of hours for the assigned crew is divided by this number to determine number of shifts for the crew.
Currency Unit	Define the unit for all calculated cost values in the project.
LBS Hierarchy	Show the location breakdown structure that was defined with the LBS Manager.
Approve Schedule	Create a baseline for the project.

Defining Project Settings

The Project Settings dialog box defines all the basic project specifications that are used everywhere in the project such as the start date and deadline as well as the shift length or currency for payments. You can also set the project name, code, responsible person, planner, and company.

To define the project settings

1. Open Schedule Planner.
2. In the **Project** menu, click **Project settings**.



–Or–

On the left toolbar, click the gear icon .

The **Project settings** dialog appears.

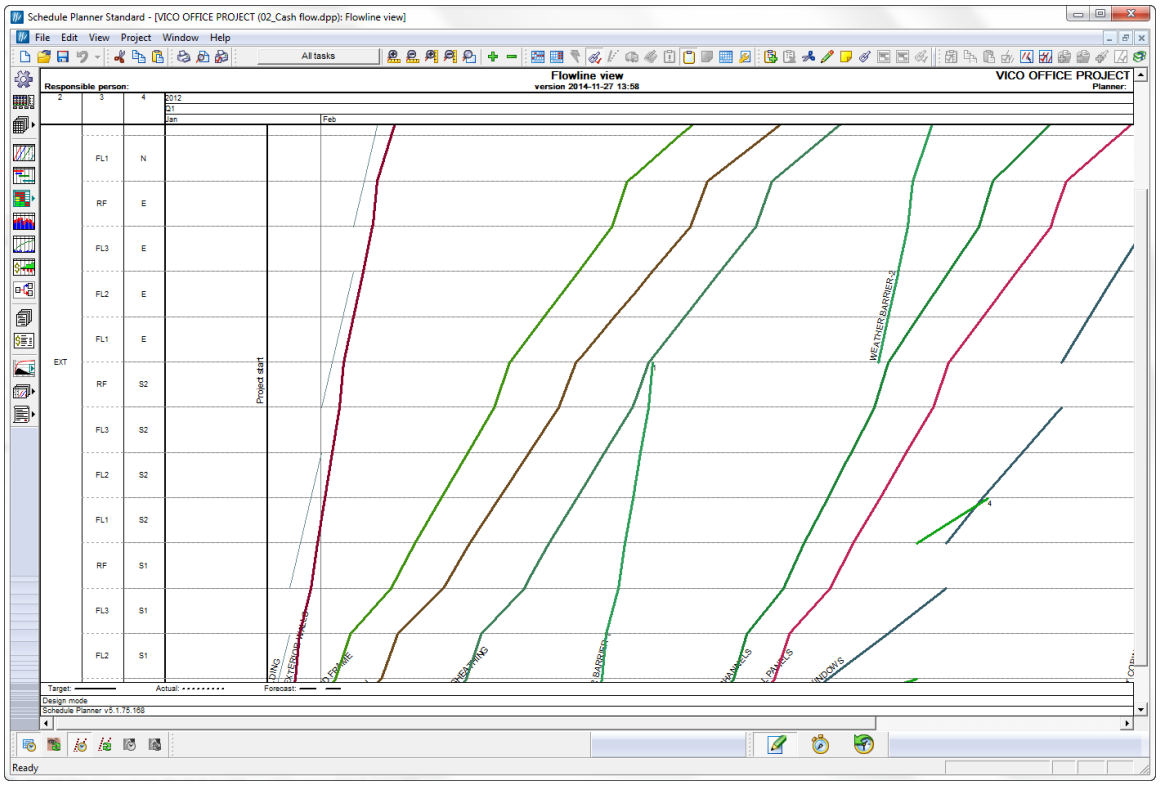
3. In the **Project settings** dialog, change **Start Date**, **Deadline** and **Shift Length** as required.

   Project Name and **Project Code** are defined in the Vico Office Dashboard view.

Schedule Planner UI

Most features of Schedule Planner are grouped into toolbars. The toolbars can be enabled or disabled from the **View** menu > **Toolbars**.

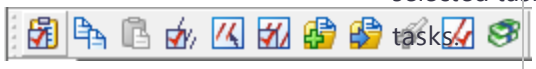
Note: To reset the toolbars to their original positions, click the **File** menu > **Program settings** > **Reset toolbars**.

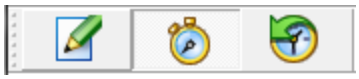


Toolbars

Toolbars are used to edit tasks and enable scheduling features.

Toolbar	Description
Standard Tools 	Basic tools such as create a new project, open a file, and save a project.
Editing Tools 	Cut, copy, and paste.
Printing Tools 	Print preview of schedule view and print.

Toolbar	Description
View Control Tools 	Schedule selector based on predefined or user defined views and zoom controls for schedule view.
View Settings Tool 	Tools such as show forecasts, actuals, and turn on and off weekends.
Flowline Tools 	Tools such as new task, split, draw, and create dependency. (Appears when you open the Flowline view.)
Gantt Chart Tools 	Tools such as edit hierarchy, indent and outdent. Appears when you open the Gantt view.)
Task Editing Tools 	Tools such as copy, paste customize selected task, and create summary tasks.
Report Tools 	Report settings.
Bill of Quantity Tools 	Create Tasks, add quantities, and edit.
Control Tools 	Add actual, and edit cell settings.

Toolbar	Description
Controlling Tools 	Vico Office synchronization settings, refresh schedule, and forecast settings.
Operating Mode Tools 	This toolbar is usually at the bottom middle of the schedule view and includes modes for Planning/Controlling/History.

Left Toolbar

The toolbar on the left side of the screen is used to access the views you need most when scheduling on controlling projects. The menus have some additional features that most users do not need as often.

The left toolbar icons from top to bottom:

Toolbar Item	Description
Project settings	Set the project base data.
Bill of quantities	Set the project cost, including overhead costs and procurement costs, as accurately as possible.
Spreadsheet menu	• Risk levels • Milestones • Resource Registry • Suppliers • Task lists • Quality Report • Inspection Report
Flowline view	Use the Line-Of-Balance tool for scheduling.
Gantt view	Use a traditional bar-chart for reporting and scheduling.

Toolbar Item	Description
Control view	Insert actual data into the project.
Resource graph	Monitor the site strength at any moment.
Resource Histogram view	Report material, cost, or resource usage as a histogram and cumulative curves.
Cash Flow view	Plan cash flow.
Network view	For examining the project logic
Open reports window	Access the reports of Schedule Planner.
Payment tables	Access the supplier and cost type specific payment tables of Schedule Planner.
Risk simulation menu	Use the schedule risk analysis tools.
Schedule menu	Select the simulated or planned schedule mode.
Log menu	View logged project information – project feasibility and disturbances.

LBS in Schedule Planner

Schedule Planner is a location-based construction management system where specific 'Place hierarchy levels' or location hierarchies and appropriate lower level 'Places' or locations are created to determine the appropriate level of precision for assigning project data, such as quantities and resources. These collectively from the Location Breakdown Structure (LBS) for the project.

In fact, Schedule Planner creates a more streamlined and sophisticated schedule resulting from the allocation of quantities, resources and production rates to specific tasks across multiple locations.

Once created, the LBS will appear in the *Flowline view*, the *Bill of Quantities* and the *Schedule task control chart* windows. For more information about how to create LBS for a model-based project, see the "Define Locations" on page 356 section.

Once you open the Schedule Planner the location breakdown structure is visible on the left side of the working area.

Location-Based Schedule

- Task durations calculated with explicit assumptions recorded
- Highlight planned work locations and wasted opportunities
- Identify bottle necks, inefficiencies, stops and starts
- Optimized for continuous labor flow
- Optimal resources + starts ensure continuous workflow
- Buffers protect against uncertainty in the field

Location-based planning

Definition:

- Provides a container for project data at a scale which is easy to monitor and analyze
- Plan for productivity

Examples:

- Building > Floors > Work Zones
  (e.g. Building 1 > Floor 2 > Offices/Apartments)
- Phases > Sections > Chain
)e.g. Phase 2 > Section B > Pipeline A/Tunnel B)

Location Breakdown Structure

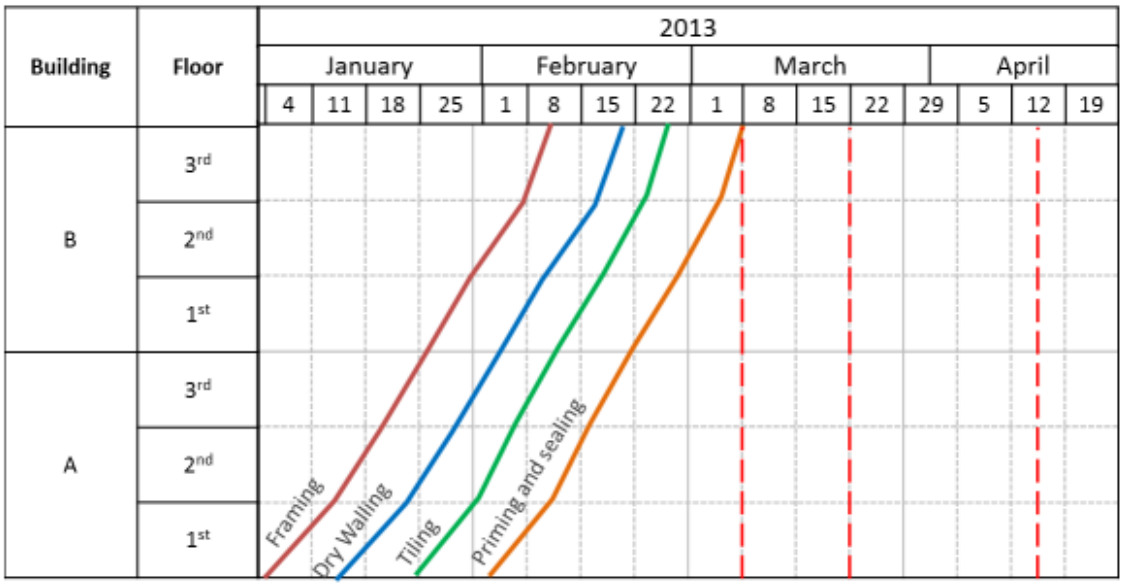
Definition:

- Physical roject locations for trade groups
- Hierarchical structure
- Independent locations (could be build simultaneously or in any sequence)

General guidelines to define locations:

- Highest level should be: independent locations (buildings)
- Middle level should require flow (floors)
- Lowest level should be the smallest location where only one trade can work effectively (zones)

- Same LBS should apply to most trades
- Plan groups of similar spaces for finishes



Add new location

Since the non model-based schedules do not have any location based structure taken from Vico Office, we should create it inside of the application.

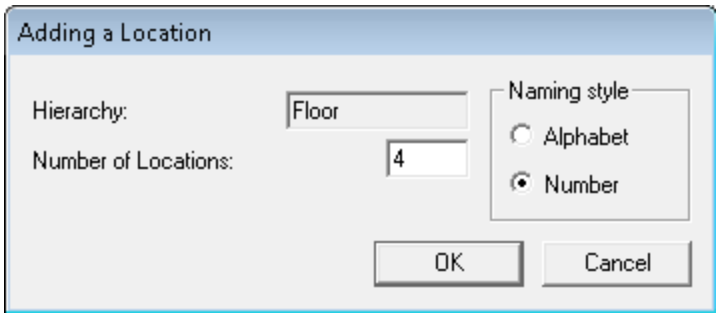
To define location based structure

1. Open the Schedule Planner

   The Project level appears by default.

2. Right click on the Project level and select Insert Location.
3. Type the hierarchy level name for the new location. (E.g.: Floor, Location, Level, etc.)

4. Enter the number of locations and the type you want them to be appeared.



Doing the same with the created locations, you can create more locations on a lower hierarchy level.

Defining Location Order

Defining the location completion order is an important step in achieving a continuous workflow. By defining an uninterrupted path through the project for a crew, crews do not have to wait for other crews to complete their work before continuing to the next location. This prevents stops and restarts and reduces risk for the project.

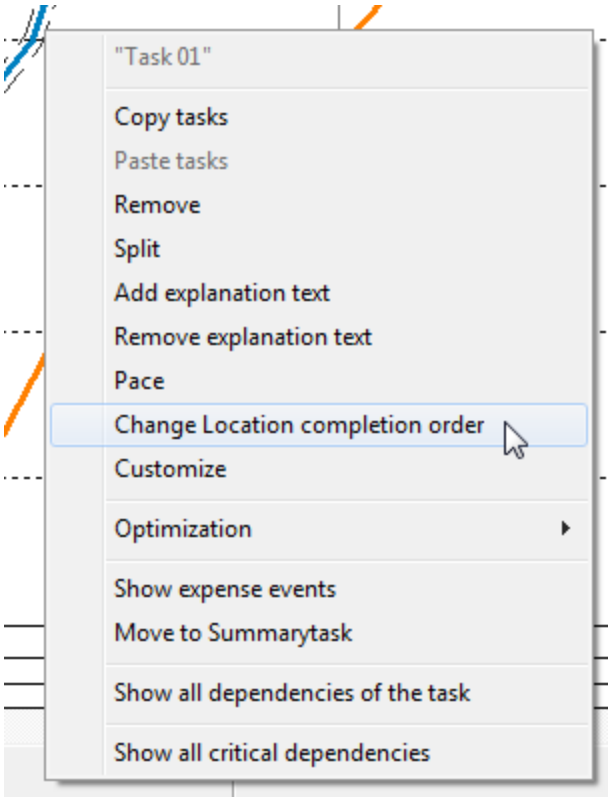
To define the location completion order for a task

1. Open Schedule Planner.

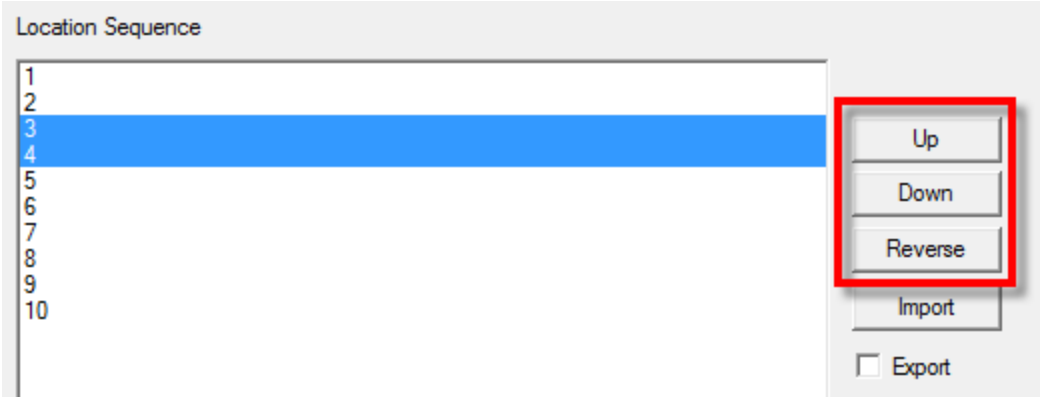
   The current schedule is opened and contains all tasks that were defined as explained in "Creating Tasks and Mapping Cost Items" on page 386. Locations are shown on the vertical axis and reflect the tocations defined by floors and zones.

2. Review the collection of tasks in the project, and select a task that has a non-optimal location completion order.

3. Right-click, and then click **Change Location completion order**.



4. In the dialog, select one ore more locations, and then click **Up**, **Down**, or **Reverse** to change the order in which work will be completed in locations where the task occurs.



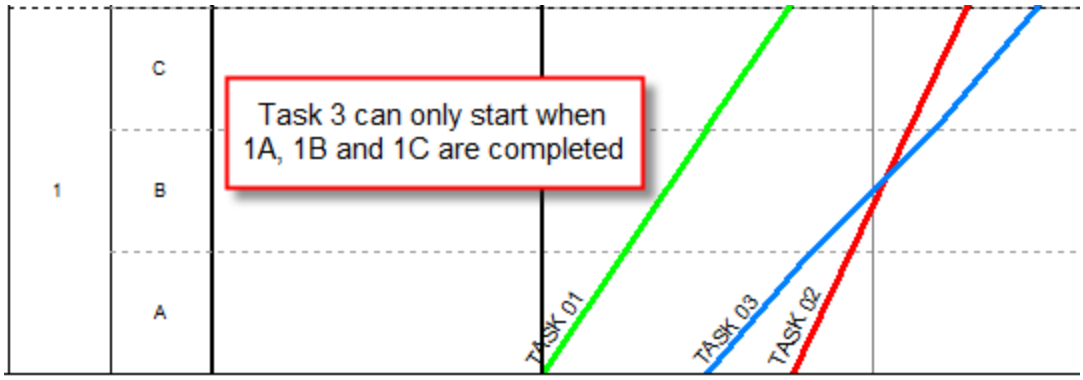
5. To confirm your changes and review the result in the Flowline view, click **OK**.

Defining a Location Lag

Multiple locations must often be completed before the next task can start.

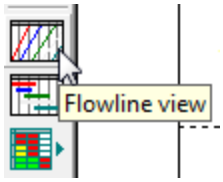
Example:

Floor 1 has three zones. Task 3 should not start until all three zones (A, B and C) are completed by the

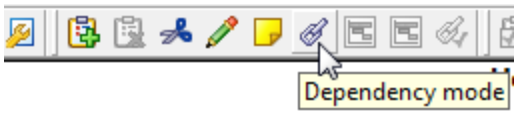


To define a restraint between activities that are in different locations

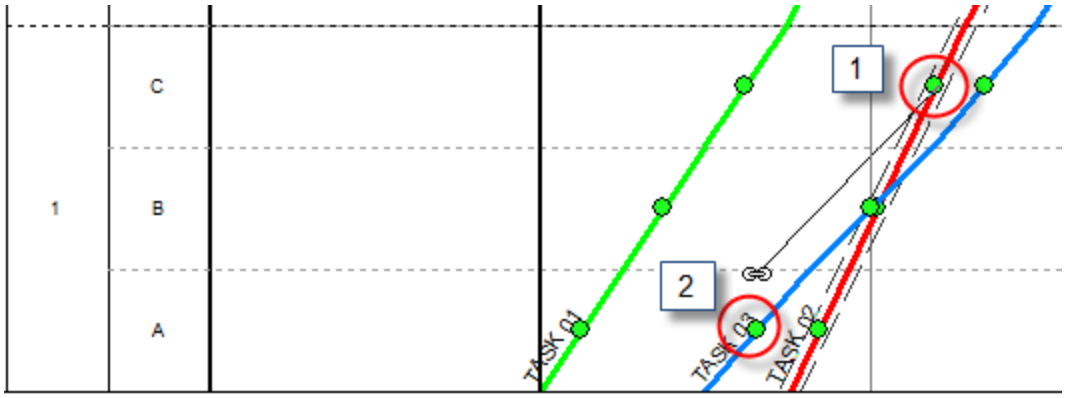
1. Open Schedule Planner.
2. On the left toolbar, click the **Flowline view** button.



3. To activate the Dependency mode, click the **Dependency mode** button on the top toolbar.



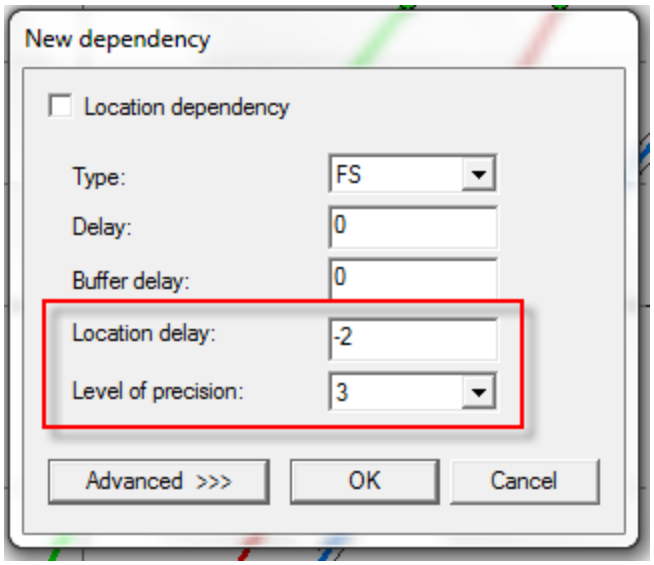
4. Draw a dependency between the activity in the last zone that needs to be completed before work on the next task can start, and the first zone in which the next task will start.



The **New dependency** dialog appears after releasing the left mouse button.

5. In the dialog, set the dependency settings.
   - The **Location delay** parameter shows to how many locations back or forward (using the location order) the relation is applied.
   - The **Level of precision** setting shows on which level of the LBS the restraint has been defined. (In this example, level 3: Project > Floor > Zone.)
   - If the restraint should only be applied to the selected activities, select the **Location dependency** check box.

     If the option remains cleared, the dependency is applied to all activities of the linked tasks.

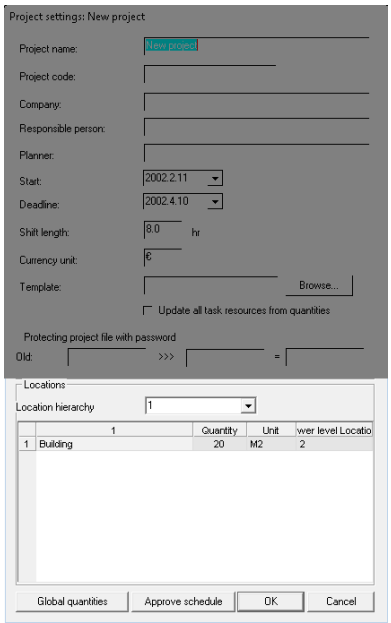


Creating Location Hierarchy

When creating Place hierarchy levels, they should preferably be given unique, descriptive names, e.g.: Site, Building, Floors and Rooms. Likewise, Place should be given unique, descriptive names to enable them to be specifically identified.

LBS can be created or edited using any one of the following:

1. The *Project settings: Locations* sub-dialog boy can be used to create and edit location hierarchies and lower level locations. The relative quantity of locations relative to each other and the appropriate unit needs to be entered, or he readability of the *Flowline view* window and resource allocation will be affected. Location hierarchies should be created in ascending order of construction, i.e. Site followed by Building, followed by Floors followed by Rooms, etc.



To create a location hierarchy:

Open the Project settings dialog, select level from the drop-down menu and over-write with the new name. The new name will then become the name of the first column in the table below, with is used to create the lower level locations.

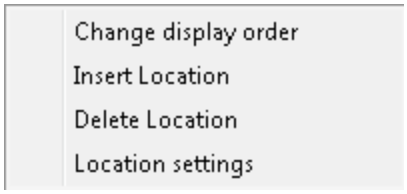
Enter the following date in the table:

Name of the hierarchy in the first cell:	Overwrite with the name.
Quantity:	Enter the quantity (usually the area in square meters/feet) of the first hierarchy level.
Unit:	Enter the specific unit (m^2/sf) chosen to compare the relative quantities devoted to each location.
Lower level Locations:	Enter the number of specific lower level locations to be assigned to the location hierarchy.

Enter **OK** to accept or **Cancel** to reject. If OK, click **Yes** to create the next hierarchy level.

Repeat the process until all locations have been created.

2. The *Flowline view* window can be used to create or edit Locations by utilizing the right-click command on the appropriate cell in the left columns (locations).

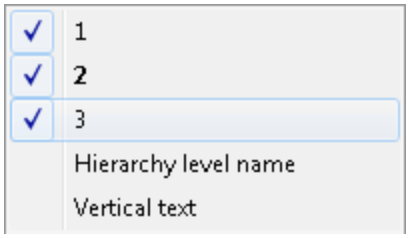


The dialog box options are:

Options	Description
Change display order:	Opens the Location display order dialog boy to change the location order, i.e.: to re-sequence the location order of the project or individual trades, if there is a need to do so.

Options	Description
Insert location:	Creates a lower level location by opening the "Adding a Location" dialog box in which the new location name is allocated along with the appropriate quantity.
Delete location:	Opens a confirmation dialog box when deleting a location.
Place settings:	Opens the "Location settings" dialog box to edit the location name and/or quantity.

Location column headers can be edited in the Flowline view window by utilizing the right-click command on the appropriate column header.



The options are:

Options	Description
Column display:	Columns can be hidden by removing a "tick" or displayed by adding a "tick".
Hierarchy level name:	Opens the "Hierarchy level name" dialog box to edit the hierarchy name.

Options	Description
Vertical text:	To select either horizontal when “not ticked” or vertical column text when ticked.

Note: Location names, if hidden, can be viewed by placing the cursor over each untitled cell, or by zooming in using the "vertical+zoom" option from the view control toolbar.

3. The *Bill of quantities* window displays the project location hierarchies in the right side of the window where locations can added or deleted, but not edited, via a dialog box.

   To add a lower level location:

   Right-click on the higher level location to open the *Add hierarchy level* dialog box, insert the name of new hierarchy and the number of new locations, select **OK** to accept or **Cancel** to reject.

   To delete a location:

   Right-click on the location to be removed, select **Remove**, select **No** to cancel or **Yes** to remove, then choose whether or not to distribute quantities.

4. The *Project settings: Locations* sub-dialog box can be used in conjunction with a spreadsheet application to rapidly populate project LBS data. The procedure is similar to (1) above, but instead of entering the text (which can get confusing in long lists), it is sufficient to enter the number of location places, drop down to the lower level and copy all the columns and rows and paste into your spreadsheet, where they may be edited. Once completed, they may be copied and pasted back into the project settings dialog box by placing the cursor into the first cell and pasting with Ctrl-V. This process may then be repeated at a lower level.
   Note: A powerful use of method (4) is to copy the structure from a past project for use in a new project. This method can construct a new LBS in a matter of minutes, even when it is complex.

Location-based Layer logic

The underlying engine of Schedule Planner is a CPM engine, as such, many of the concepts will be familiar to many who have used other software packages for scheduling construction. However basic CPM is unaware of location information, and is not able to control resources for continuous use. The following discussion briefly introduces the more powerful Layered logic which is part of the location-based management system and which is fully developed in Schedule Planner.

The new theory of Location-based scheduling involves far more that like activities in chain to derive resource optimization, as sometimes suggested. Rather, it involves several layers of interactive CPM logic, which combine to form a powerful location-based logic, *Layered Logic*, which involves the following:

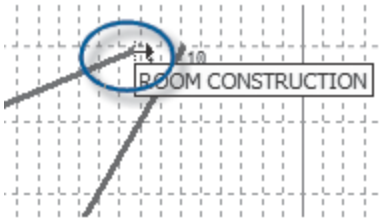
1. External logical relationship between activities within locations.
2. External higher-level logical relationships between activities driven by different levels of accuracy.
3. Internal logic between activities within tasks.
4. Phased hybrid logic between tasks in related locations.
5. Standard CPM links between any tasks and different locations.

In this chapter, only the basic elements of location-based scheduling will be demonstrated. These involve Layer 1, Layer 2, and Layer 3logic. Essentially, this is the internal logic for a task that involves sequential work through locations (Layer 3) and the connection between tasks as they pass the location from task to task using Layer 1 (same level) and Layer 2 (higher level) logic.

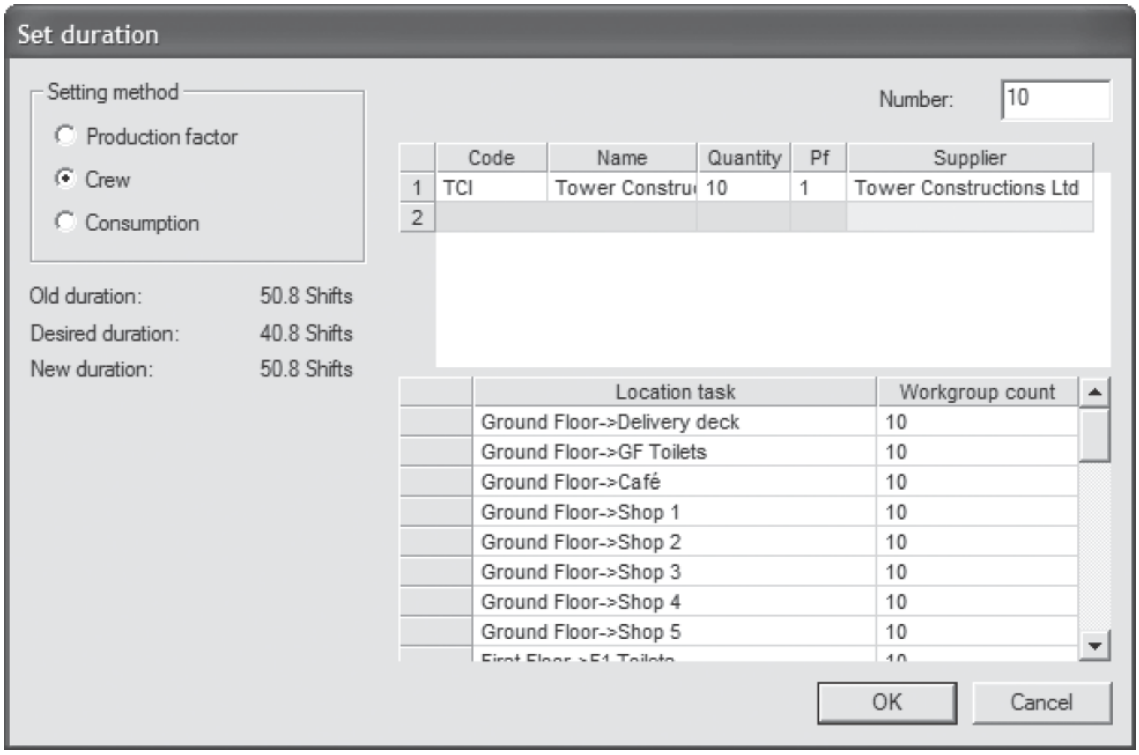
Adjust crews

To align production by changing the number of crews:

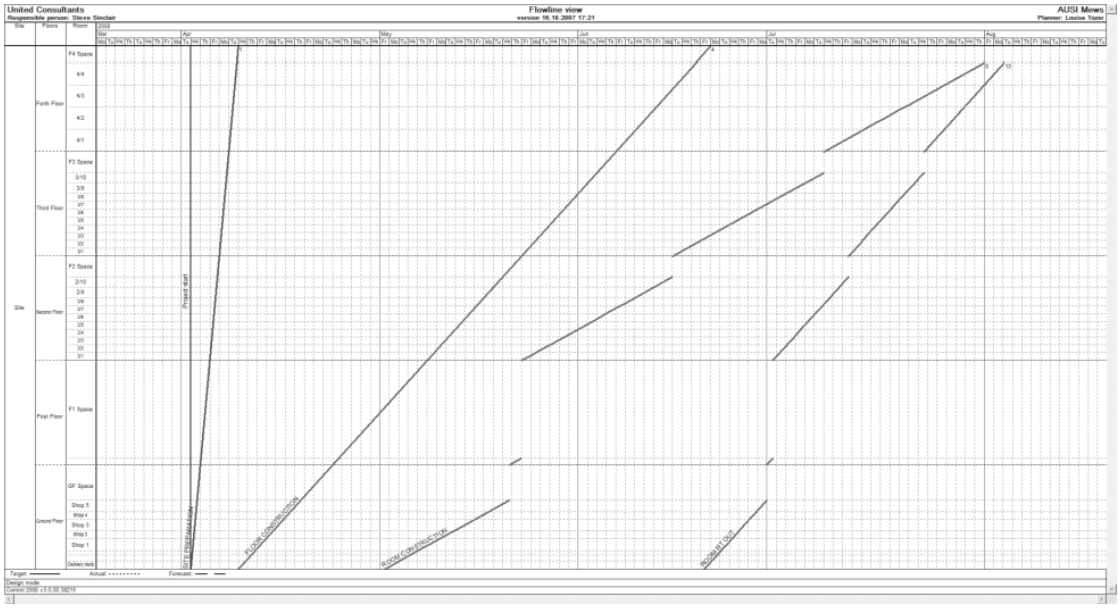
1. Open the Flowline view by clicking on the icon in the left toolbar.
2. Move the mouse over the upper right end of the task until the cursor changes to an arrow to the right. Click and drag to the left until the slope of the line is similar to the preceding task.



3. The “Crew” is proposed automatically in the “Setting method” sub-dialog box. In the example, the original duration was 127 shifts, it was dragged to 60 shifts, and adding 4 crews (to result in a total of 10) results in a duration of 50.8 shifts. You can manually change the Number if it differs - the duration is then recalculated.



4. Select OK. Observe how the wasted space is reduced in the Flowline, cutting the overall project duration. Select Save.



Note: The small number at the top right of the task will now display 8 as the number of crews for the task, if the crew are displayed for the task.

Assigning Crews from Cost Components

The duration of a task is defined by the production rate of the crew that works on it, using the following formula:

Duration = (**Units of Work**) / (**Crew Output per Hour** * **Number of Crews**)

The formula is evaluated in each location where units of work (thus an activity) exist.

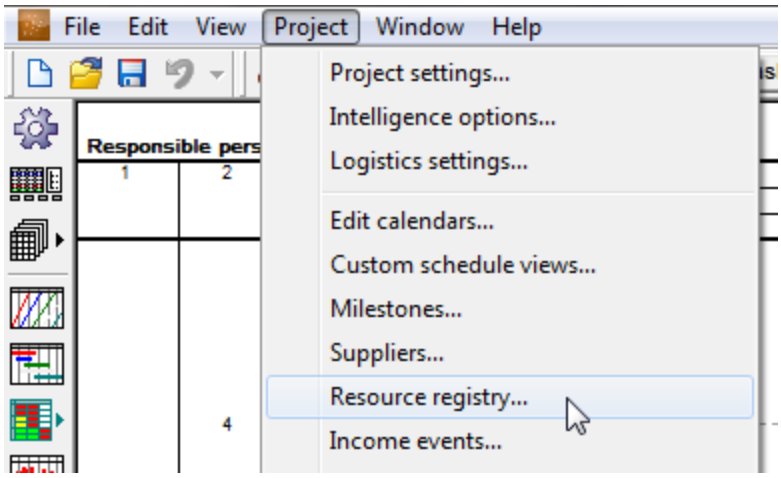
When the assembly that contains labor components was mapped to the task (see also "Creating Tasks and Mapping Cost Items" on page 386). crews can be generated automatically.

To assign crews from calculated labor components to scheduled tasks

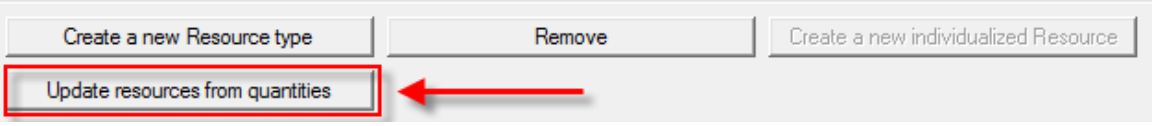
1. Define tasks and assign assemblies and components with labor components, as explained in "Creating Tasks and Mapping Cost Items" on page 386.

   Ensure that the labor components are used as task drivers, as explained in "Calculate Hours of Work" on page 389.

2. Open Schedule Planner.
3. In the **Project** menu, click **Resource registry**.

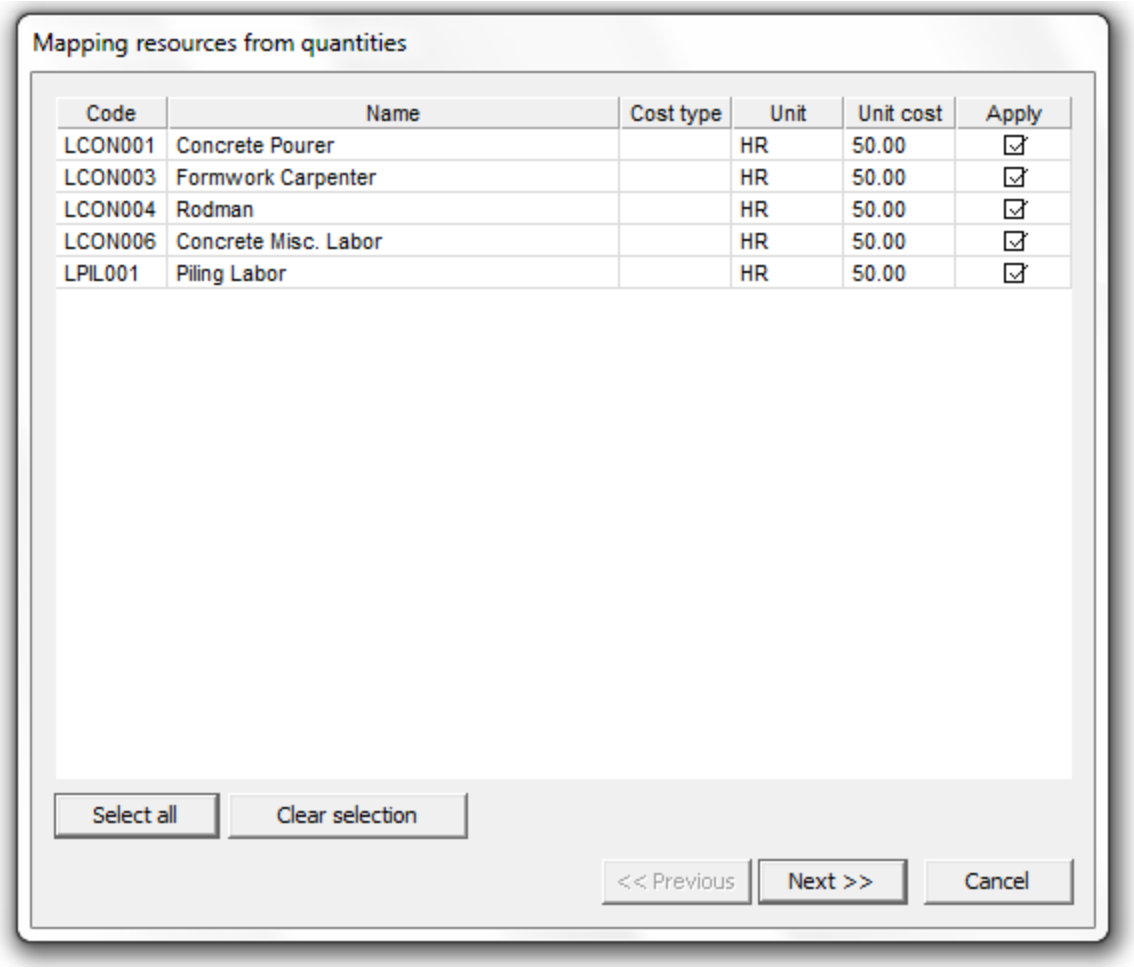


4. To generate labor resources and crews, click the **Update resources from quantities**.

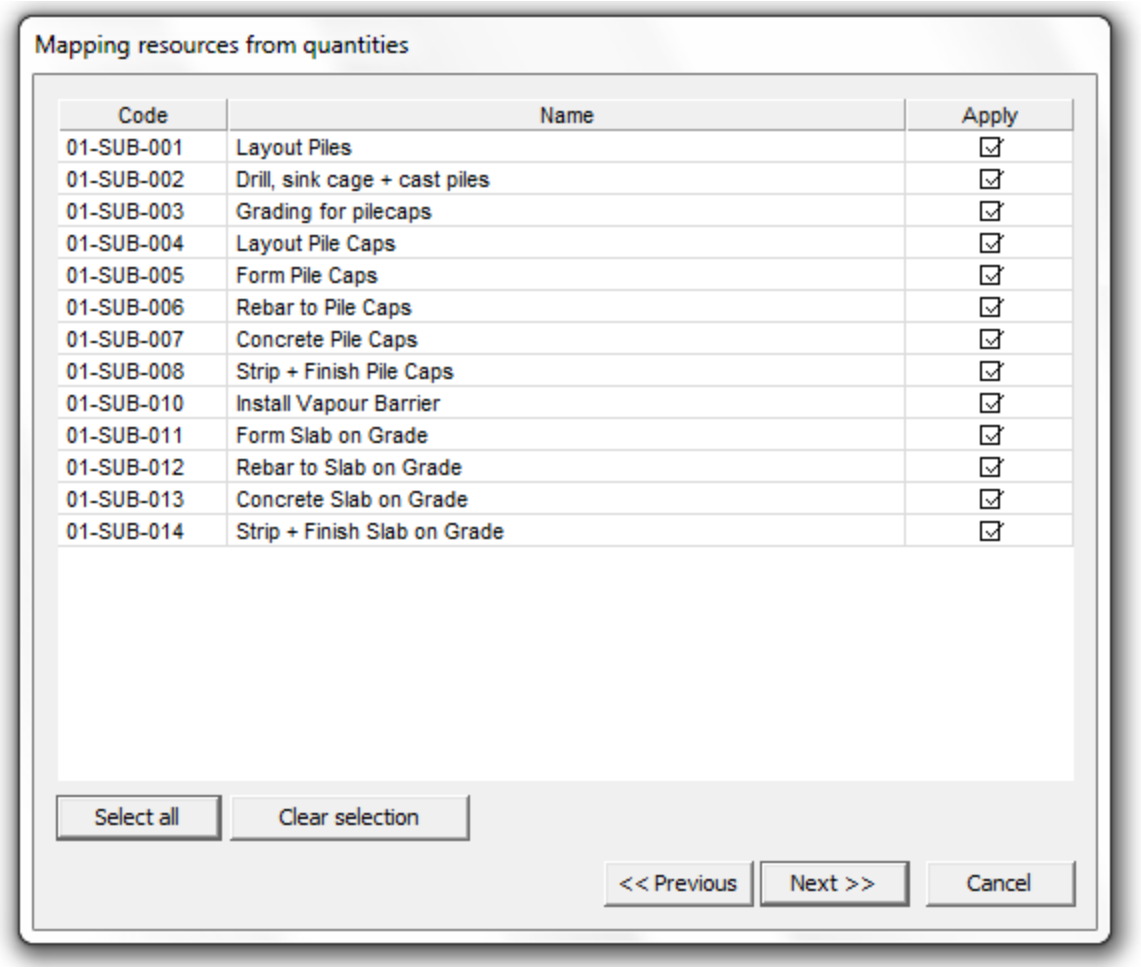


The **Mapping resources from quantities** dialog appears.

5. Select the resources from the cost plan's components that should be treated as labor resources for schedule planning, and then click **Next**.



6. Select the tasks to which the selected labor resources should be assigned, and then click **Next** to complete the resource mapping.



The labor resources, including unit rate, are now listed in the Resource Registry.

Hierarchy	Code	Name	No	Maximum usage	Unit cost	Unit	ilization delay	ibilization dela	Begin time	End time	Duration
-1	*Supplier independent resources*		1.2						2/17/2011	12/12/2011	1606 MAN HOURS
1.1	LCON001	Concrete Pourer	1		50.00 $	HR	0	0	7/28/2011	12/12/2011	306 HR
1.2	LCON003	Formwork Carpente	1		50.00 $	HR	0	0	5/23/2011	12/12/2011	333 HR
1.3	LCON004	Rodman	1		50.00 $	HR	0	0	7/7/2011	10/25/2011	409 HR
1.4	LCON006	Concrete Misc. Lab	1		50.00 $	HR	0	0	5/18/2011	8/24/2011	53 HR
1.5	LPIL001	Piling Labor	1		50.00 $	HR	0	0	2/17/2011	5/17/2011	504 HR
Altogether:			***1.2***						***2/17/2011***	***12/12/2011***	***1606 MAN HOURS***
											202.2 Shifts
											292.7 Calendar days

The labor resources from your cost plan are now also assigned as crews to the tasks in your schedule. The crew composition is calculated by setting the component with the largest number of labor hours to "1". All other labor resource numbers are calculated by ratio of this number.

Example

A task has been assigned the following resources from cost components:

Concrete Laborer	220 hours
General Labor	100 hours

The Crew becomes:

Concrete Laborer	1.00
General Labor	0.45

The optimal crew for this task will be 2 Concrete Laborers and 1 General Labor resource. Optimization of the schedule will involve including the number of "Standard Crews", which is standard calculated.

Assigning Crews Manually

The duration of a task is defined by the production rate of the crew that works on it, using the following formula:

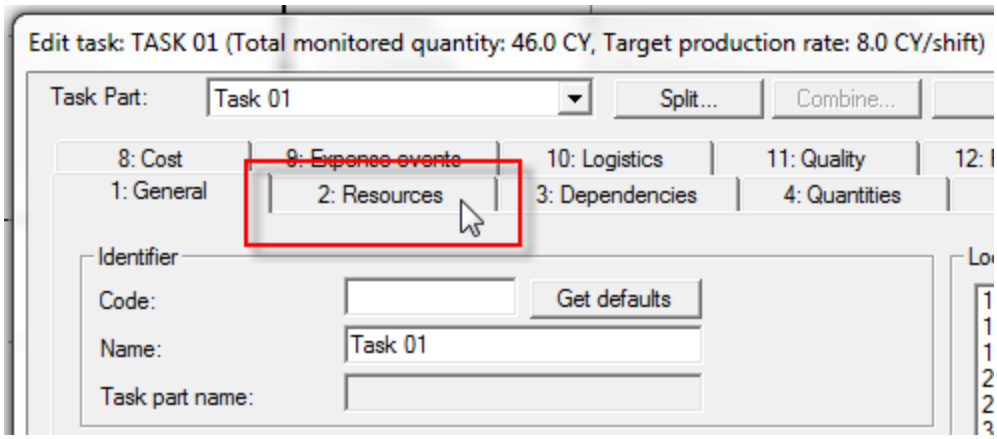
Duration = (**Units of Work**) / (**Crew Output per Hour** * **Number of Crews**)

The formula is evaluated in each location where units of work (thus an activity) exist.

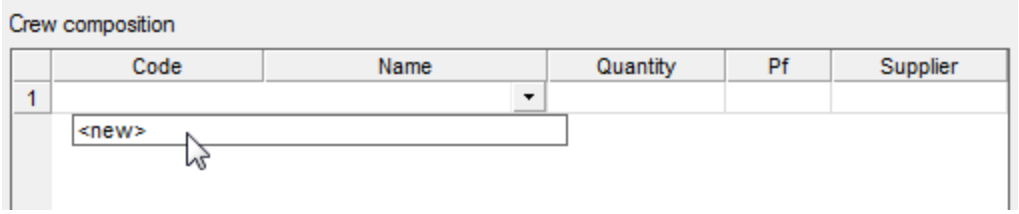
When cost for the project is not calculated to the level of labor resources, crews for tasks can be defined manually.

To assign crews to tasks manually:

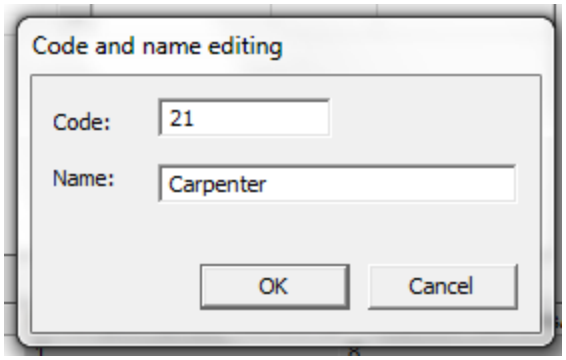
1. Open Schedule Planner.
2. On the left toolbar, click either the **Flowline view** buttton or the **Gantt view** button.
3. To open the schedule task, double-click it.
4. Click **Advanced**, and then click the **Resources** tab.



5. In the **Crew Composition** section, click the drop-down button, and then click **<new>**.



6. In the **Code and name editing** dialog, enter the required values, and then click **OK**.



7. In the **Consumption** section, in the **Production rate units/shift** cell, define the production rate as number of units of work that can be completed per shift.

   The standard shift is equal to one day of work (8 hours).

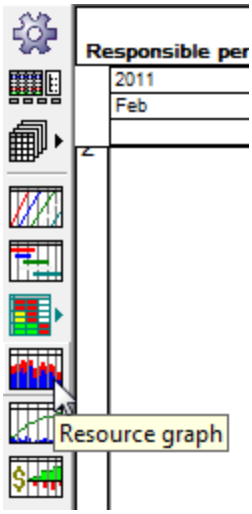
Consumption

	Item	Consumption person hours/units	Production rate units/shift	Quantity	Cost type
0	Formwork	1	3	46 SF	1

8. To confirm the changes, click **OK**.

   Note how the slope of the flowline changes after confirming the changes.

   The resource usage is visible immediately in the **Resource Graph**, which can be activated from the left toolbar.



Optimizing Crew Allocations

You can optimize production by adjusting crews, by adjusting crew configuration, or by splitting the work to enable parallel activities.

To adjust crews

1. Double-click the task, and then click **Advanced**.
2. On the **Resources** tab of the **Edit Task** dialog, change the number of crews to the number required to achieve the required faster or slower production rate.

To adjust crew configuration

1. In the Flowline view, point to the top of the task.

   The cursor changes to an arrow pointing to the right.

2. Click the top of the task, and then drag the line until its slope matches the task that is being matched.

   The **Set duration** dialog appears. You can change either the **Production Factor** (the same as the **Production factor** on the duration tab of the **Edit task** dialog box), the crew (either **Number** or the crew makeup (Resource Quantity), or Consumption.

To enable parallel activities by splitting the work

1. Double-click the task, and then click **Advanced**.
2. On the **Duration** tab of the **Edit Task** dialog, change the count of crews per location in the **Work-group count** cell.

   The composition of crews is the same for all locations, but the count may differ. Thus, you can speed up the locations with more work, and slow down locations with less work or space for working.

Creating Tasks

Location-based methods of scheduling shift the focus from the activity alone, to the flow of the series of activities that make up common tasks through many locations.

The Flowline schedule produced by Schedule Planner recognizes three board categories of tasks. They are:

- **Schedule tasks:** The combination of quantity of work and resource consumption required for a task over all locations, i.e. they can be said to be construction tasks. Schedule tasks will be further modified into Baseline tasks and Current tasks in the Control mode discussion.

  Note: The terms vary, the Current tasks are also called Micromanagement tasks or MiMa tasks.

  Note: Schedule tasks can be grouped to summary Tasks which combine the information of several schedule tasks to one task line. For more information see "Creating Summary Task in Schedule Planner" on page 433 section.

- **Procurement tasks:** The sequence of activities required preparing for a schedule task, such as the design, tendering, manufacture, and delivery of materials.
- **Overhead tasks:** Virtual tasks that contain resources and costs that are time-related and linked to either the project or scheduled tasks, e.g. on-site cranes that remain on-site for the duration of the project that have daily cost but are not necessarily used every day.

Creating a Schedule Task

A schedule task is the combination of quantity of work and resource consumption required for a task over all locations, i.e. they can be said to construction tasks.

Besides Cost Planner driven Tasks, it is possible to add Tasks to the Flowline schedule manually by 'sketching' it in the Flowline view.

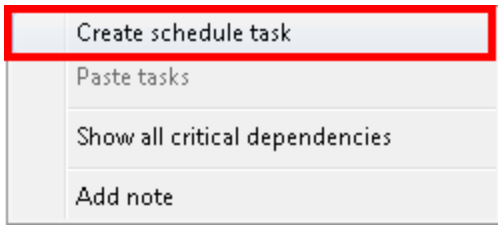
In this section you will read about how to create non model-based tasks. For information about how to create mode-based tasks, see "Creating Tasks and Mapping Cost Items" on page 386 section.

A schedule task can be created or edited via any one of three windows:

1. The “Flowline view” window:

   To create a new task:

   Right-click the calendar section of the *Flowline view* window, then left-click the **Create schedule task** button.

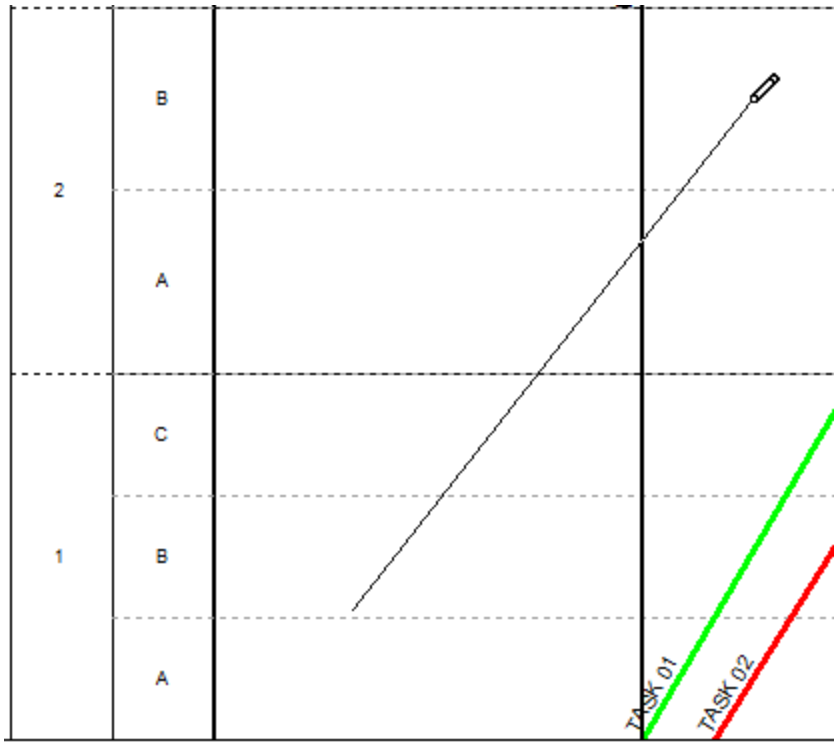
   

   Or

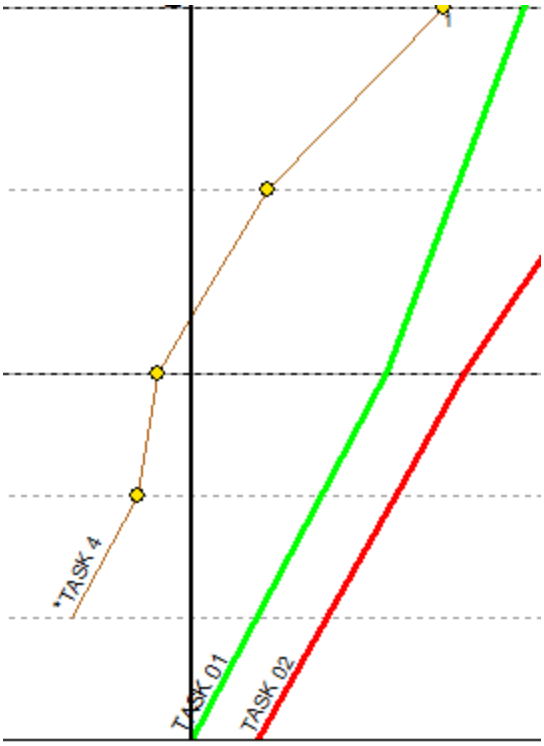
   1. Click on the **pen** icon  in the *Flowline view* toolbar to enable the task drawing mode.

      Now you can draw tasks to the locations of the Flowline.

   2. In the Flowline view, click in the Location where the new Task should begin, hold the left mouse button and draw the line to reflect duration and Locations where it should be performed.



3. Release the left mouse button to complete the Task definition.
4. The new, manual, Task is shown as a thin line to indicate that the duration is not quantity driven. The yellow dots can be dragged to set the estimated duration per Location. The new Task appears in the Task Manager view, and Assemblies/Components can be mapped to it there.



Note: To edit an existing task, double-click the schedule task Flowline.

2. The "Gantt chart" window:

   To create a new task:

   Right-click the calendar section of the “Gantt chart” window then left-click the **Create schedule task** button.

   Or

   Write the task name/code/duration to the grid area. Observe that you can write the task name to any row of the Gantt chart - thus you can easily group tasks.

   Note: To edit an existing task: Double left-click on the schedule task Gantt line.

3. The "Bill of quantities" window:
   To create a new task from an imported Bill of quantities: Select the required quantity from below the pink *Free quantities* line, left-click the **Create schedule task** command and select OK in the New schedule task quantities dialog box.

   Or

Left-click on the pink *Free quantities* line, left-click on the **Add/Edit quantities** to open the *Add method* dialog box enter data and select **OK**. Select the new task then left-click the **Create schedule task** button and select **OK** in the *New schedule task quantities* dialog box.

Note: To save time, schedule tasks and quantities can be prepared, stored and managed for import from a spreadsheet prior to importation into the Bill of quantities.

Note: To edit an existing task: Double left-click on the schedule task name.

The above procedures all result in opening the Edit task dialog box which is used to create or edit a schedule task via 15 schedule task sub-dialog boxes. If the task does not have quantities, then a smaller **Edit Task** dialog is shown - the normal one is then accessed from the *Advanced* button.

For more information see "Edit Task" on page 455 section.

Creating Overhead Task

Overhead costs are usually incurred by the general contractor, and arise from the costs of supporting the construction activities. They are a function of the project, particularly a construction phase duration or the duration of use of important resources, such as a tower crane and supervision.

To create Overhead Task via the Bill of Quantities window:

1. Open the **Bill of Quantities** window.
2. Select **Overhead** from the Task type.
3. Select the "Free quantities" line and select the **Add/edit quantities** button. Enter the quantity items, including a description, quantities and units.
4. Click **OK**.
5. Select the relevant method from below the "Free quantities" line.
6. Left click the **Create an overhead task** button, then click **OK** in the "The quantities of a new overhead" task dialog box to open the Overhead task editing dialog box.

   The Overhead task editing dialog box appears.

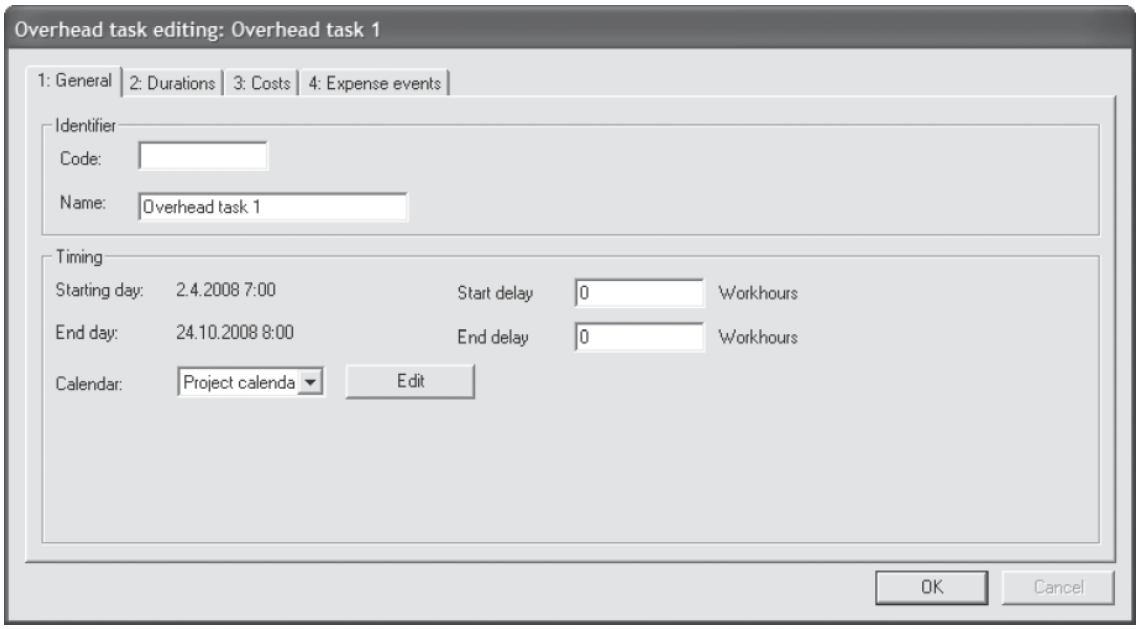
The Overhead task editing dialog box allows access to four sub-dialog boxes:

Sub-dialog box	Description
General	Used to enter general information about the task.

Sub-dialog box	Description
Durations	Used to calculate the duration of the overhead task.
Costs	Used to display cost information on the overhead task.
Expense events	Used to define expense events for the overhead task.

1. The "General" sub-dialog box displays board parameter information for each overhead task:

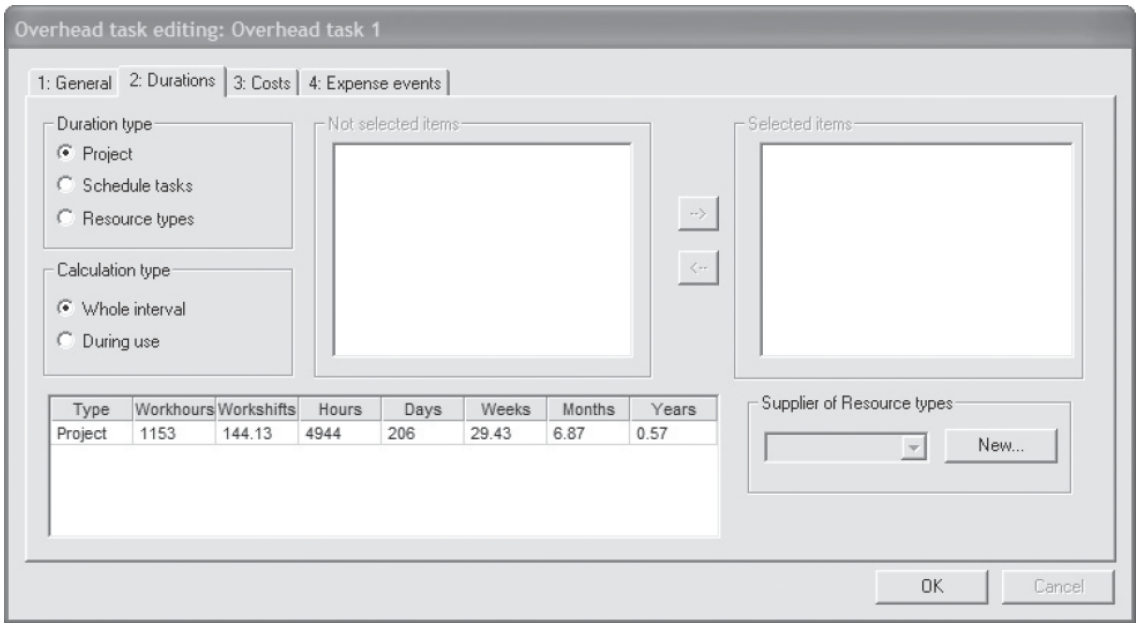
Identifier:	Enables the procurement task to be identified by Code and Name.
Timing:	**Start delay**: The lead period for costs to commence prior to production starting. For example, the erection of a crane, or setting out site sheds. Enter the duration (in hours). **End delay**: The following period for costs to continue after production is complete. For example, dismantling cranes, or removing site sheds. Enter the duration (in hours). Calendar: The overhead task may have its own calendar. For example, a seven-day hiring calendar might be used.



2. The “Durations” sub-dialog box calculates the duration of the overhead task:

Duration type:	**Project**: The overheads that occur during the entire duration of the project. For example, the Project Manager. **Schedule tasks**: The overheads that occur only during selected tasks. For example, a Plumbing Supervisor for the supervision of plumbing tasks; or crane hire. **Resource types**: The overheads that occur only during the presence of specific resources. For example, crane maintenance. Select one of the above.
Calculation type:	**Whole interval**: The overheads that occur continuously from the start of the overhead to the end, without a break. For example, a fixed crane. **During use**: The overheads that occur only during the actual work period. For example, mobile crane hire. Select one of the above.

Selected items selection:	**Not selected items**: A list of tasks or resources from which the relevant selection may be made. **Selected items**: A list of the selected tasks or resources. To add the selected items, highlight all the relevant items in the "Not selected items" list and left-click –>. To remove the selected items, highlight all the relevant items in the "Selected items" list and left-click <–.
Supplier of Resource types:	The supplier of resources for this overhead task. Add a new supplier or select one from the drop-down menu.



3. The "Costs" sub-dialog box displays information on the costs of the overhead task:

Name:	The name of each quantity item included in the overhead task.
Target costs $: **Current costs $:** **Target number of units:** **Forecast number of units:**	Calculated fields.

Overhead task editing: Overhead task 1

1: General | 2: Durations | 3: Costs | 4: Expense events

Name	Target costs $	Current costs $	Target number of units	Forecast number of units
Tower Crane	250142.9		29.4 WEEK	

OK Cancel

4. The “Expense events” sub-dialog box defines expense events for the overhead task:

This section is for determining the timing of payments (expense events). Selection options are: Selected days, Weekly, Bi-weekly and Monthly. These selections determine the options for the cash flow system, discussed elsewhere.

Overhead task editing: Overhead task 1

1: General | 2: Durations | 3: Costs | 4: Expense events

Payment periods: Monthly Total cost: 250 143 $

Code	Name	Cost	Date	Payment delay
		34 712 $	1.5.2008	14
		36 448 $	1.6.2008	14
		34 712 $	1.7.2008	14
		39 919 $	1.8.2008	14
		36 448 $	1.9.2008	14
		38 183 $	1.10.2008	14
		29 722 $	1.11.2008	14

Add payment event Remove a payment event

OK Cancel

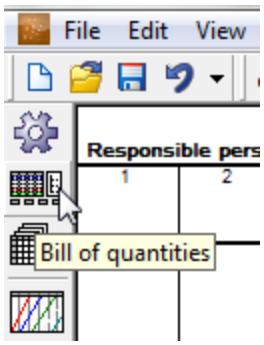
Creating Procurement Task

In current scheduling practice, the common way for linking procurement and design activities to the construction schedule is to add the relevant events as predecessor tasks to the schedule. This method effectively pushes the start dates of production tasks - thus the procurement activities are treated as being of equal importance to production.

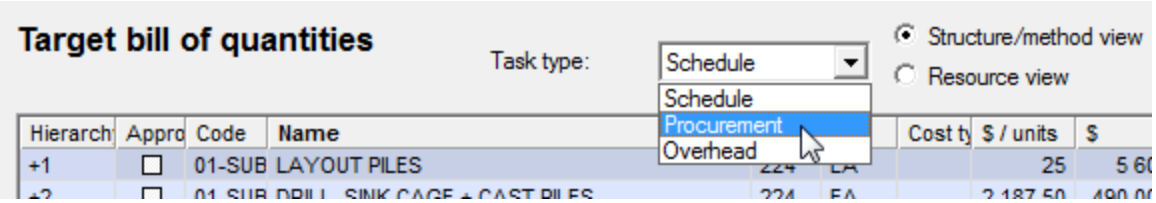
Procurement Tasks are used to group the labor, material and equipment, needed for the execution of schedule Tasks, and to plan the purchasing process for these resources. Planned Procurement Events help to keep track of the procurement process during the production phase.

To create Procurement Task via the Bill of Quantities window

1. Open the Bill of Quantities window from the left toolbar.



2. Change the active view in the Bill of Quantities to **Procurement**. Switch to **Resource view** to isolate the set of resources in the project.



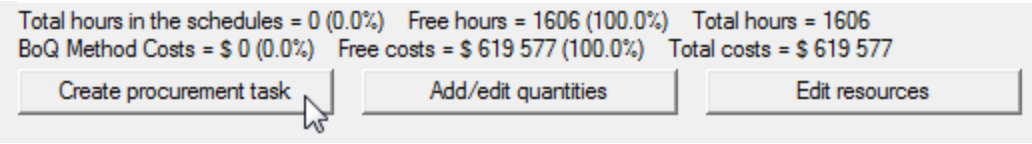
3. The list of resources is presented.

Hierarchy	Approved	Code	Name	Quantity	Unit
-					
-1					
+1.1	☐	LCON001	Concrete Pourer	306.24	*HR*
+1.2	☐	LCON003	Formwork Carpenter	333.21	*HR*
+1.3	☐	LCON004	Rodman	408.87	*HR*
+1.4	☐	LCON006	Concrete Misc. Labor	53.4	*HR*
+1.5	☐	LPIL001	Piling Labor	504	*HR*
+1.6	☐	M03.11.00.060	Erect Forms - Pile Cap - Materials	1680	SF
+1.7	☐	M03.11.00.061	Strip Forms - Pile Cap - Materials	1680	SF
+1.8	☐	M03.11.00.160	Erect Forms - Slab on Grade - Materials	364.22	SF
+1.9	☐	M03.11.00.161	Strip Forms - Slab on Grade - Materials	364.22	SF
+1.10	☐	M03.21.00.060	Re Steel - Pile Cap - Materials	8.17	TONS
+1.11	☐	M03.21.00.160	Re Steel - Slab on Grade - Materials	18.67	TONS
+1.12	☐	M03.31.00.060	Concrete - Pile Cap - Materials	81.67	CY
+1.13	☐	M03.31.00.160	Concrete - Slab on Grade - Materials	311.09	CY
+1.14	☐	M03.35.00.060	Finishing to - Pile Cap - Materials	1400	SF
+1.15	☐	M03.35.00.160	Finishing to - Slab on Grade - Materials	11999.17	SF
+1.16	☐	M07.26.00.010	Vapor Barrier at SOG - Material	12599.13	SF
+1.17	☐	M31.63.00.010	CIP RC Pile - Materials	2352	FT

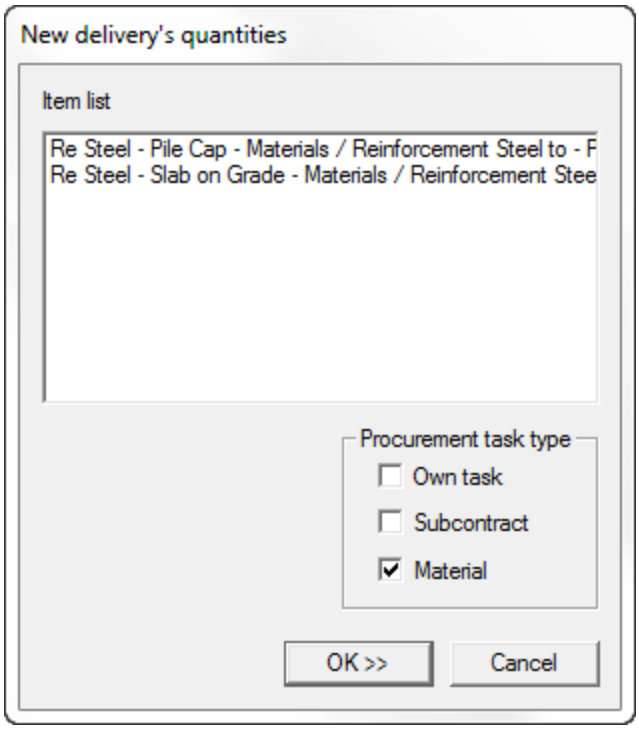
4. Select the materials that should be purchased as a package.

Hierarchy	Approved	Code	Name	Quantity	Unit
-					
-1					
+1.1	☐	LCON001	Concrete Pourer	306.24	*HR*
+1.2	☐	LCON003	Formwork Carpenter	333.21	*HR*
+1.3	☐	LCON004	Rodman	408.87	*HR*
+1.4	☐	LCON006	Concrete Misc. Labor	53.4	*HR*
+1.5	☐	LPIL001	Piling Labor	504	*HR*
+1.6	☐	M03.11.00.060	Erect Forms - Pile Cap - Materials	1680	SF
+1.7	☐	M03.11.00.061	Strip Forms - Pile Cap - Materials	1680	SF
+1.8	☐	M03.11.00.160	Erect Forms - Slab on Grade - Materials	364.22	SF
+1.9	☐	M03.11.00.161	Strip Forms - Slab on Grade - Materials	364.22	SF
+1.10	☐	M03.21.00.060	Re Steel - Pile Cap - Materials	8.17	TONS
+1.11	☐	M03.21.00.160	Re Steel - Slab on Grade - Materials	18.67	TONS
+1.12	☐	M03.31.00.060	Concrete - Pile Cap - Materials	81.67	CY
+1.13	☐	M03.31.00.160	Concrete - Slab on Grade - Materials	311.09	CY
+1.14	☐	M03.35.00.060	Finishing to - Pile Cap - Materials	1400	SF

5. Click the **Create procurement task** button.



6. Select the appropriate **Procurement task type** and click **OK**.



The Editing procurement dialog box appears.

The Editing procurement dialog box allows access to five sub-dialog boxes:

Sub-dialog box	Description
General	Used to enter general information about the task.
Quantity data	Used to enter quantity data.
Events	Used to enter information on the scheduling of events, such as planning, tendering, contracting, ordering, and delivery.
Dependencies	Used to define dependencies.
Diary	Used to record special dates.

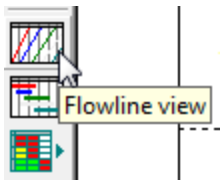
Sub-dialog box	Description
Deal	In the project controlling mode there is an additional tab for making deals of procured quantities.

For more information, see the "Editing Procurement task" section.

Adding a Task Manually

To 'sketch' a new schedule Task

1. Open Schedule Planner.
2. On the left toolbar, click the **Flowline view** button.



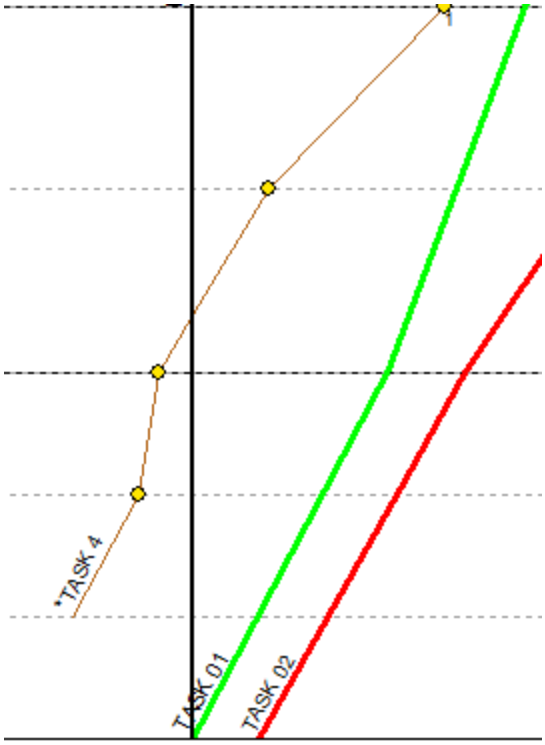
3. Click the **Task drawing mode** button.

   The cursor changes to a pencil.

4. In the Flowline view, click the location where the new task should begin, and hold the left mouse button while drawing the line to reflect the duration and locations where it should be performed.
5. To complete the task definition, release the left mouse button.

   The new task is shown as a thin line to indicate that the duration is not quantity-driven. The yellow dots can be dragged to set the estimated duration per location. The new task appears in the Task

Manager view, and assemblies and components can be mapped to it there.

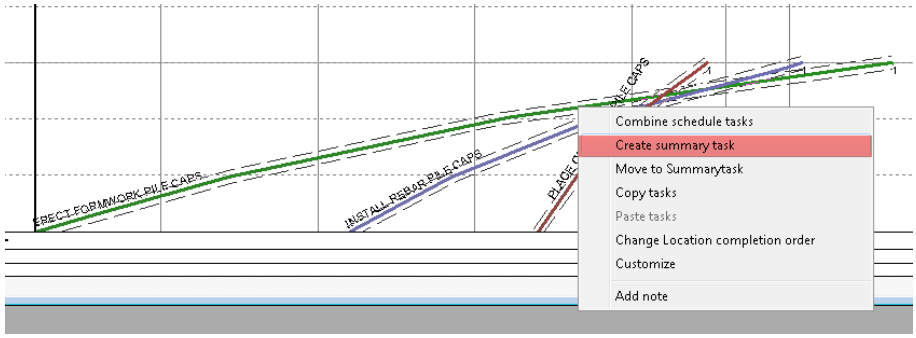


Creating Summary Task in Schedule Planner

Creating a group of tasks using the Task Manager New Summary Task feature. For more information see "Creating Summary Tasks " on page 388 section. In schedule Planner you can choose to see lower or higher level tasks.

To create summary task

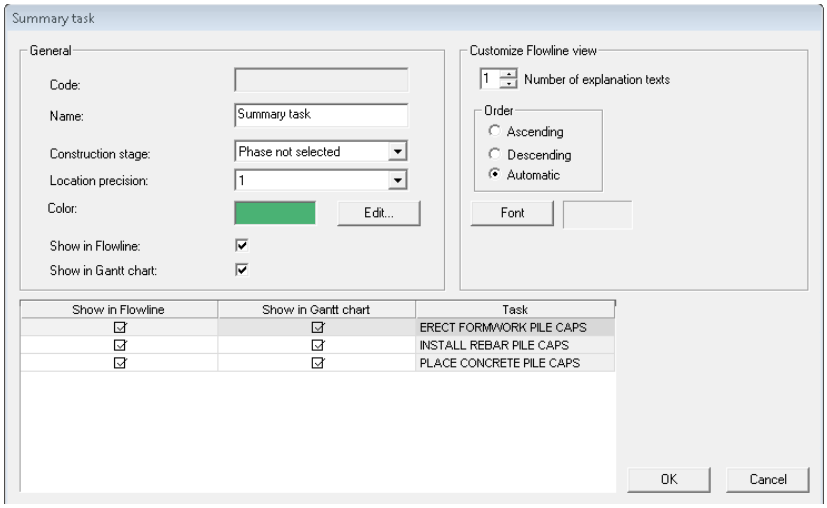
1. Select the tasks you want to include in the summary task.
2. Right click on the view and select Create Summary Task from the drop-down list.



The Summary task dialog appears.

Note: The created summary task will appear as one sequential workflow item on the selected hierarchy level.

3. Define the settings for the summary task and click OK.



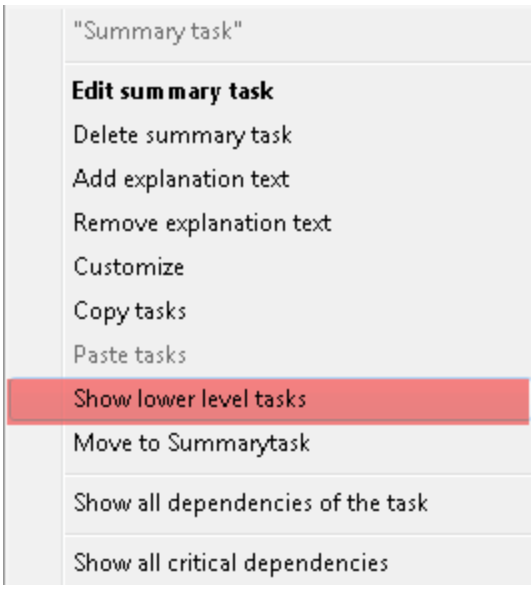
Note: The Summary task dialog can be applied again by double-click on the summary task.

In the Flowline view you have the opportunity to choose of seeing the tasks grouped in the summary task, or you want to see the lower level tasks separately.

After creating a summary task, the grouped items are visible as one single summary task by default.

To see lower level tasks

1. Select the summary task and right click on it.
2. Select the Show lower level tasks from the drop-down list.

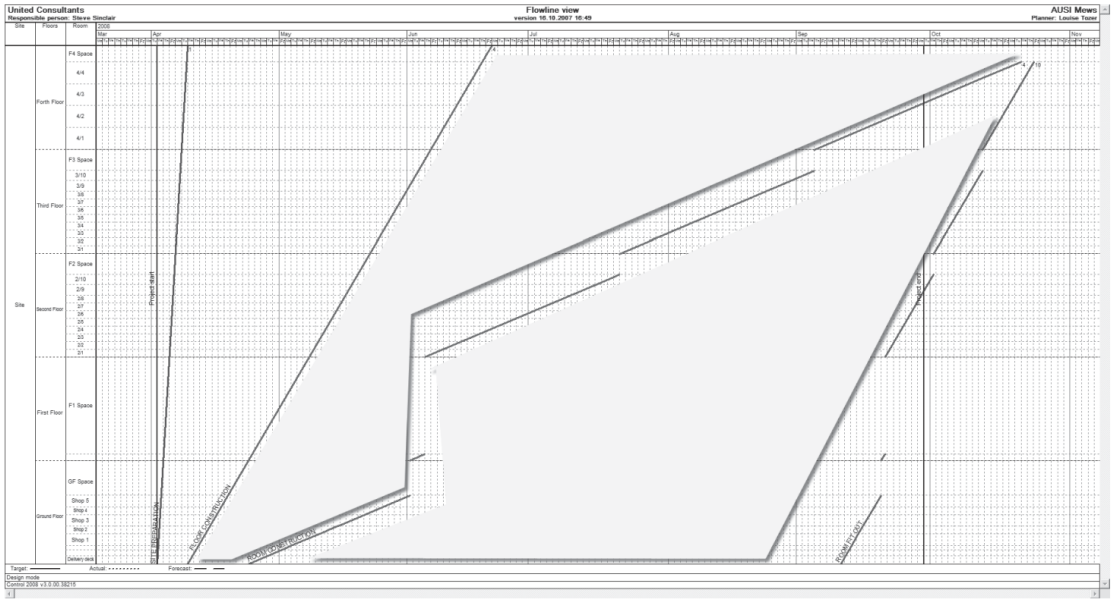


Note: To see the tasks in one single summary task again, right click on an included task and select **Show higher level task**.

Aligning task production

Space buffer: Locations where work is not being undertaken between active tasks.

Project planning using a location-based methodology enables you to schedule the project to achieve production efficiency. Tasks which have different production rates, will result in "space buffers" if scheduled as "Paced". Space buffers are locations where work is not being undertaken due either to design (i.e. a deliberate allowance for variation and/or error) or to poorly aligned production.



In the above figure, the slow production of the Room Construction task results in unworked areas (highlighted in yellow), afterwards on the lower floors, and before on the upper floors. This problem can be solved by aligning production.

Production may be aligned using a number of methods:

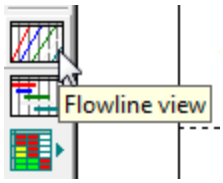
- Adjust crews (number of optimum crews)
- Adjusting crew make-up (number in the optimum crew)
- Splitting the work to allow multiple work-faces

Defining Task Restraints in Flowline View

You can graphically define dependencies between tasks by using the Dependency mode to draw relations between activities.

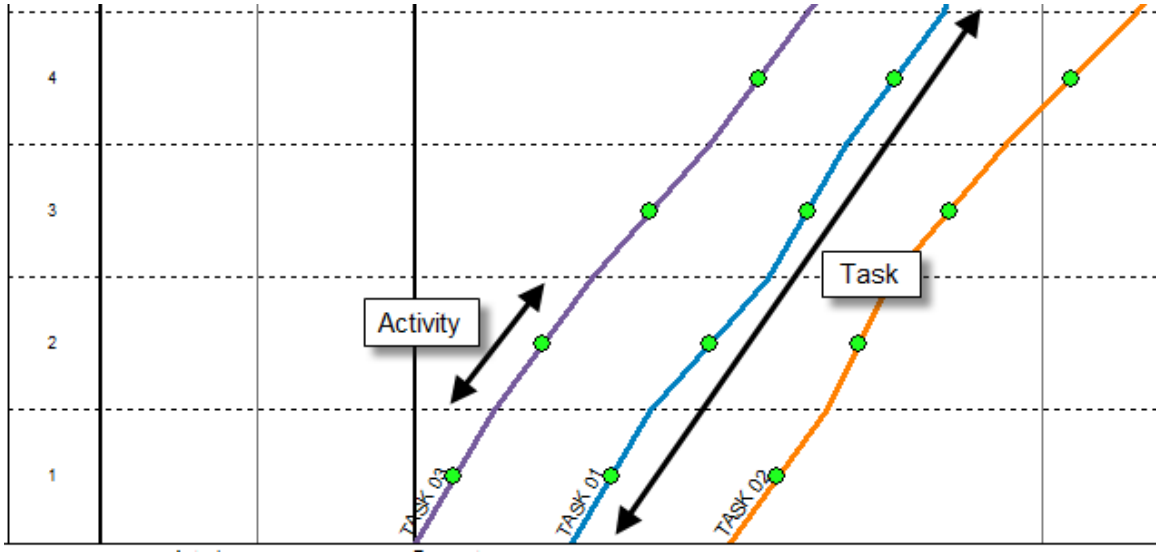
To define dependencies in the Flowline view

1. Open Schedule Planner.
2. On the left toolbar, click the **Flowline view** button.

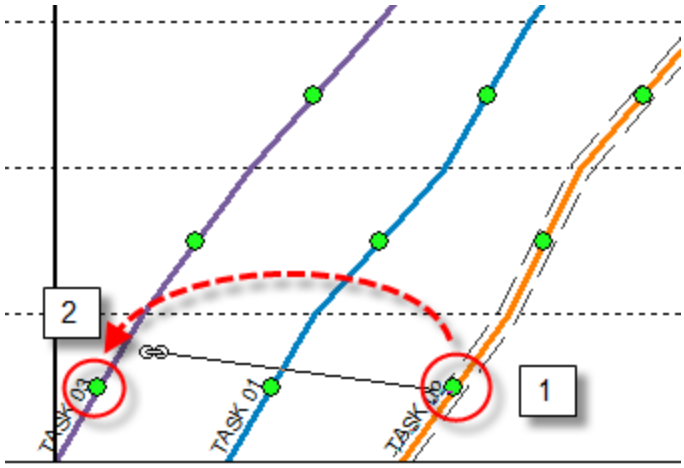


3. To activate the Dependency mode, click the **Dependency mode** button on the toolbar.

Green nodes appear for each activity in all tasks.



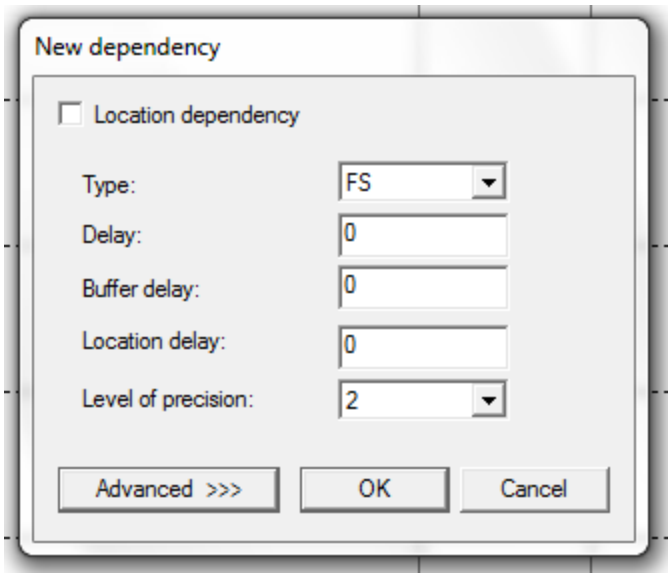
4. To define dependencies between activities, connect a green dot while holding the left mouse button, click the second green dot, and then release the left mouse button.



The **New dependency** dialog appears.

5. In the dialog, define the dependency as desired.
   - **Location dependency:** If the dependency should only apply to the connected activities, and not to all activities in the task, select the **Location dependency** check box. If the check box is not selected, the dependency is automatically applied to all activities in the task.
   - **Delay:** The scheduled delay defined in calendar days. For example, work cannot start earlier than 2 days after completion of a predecessor task.
   - **Buffer delay:** The delay defined in work days.
   - **Location delay:** The number of locations that must be finished (in sequence) before the successor task can start.
   - **Level of precision:** The level of the LBS where the dependency is defined. For location

delay, it specifies which location grouping is used to calculate the location lag.



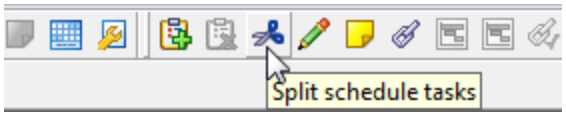
6. To reorganize the flowlines to reflect the newly defined restraint, click **OK**.

Optimizing with Task Splitting

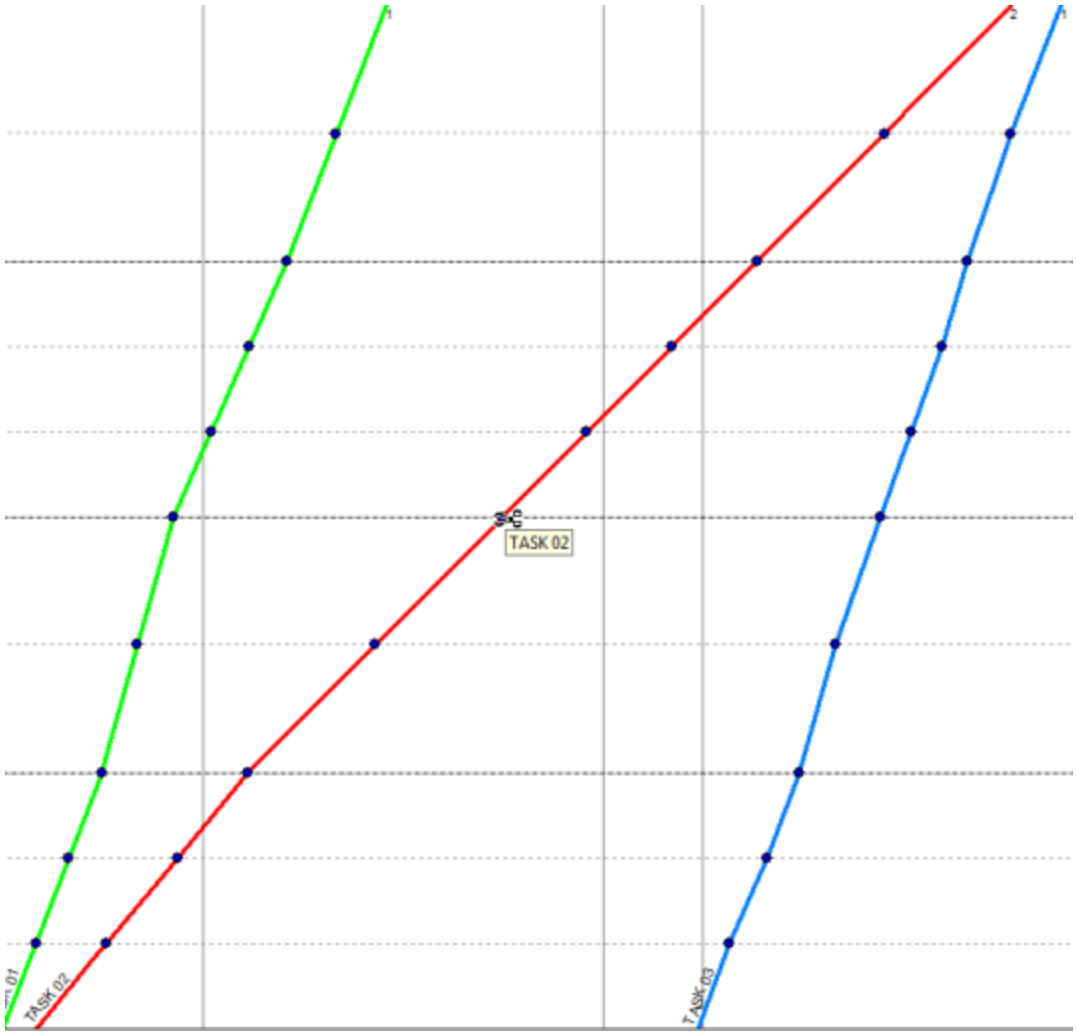
You can split tasks to enable parallel work of two or more crews on the same task at the same time. Tasks are split by location, so additional crews can be assigned to different locations without disturbing each other's work.

To introduce parallel work by splitting tasks

1. Open Schedule Planner.
2. In the Flowline view, click the **Split schedule** tasks button on the toolbar.

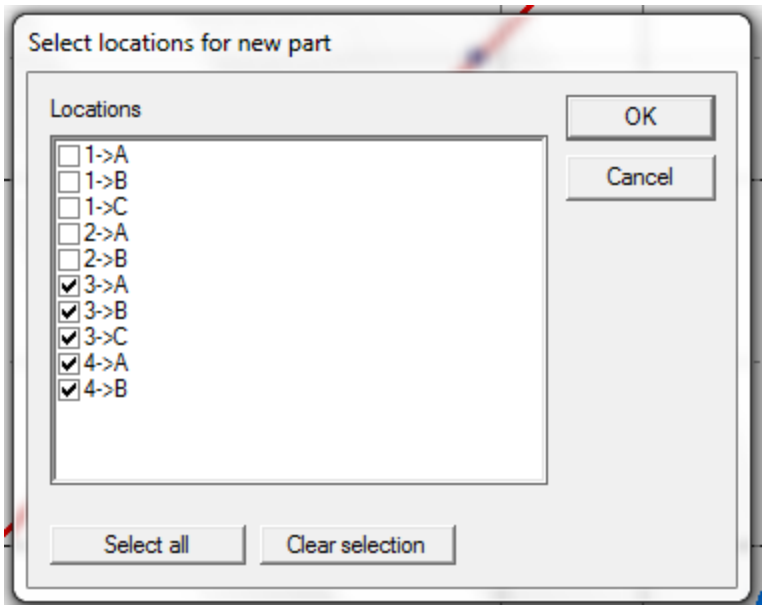


Blue dots appear on the flowlines in the schedule. The dots are the points where the task can be split.



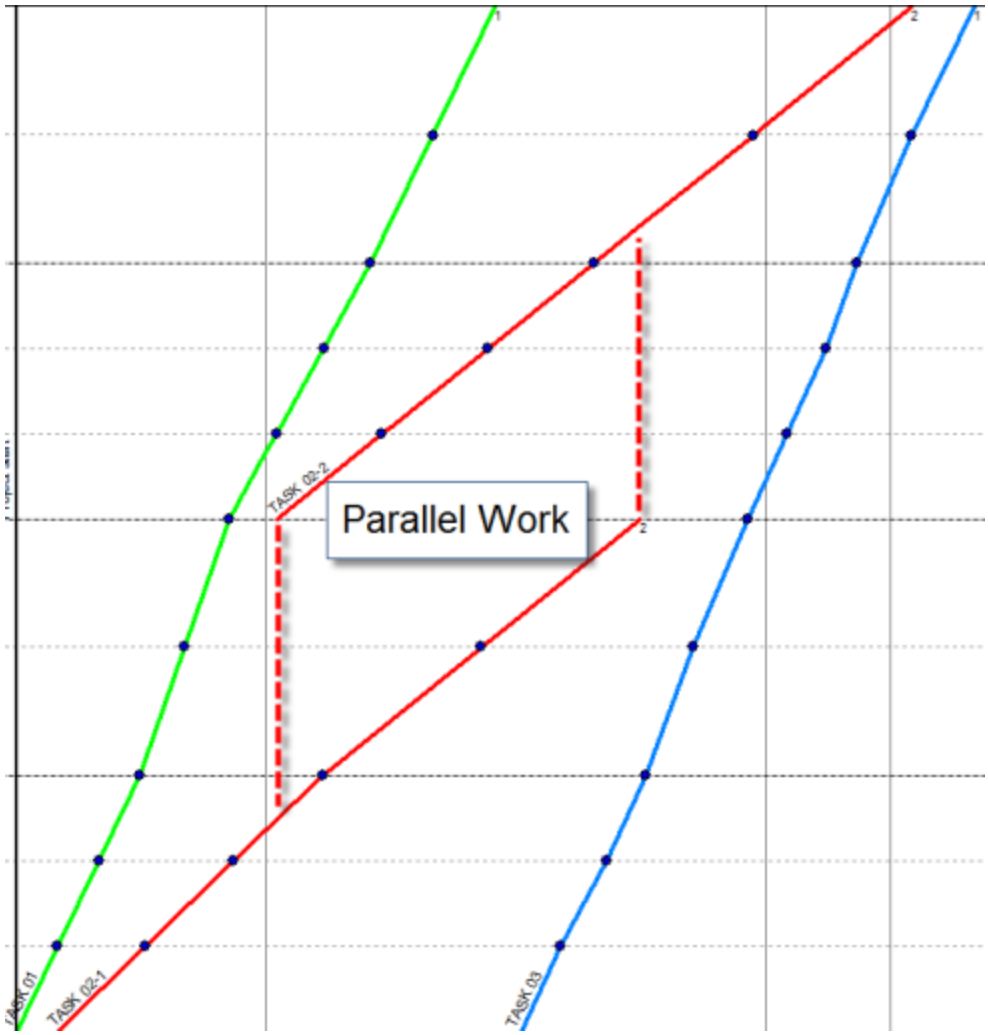
3. To apply a split operation, point the cursor to a blue dot and left-click it.

   The **Select locations for new part** dialog appears to confirm the locations for the two new tasks.



4. Click **OK** to confirm.

   The original task is split into two split tasks. You can define parallel work and assign different labor resources for optimization of the schedule.

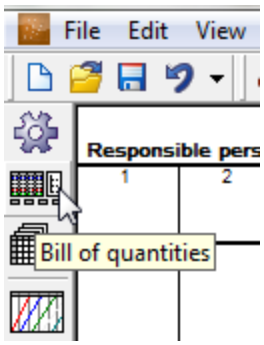


Defining Procurement Tasks

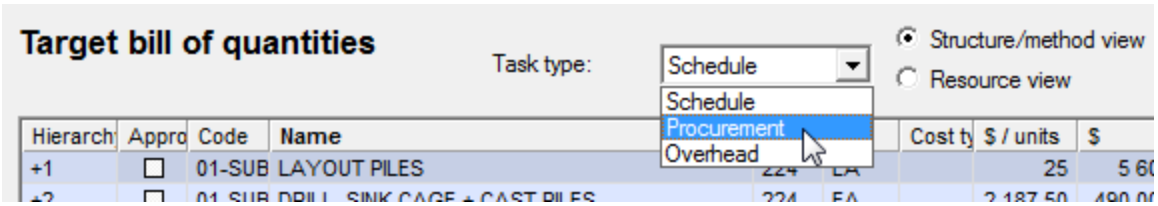
To create procurement tasks for required resources

Procurement tasks are used to group the labor, material and equipment, needed for the execution of schedule tasks, and to plan the purchasing process for these resources. Planned procurement events help to keep track of the procurement process during the production phase.

1. Open Schedule Planner.
2. On the left toolbar, click the **Bill of quantities** button.



3. From the **Task type** list, select **Procurement**.



4. To isolate the set of resources in the project, select **Resource view**.

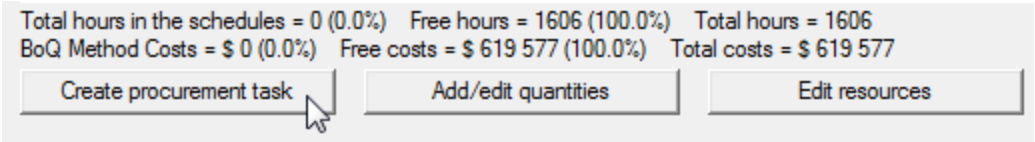
   The list of resources is displayed.

Hierarchy	Approved	Code	Name	Quantity	Unit
-					
-1					
+1.1	☐	LCON001	Concrete Pourer	306.24	*HR*
+1.2	☐	LCON003	Formwork Carpenter	333.21	*HR*
+1.3	☐	LCON004	Rodman	408.87	*HR*
+1.4	☐	LCON006	Concrete Misc. Labor	53.4	*HR*
+1.5	☐	LPIL001	Piling Labor	504	*HR*
+1.6	☐	M03.11.00.060	Erect Forms - Pile Cap - Materials	1680	SF
+1.7	☐	M03.11.00.061	Strip Forms - Pile Cap - Materials	1680	SF
+1.8	☐	M03.11.00.160	Erect Forms - Slab on Grade - Materials	364.22	SF
+1.9	☐	M03.11.00.161	Strip Forms - Slab on Grade - Materials	364.22	SF
+1.10	☐	M03.21.00.060	Re Steel - Pile Cap - Materials	8.17	TONS
+1.11	☐	M03.21.00.160	Re Steel - Slab on Grade - Materials	18.67	TONS
+1.12	☐	M03.31.00.060	Concrete - Pile Cap - Materials	81.67	CY
+1.13	☐	M03.31.00.160	Concrete - Slab on Grade - Materials	311.09	CY
+1.14	☐	M03.35.00.060	Finishing to - Pile Cap - Materials	1400	SF
+1.15	☐	M03.35.00.160	Finishing to - Slab on Grade - Materials	11999.17	SF
+1.16	☐	M07.26.00.010	Vapor Barrier at SOG - Material	12599.13	SF
+1.17	☐	M31.63.00.010	CIP RC Pile - Materials	2352	FT

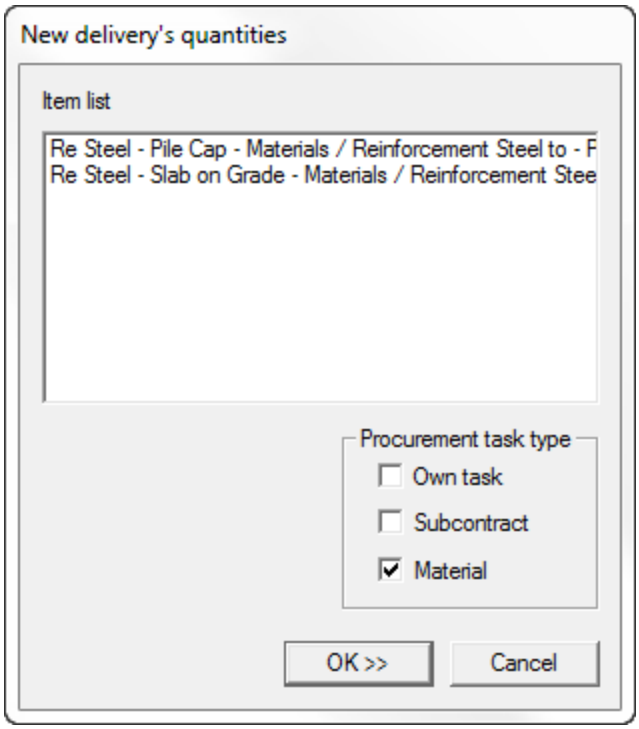
5. Select the materials that should be purchased as a package.

Hierarchy	Approved	Code	Name	Quantity	Unit
-					
-1					
+1.1	☐	LCON001	Concrete Pourer	306.24	*HR*
+1.2	☐	LCON003	Formwork Carpenter	333.21	*HR*
+1.3	☐	LCON004	Rodman	408.87	*HR*
+1.4	☐	LCON006	Concrete Misc. Labor	53.4	*HR*
+1.5	☐	LPIL001	Piling Labor	504	*HR*
+1.6	☐	M03.11.00.060	Erect Forms - Pile Cap - Materials	1680	SF
+1.7	☐	M03.11.00.061	Strip Forms - Pile Cap - Materials	1680	SF
+1.8	☐	M03.11.00.160	Erect Forms - Slab on Grade - Materials	364.22	SF
+1.9	☐	M03.11.00.161	Strip Forms - Slab on Grade - Materials	364.22	SF
+1.10	☐	M03.21.00.060	Re Steel - Pile Cap - Materials	8.17	TONS
+1.11	☐	M03.21.00.160	Re Steel - Slab on Grade - Materials	18.67	TONS
+1.12	☐	M03.31.00.060	Concrete - Pile Cap - Materials	81.67	CY
+1.13	☐	M03.31.00.160	Concrete - Slab on Grade - Materials	311.09	CY
+1.14	☐	M03.35.00.060	Finishing to - Pile Cap - Materials	1400	SF

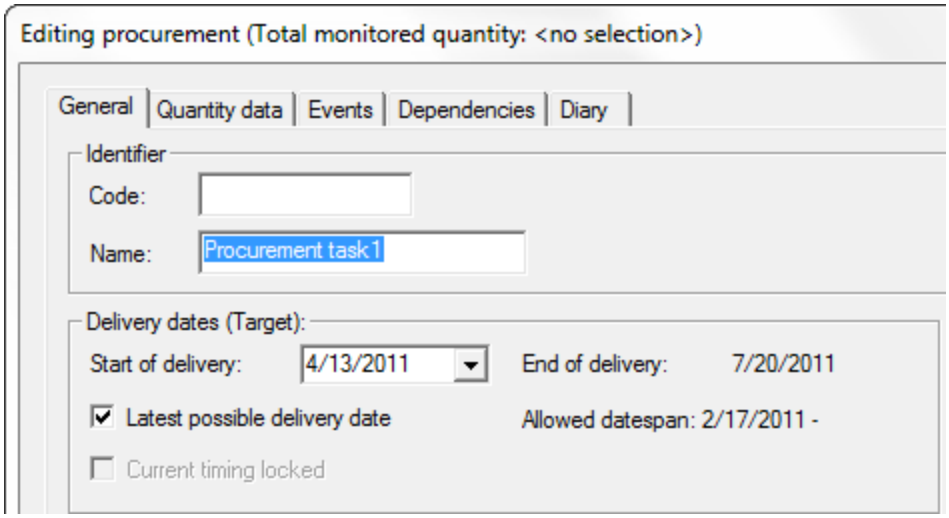
6. Click **Create procurement task**.



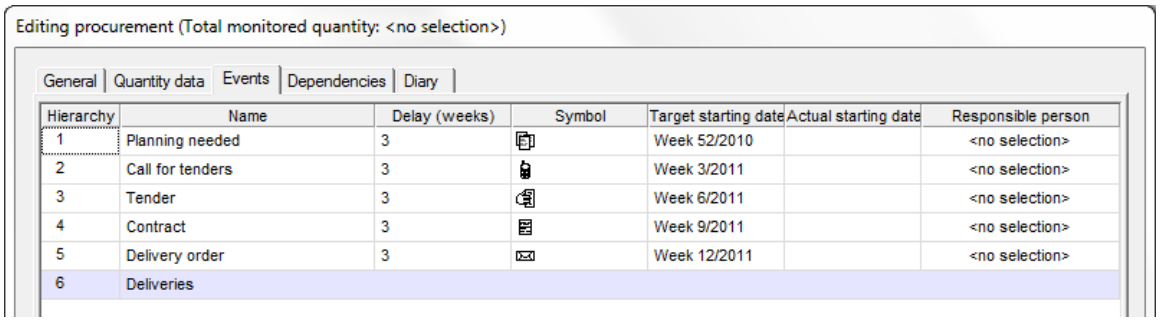
7. In the **Procurement** task type section, select the appropriate type, and then click **OK**.



8. In the **Editing Procurement** dialog:
   - In the **Code** field, enter the code.
   - In the **Name** field, enter the name.
   - In the **Delivery dates (Target)** section, check the dates, which are automatically retrieved from the task information.



9. On the **Events** tab, define the procurement events and required lead time.



Hierarchy	Name	Delay (weeks)	Symbol	Target starting date	Actual starting date	Responsible person
1	Planning needed	3		Week 52/2010		<no selection>
2	Call for tenders	3		Week 3/2011		<no selection>
3	Tender	3		Week 6/2011		<no selection>
4	Contract	3		Week 9/2011		<no selection>
5	Delivery order	3		Week 12/2011		<no selection>
6	Deliveries					

You can monitor the progress of the procurement process in the **Production Controller** view.

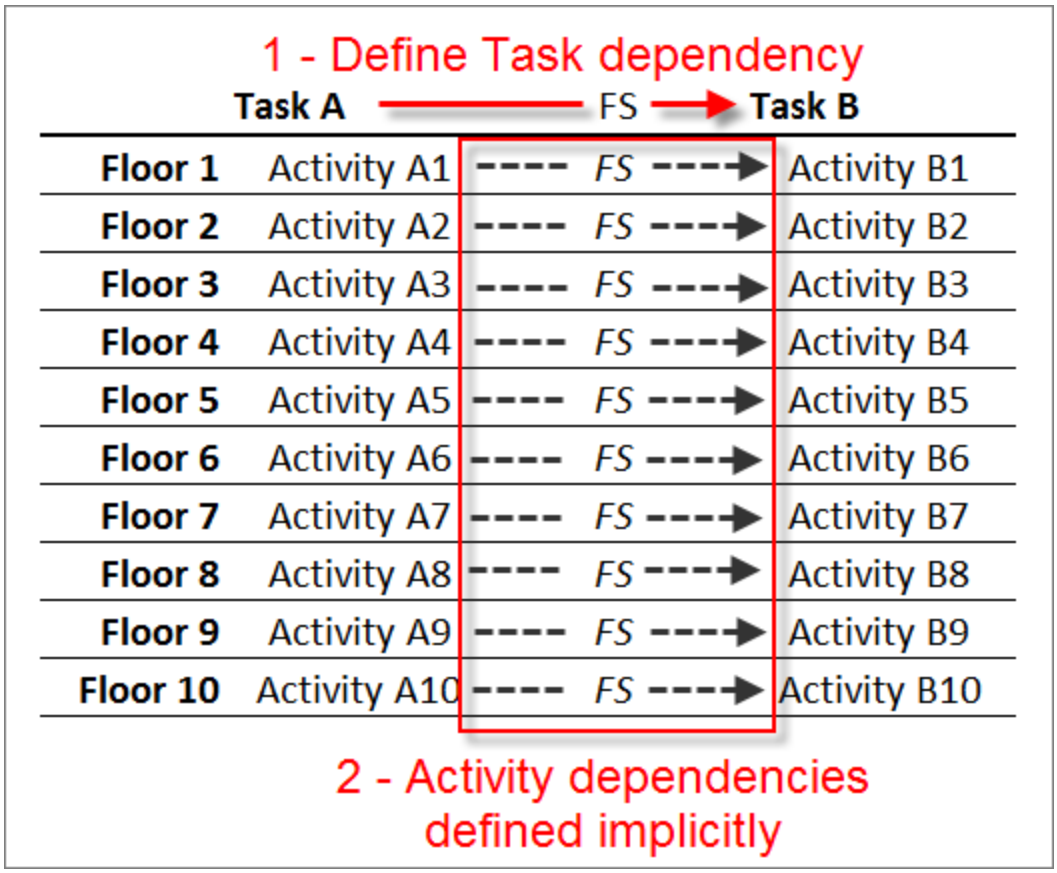
Defining Schedule Logic in Network View

To define schedule logic, restraints between tasks have to be defined. Schedule Planner's Network view provides a powerful way to quickly define the main logic between tasks.

Note: An activity is a task that occurs in a location. Task restraints (dependencies) are automatically defined for all activities of a task.

Example:

Task A occurs in 10 locations and is restrained by a dependency to Task B that also occurs in 10 locations. The 10 activities from both tasks are linked with the same dependency when it is defined between Task A and Task B.

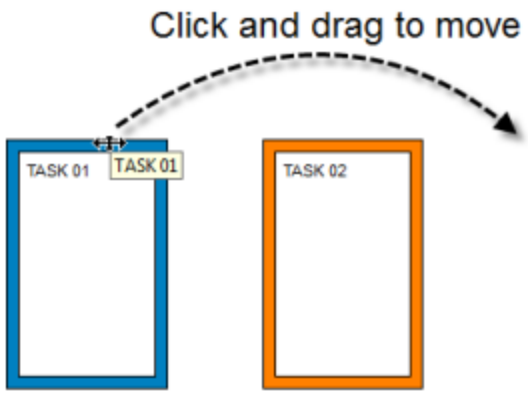


To define the logical connections between tasks in the schedule

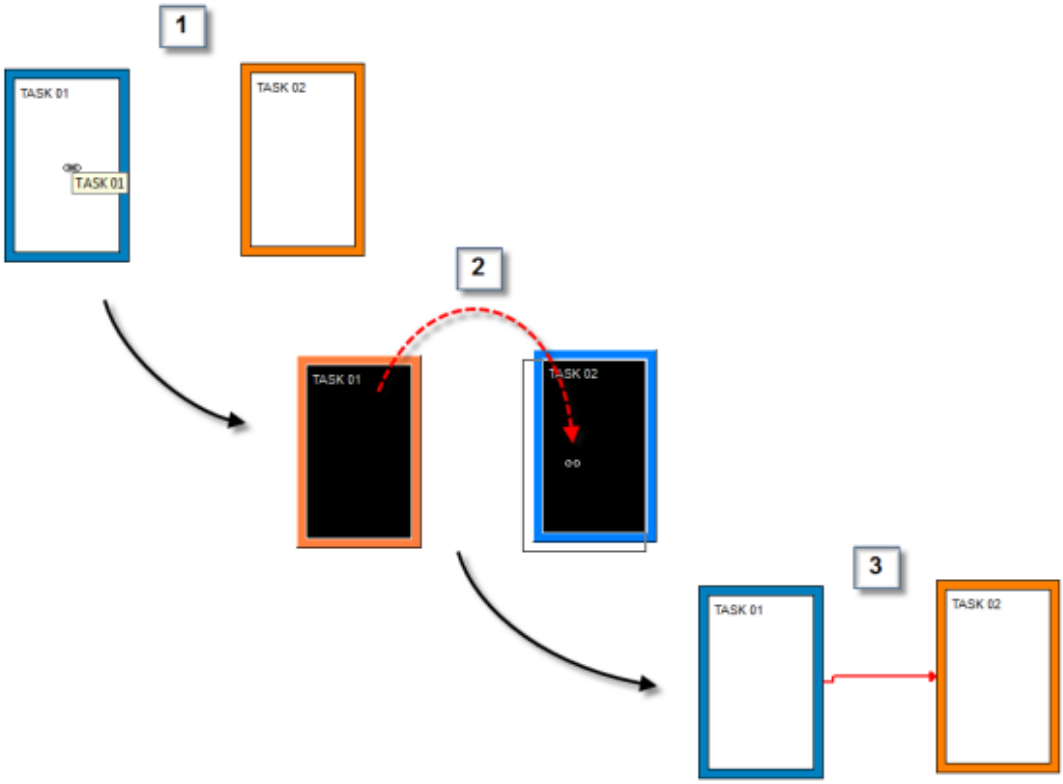
1. Open Schedule Planner.
2. On the left toolbar, click the **Network view** button.

In the Network view, the tasks defined for the project are represented as boxes.

3. To move a box and organize the set of tasks, click the top edge of the box, and drag it to the desired to location.

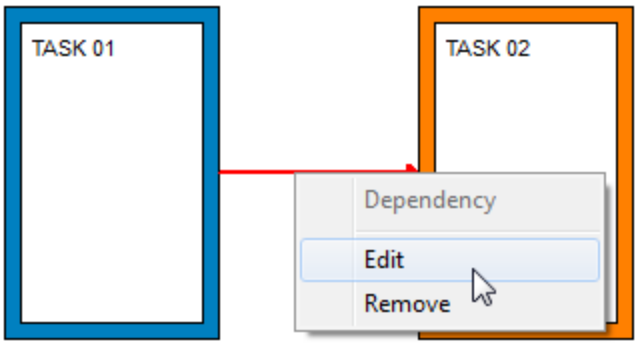


4. To define task relations (restraints), click inside a task box, and drop it on top of another task box.



A red arrow appears to indicate that a finish to start restraint is defined.

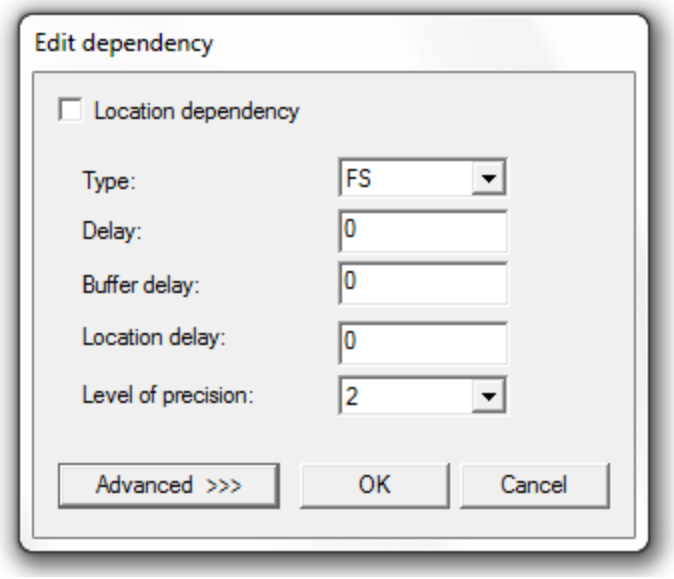
5. To edit the properties of a dependency, right-click the dependency arrow, and then click **Edit**.



6. In the **Edit dependency** dialog, edit the dependency as desired.

   The following dependency types are available:

   - **Finish-Finish (FF)**
   - **Start-Finish (SF)**
   - **Finish-Start (FS, default)**
   - **Start-Start (SS)**
   - **Start-Start AND Finish-Finish (SS+FF)**



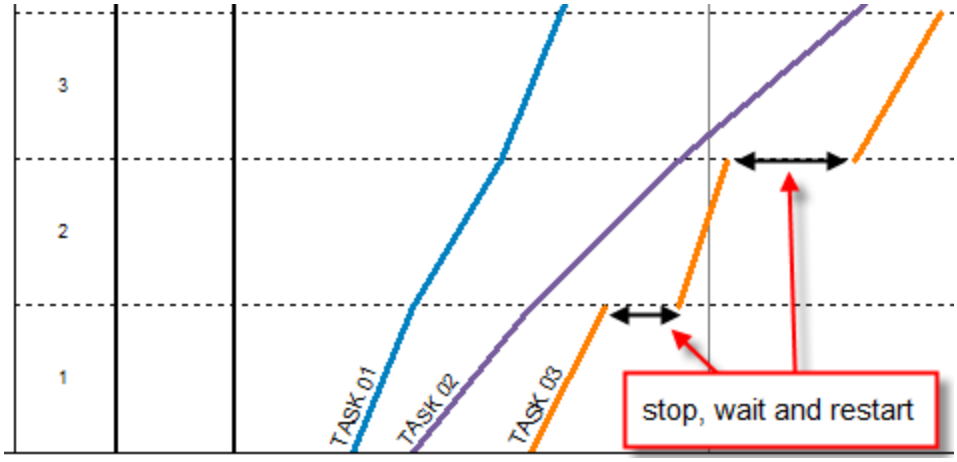
Using "Paced" and "ASAP"

In addition to the "start as early as possible" restraint that can be found in CPM scheduling tools, Schedule Planner contains an option to enforce continuous flow of a task to prevent stop/restarts, which

introduce extra cost and risk to the project.

Example:

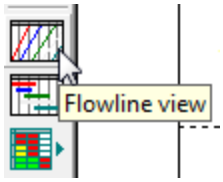
The crew that is working on Task 03 has to stop after completing the work in Location 1, wait, then restart in Location 2, and stop again after completing the work in Location 2.



Schedule Planner uses two internal restraints that prevents this from happening in the plan: "Pace" and "ASAP".

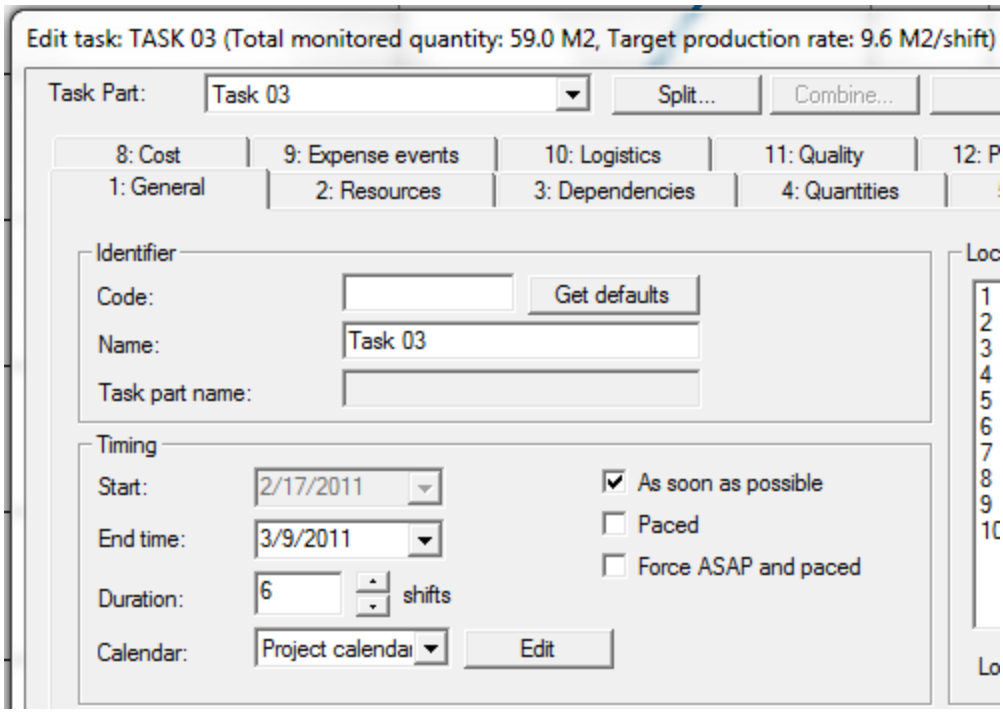
To force the early start and continuous flow of tasks

1. Open Schedule Planner.
2. On the left toolbar, click the **Flowline view** button.

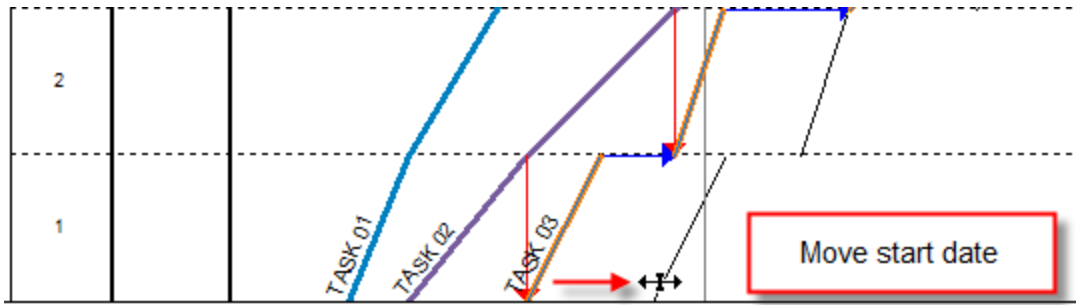


3. Double-click the task that you want to make changes to.

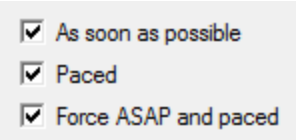
   The **Edit Task** dialog appears.



In the **Timing** section, there are two options that define the behavior of the task as it concerns when it starts and whether or not stops/restarts are permitted. The **As soon as possible** option forces activities to start directly after completion of predecessor activities. If you want to be able to freely move the task to any desired start date to prevent stops/restarts, clear the check boxes for both **As soon as possible** and **Paced**.

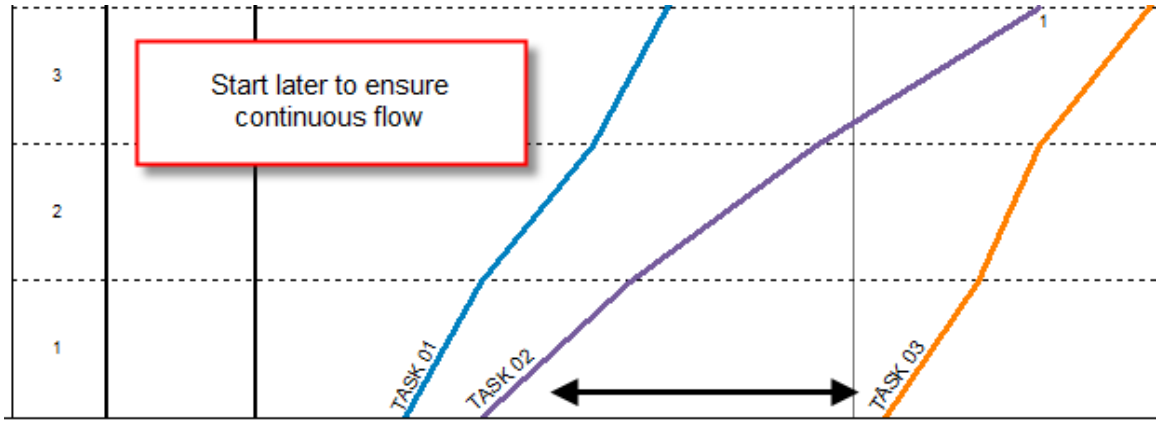


4. To start the task as early as possible AND force continuous flow, select the check boxes for both **As soon as possible** and **Paced**.



The task will now start at the earliest date when uninterrupted work is possible.

In the example below, this means starting later and finishing on the same date.

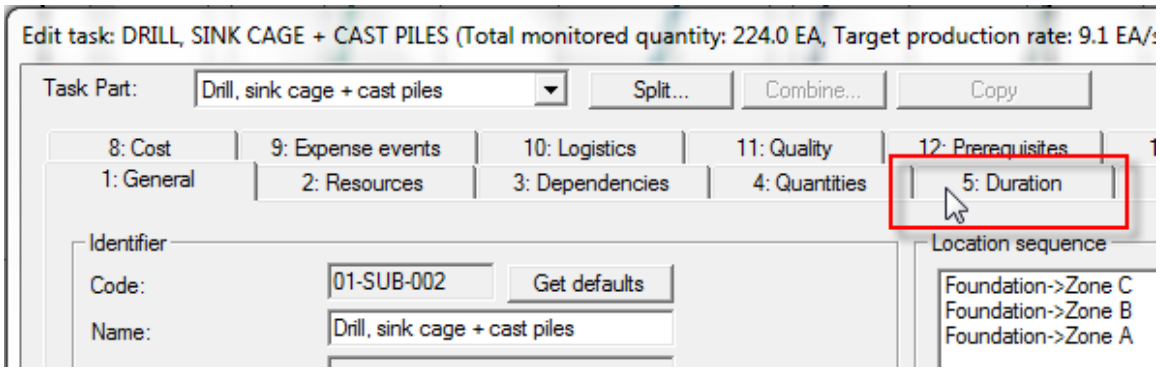


Changing Production Rates and Crews per Location

Activities of the same task may take longer in specific locations of the project, due to accessibility or the higher complexity of those locations. To account for the additional time that is required to complete these locations, the production rate can be changed per location. For example, pouring concrete on the 40th floor takes more time than pouring the same concrete on the 3rd floor.

To plan for varying production rates per location

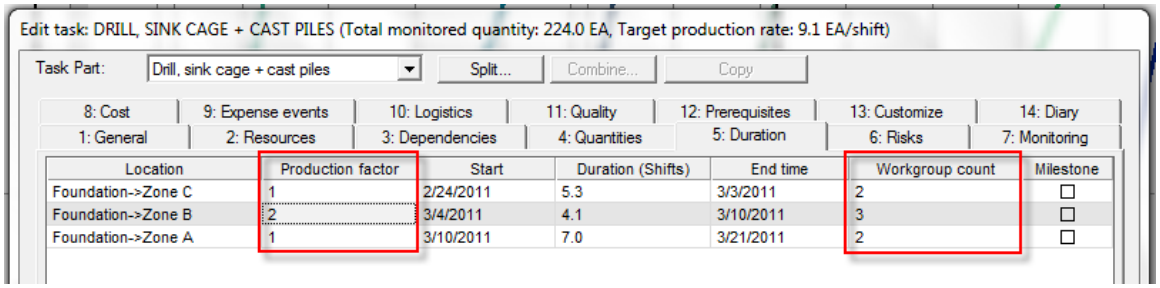
1. Open Schedule Planner.
2. To open the task for which you want to change the production rates for specific locations, double-click it.
3. Click the **Duration** tab.



4. Edit the default value as required.

   The default production factor is <1>.

   If needed due to complexity or amount of work, additional crews can be added per location for optimal flow of work.



Adding Buffers

To accommodate the risk that a predecessor task will disturb a successor task or to schedule time for post-activity curing, a buffer can be added as part of a defined dependency. For more information defining dependencies, see "Defining Schedule Logic in Network View" on page 446 and "Defining Task Restraints in Flowline View" on page 436.

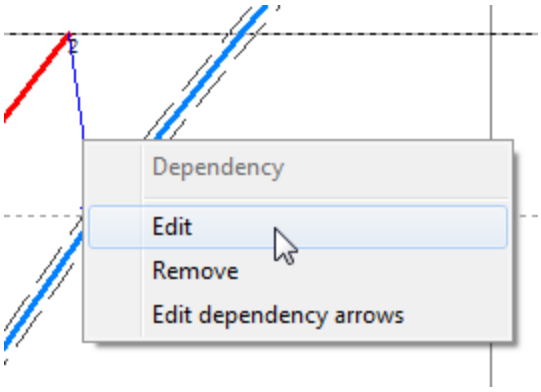
To add buffers between Tasks in your schedule

1. Open Schedule Planner.
2. In Flowline view, select the task for which a buffer should be defined.

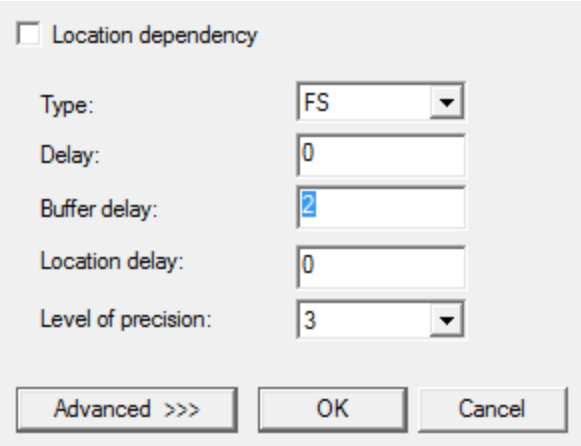
   All dependencies of the task are shown. Blue dependency lines are activity (location-specific) dependencies; red dependency lines illustrate the dependency.

   If the dependencies are not shown, see "Using the View Filter Settings" on page 472 for information on how to make dependencies visible.)

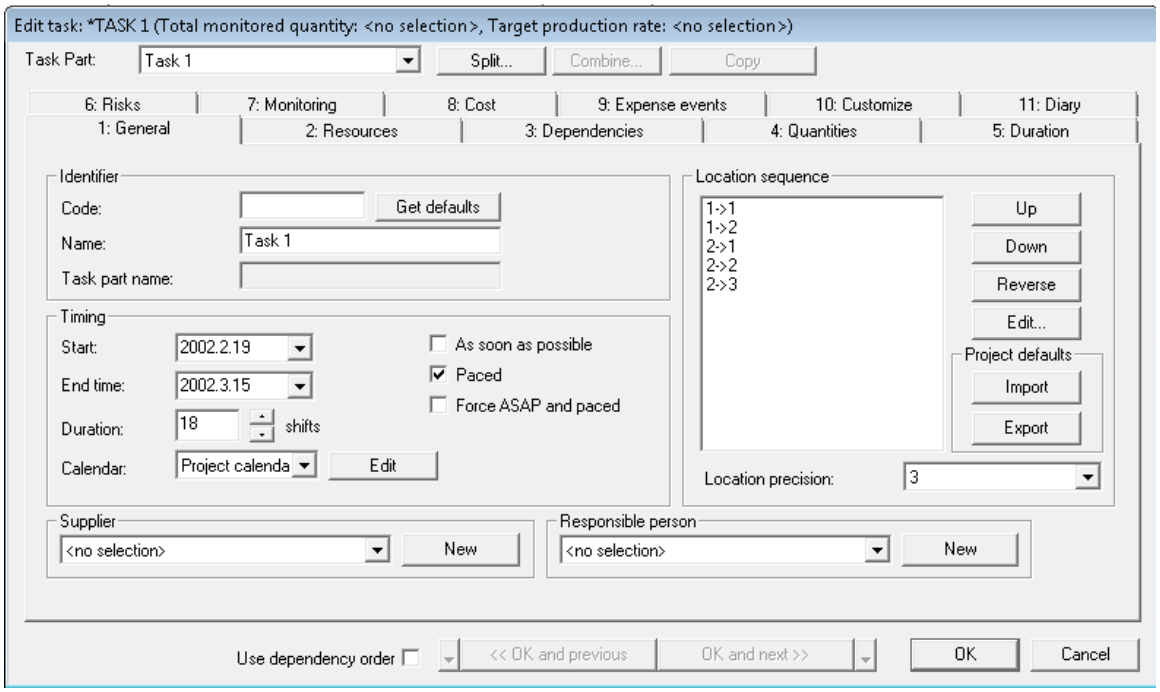
3. Right-click a dependency, and then click **Edit**.



4. Enter a value in one or both of the following fields:
   - **Delay:** Number of calendar fields.
   - **Buffer delay:** Number of work days.



Edit Task



“Edit task” dialog box is used to create or edit a schedule task via 15 schedule task sub-dialog boxes. If the task does not have quantities, then a smaller Edit Task dialog is shown - the normal one is then accessed from the “Advanced” button.

There are a variety of operations that can be performed using the "Edit task..." dialog box:

- To access the 15 schedule task sub-dialog boxes: Select the relevant tab.

  Note: The number and content of the tabs varies, depending on the selected software options. The numbering will vary because non-activated features will be hidden.

- To split schedule task: Use the split button.
- To combine a previously split schedule task: Use the Combine button.
- To select of parts of a split schedule task: Use the Task bat drop list.
- To confirm new schedule tasks or changes to schedule task:

  Left-click either:

  <<OK and previous, to open the previous schedule task,

  OK and next>>, to open the next schedule task,

  Or

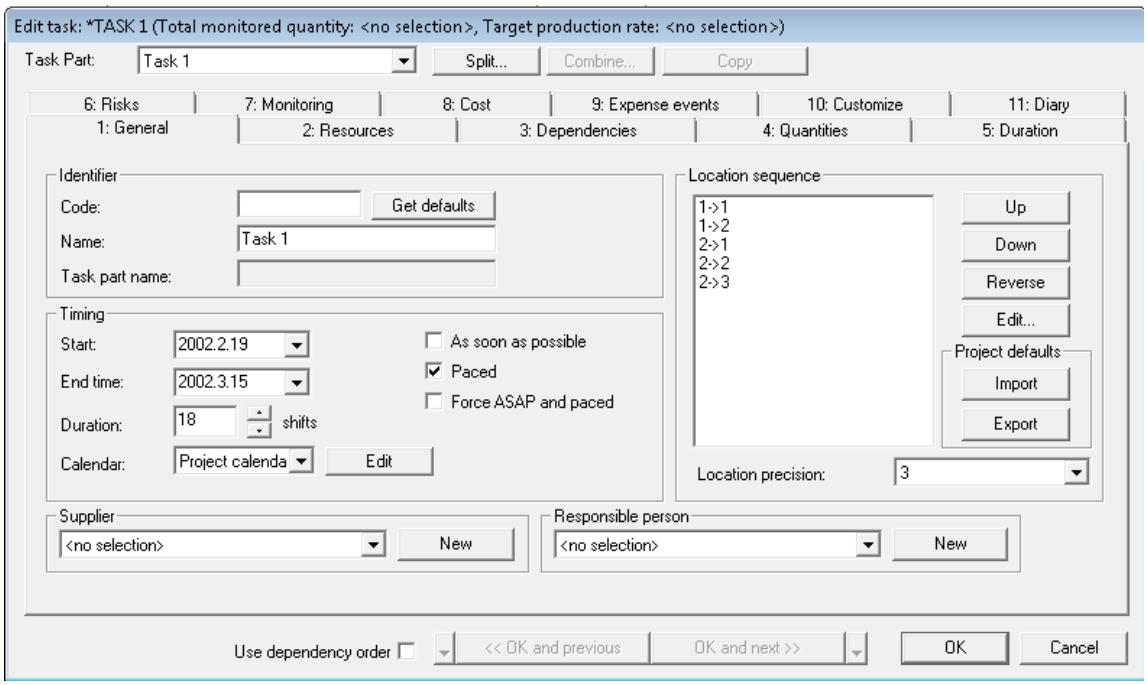
  OK, to return to he original window from which the edit schedule task was accessed.

- To cancel new schedule tasks or changes to schedule tasks: Left-click cancel to return to the original window from which the Edit Task dialog box was accessed.

Note: The Use dependency order command also appears in every tab dialog boy and, when checked, allows access to schedule tasks in the order of succession i.e. dependency.

Tab 1: General

The “Tab 1 General” sub-dialog box displays broad parameter information for each schedule task.

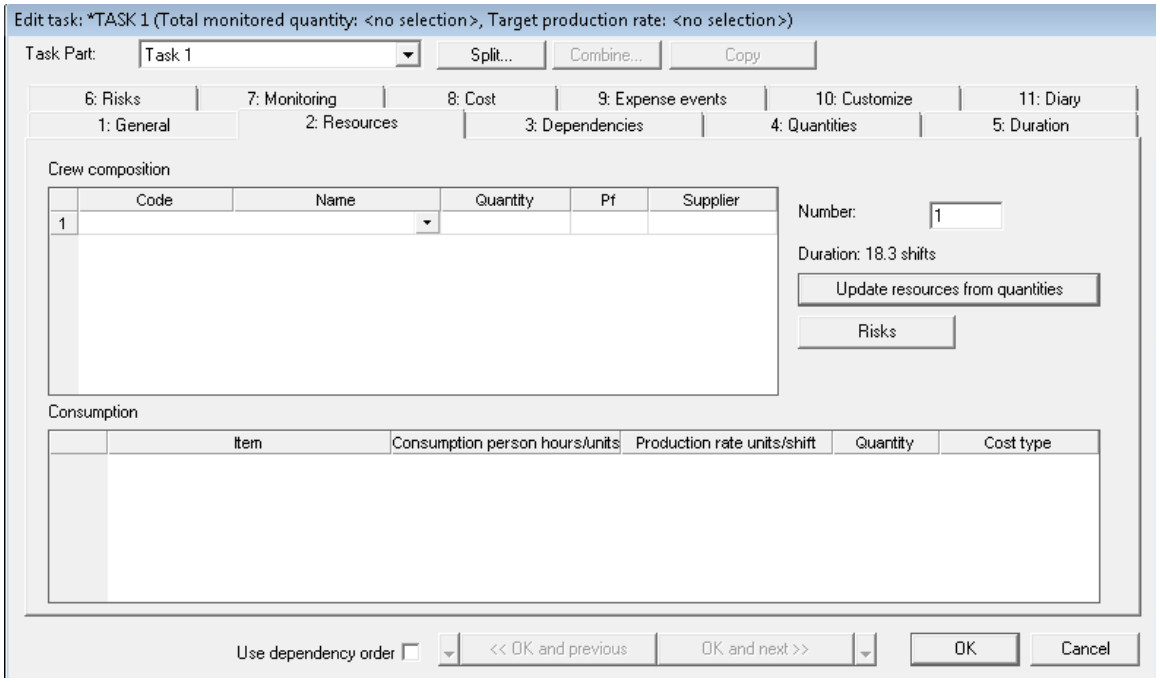


Identification:	Enables the schedule task to be identified by **Code** and **Name**. **Get defaults:** Allows the user to select any task from a template project and to import selected information (e.g. resources, dependencies, etc.).

Timing	**Start:** The expected schedule task commencement date. The start date does not affect the duration of the schedule task. **End time:** The expected schedule task finish date. Changing this will affect the duration of the schedule task. **Duration:** The expected duration, in number of shifts, to complete the schedule task. **Calendar:** The default project calendar will be automatically selected unless another task calendar is selected from the drop-down menu, or a new task calendar is created by using the "Edit" button.
Work continuity settings check boxes:	**As early as possible:** Checking this box will schedule the schedule task to be started as early as possible in each location, based on its dependencies. **Paced:** Checking this box will schedule the schedule task to be carried out in a continuous manner, from location to location, without any interruption to resources. **Forced ASAP and paced:** Checking this box forces the schedule task to be completed in a continuous manner, with the earliest start date based on its dependencies.
Location sequence:	The "location sequence" or "Location completion order" affects location dependencies where the uppermost listed location is performed first and the bottom last. The locations can be reordered by utilizing the **Up**, **Down** and **Reverse** buttons.
Location precision:	The drop-down menu contains the location hierarchies created for the project. The selected precision affects the location precision used in dependencies and how the task is displayed in control charts.
Project defaults:	Enables a sequence of locations for a schedule task to be exported or imported to other schedule tasks. **Import:** Select to import. **Export:** Select to export.

Tab 2: Resources

The “Tab 2: Resources” sub-dialog box is used to select the workgroups and resources with which the schedule task will be completed.



Consumption:

The following fields are calculated, so no data entry is required: **Item**, **Consumption person hours/unit**, **Production factor units/shift**, **Quantity** and **Cost type**.

Crew composition:

Identifies the different work crews and their composition required to complete the schedule task.

Code: Identification code.

Name: The name of the crew.

Quantity: The number of people in the crew.

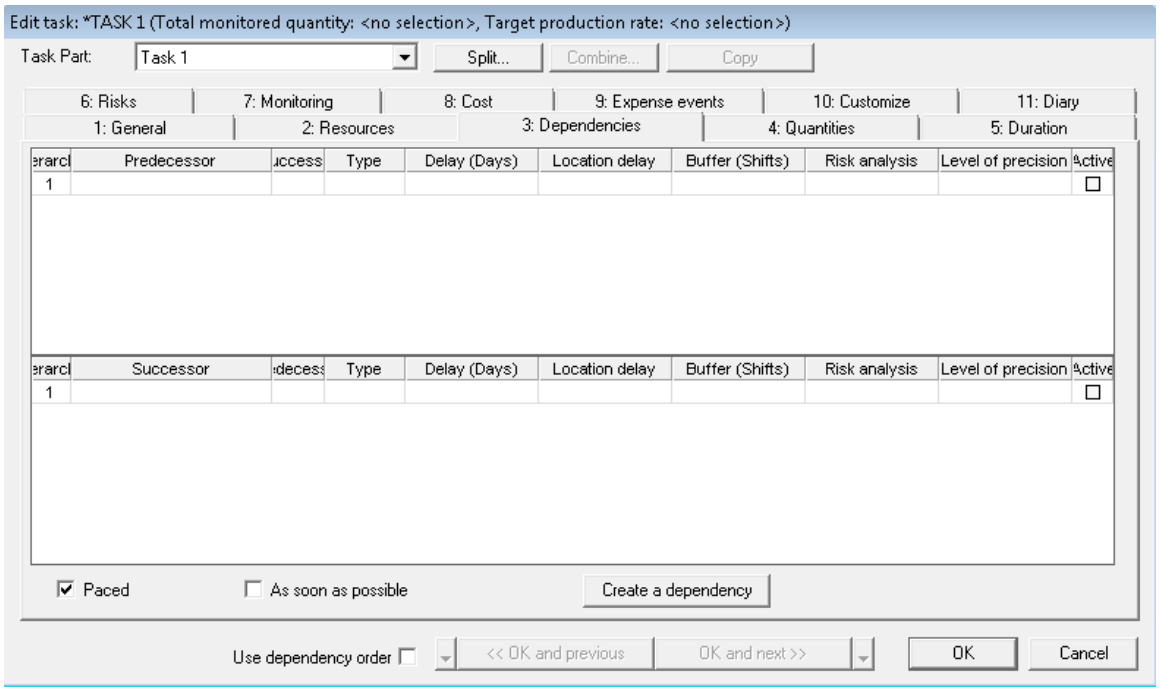
Distribution of production factors: The minimum, most likely, and maximum production factors which are used in risk management.

Number: The number of crews required to finish the schedule task on time.

Supplier:	The name of the supplier who is providing the crews for the schedule task. Use the drop-down menu to select a previous supplier or create a new supplier by selecting the “New” button.
Responsible person:	The person responsible for ensuring the schedule task is completed satisfactorily and on time. Use drop-down menu to select a previous responsible person or create a new person by selecting the “New” button.

Tab 3: Dependencies

The “Tab 3: Dependencies” sub-dialog box determines the logical order of the schedule task in relation to preceding and succeeding schedule tasks.



The “Dependencies” sub-dialog box consists of an upper dialog box related to a schedule task “Predecessor”, where the predecessor is chosen from a drop-down menu, and a lower dialog box related to a schedule task “Successor”, where the successor is chosen from a drop-down menu. The dependencies are easier to insert in the “network view” or in the “Flowline”.

Hierarchy:	This is calculated field.

Predecessor:	The schedule task that logically precedes the current schedule task. Select from the drop-down menu.
Successor:	The schedule task that logically follows the current schedule task. Select from the drop-down menu.
Type:	Select from the drop-down menu where:
	FS: The predecessor must finish before the successor can start.
	FF: The successor cannot finish until the predecessor has finished.
	SS: The successor can start when the predecessor has started.
	SF: The successor can finish when the predecessor has started.
Delay (Shifts):	The duration of the link between the two schedule tasks.
Location delay:	A special Layer 4 logic relationship.
Buffer (shift):	A special delay designed to absorb production variability, which is used like a Delay, when planning a schedule, but in contrast, may be absorbed by actual delays in the control phase. Refer to Risk Management
Risk analysis:	Refer to Risk Management.
Level of precision:	Used to set the accuracy to the same r a lower level as the schedule task accuracy e.g.: to set Layer 2 logic. Must be selected.
Active:	Used to select specific locations where the link between schedule tasks is active, e.g. to set Layer 5 logic.
Work continuity settings check boxes:	Use as required as per Tab 1, General.
The dependency should preferably be created or edited using the *Dependency* dialog box.	

To open the Dependency dialog box:

Left-click the Create a dependency button

Or

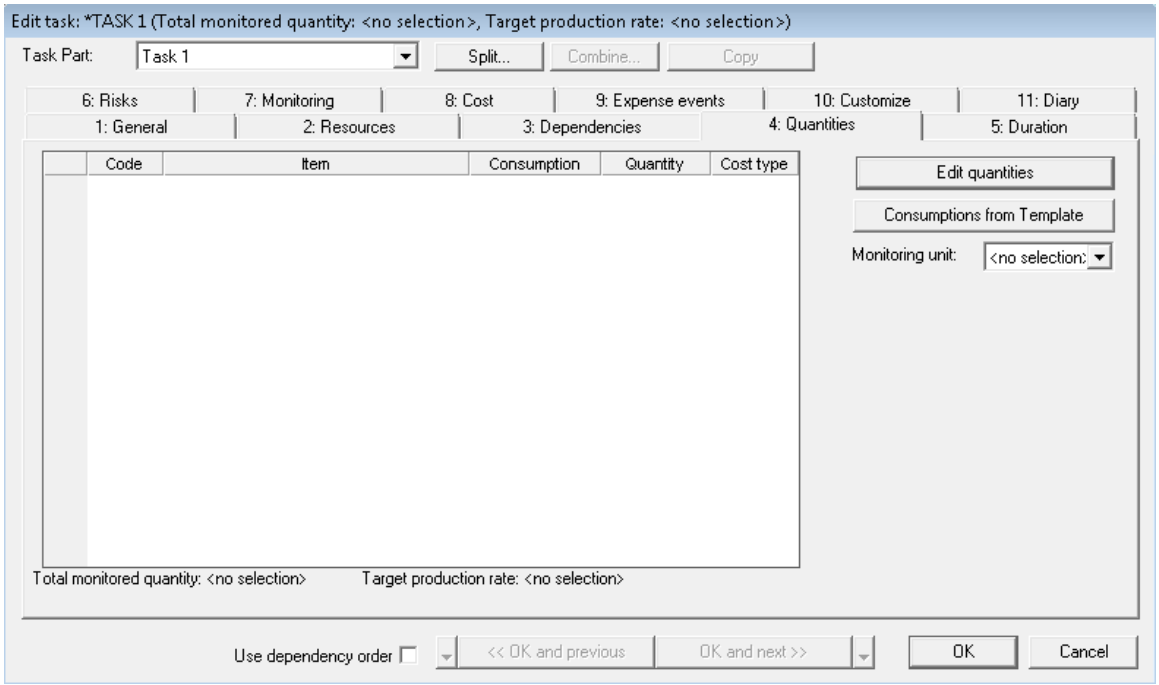
Double-click on any cell in an existing dependency.

The “Dependency” dialog box uses the same fields as the dependencies sub-dialog box. For definitions and functions, refer to the previous table. This is the preferred form of entry for dependencies, as it is easier to use; for example, only valid selection options for “Level of precision” are available.

Most importantly, this dialog box can be used to create Layer 5 logic links between tasks by checking the box labeled “Location dependency”. Selecting this option allows the selection of a single location from the predecessor/successor as the basis of the link. For example, Fit-out might start on level 1 after the completion of the windows on level 5.

Tab 4: Quantities

The “Tab 4: Quantities” sub-dialog box contains a summary of the total quantities for all items included in the schedule task.



Code:	To identify the schedule task.
Item:	To identify the schedule task.
Consumption: (person hours per unit)	Describes how many hours it takes to complete one unit of work.

Quantity:	For example, piling might take 0.07 hours per meter, cutting off piles might take 0.09 hours each, and placing reinforcement might take 0.01 hours per kilogram or 10 hours per tonne. **Note:** When the quantity is not known, and the number of days of work is estimated, it is possible to schedule in days by setting the consumption to shift length and the unit to days. The total quantity required to complete the schedule task.
Cost Type:	Refer to **Cost**.

The “Quantities” dialog box also provides the following:

Total controlled quantity: A calculated field giving the total quantity required to complete the schedule task.

Target production rate: A calculated field giving the number of consumption units required per shift to complete schedule task.

Monitoring unit: A drop-down menu that enables different units to be selected to monitor the schedule task production rates used to determine if the calculated production rate is reasonable. The selected unit then becomes the unit that is monitored in the control phase. By choosing that unit Schedule Planner will automatically select all items with that unit as control items, and these will be highlighted in blue. If a unit is not selected, the program will select a unit automatically.

To remove or add to item to control:

Right-click the item.

Consumptions from template: Imports consumptions, by **Code** and **Name**, from a similar previous project which can be applied to this schedule task.

The “Bill of quantities” window “Add method:” dialog box requires the following data to be inputted:

Quantities are allocated via the “Bill of quantities” window, where data is entered via the “Add method:” dialog box.

To open the “Add method” dialog box:

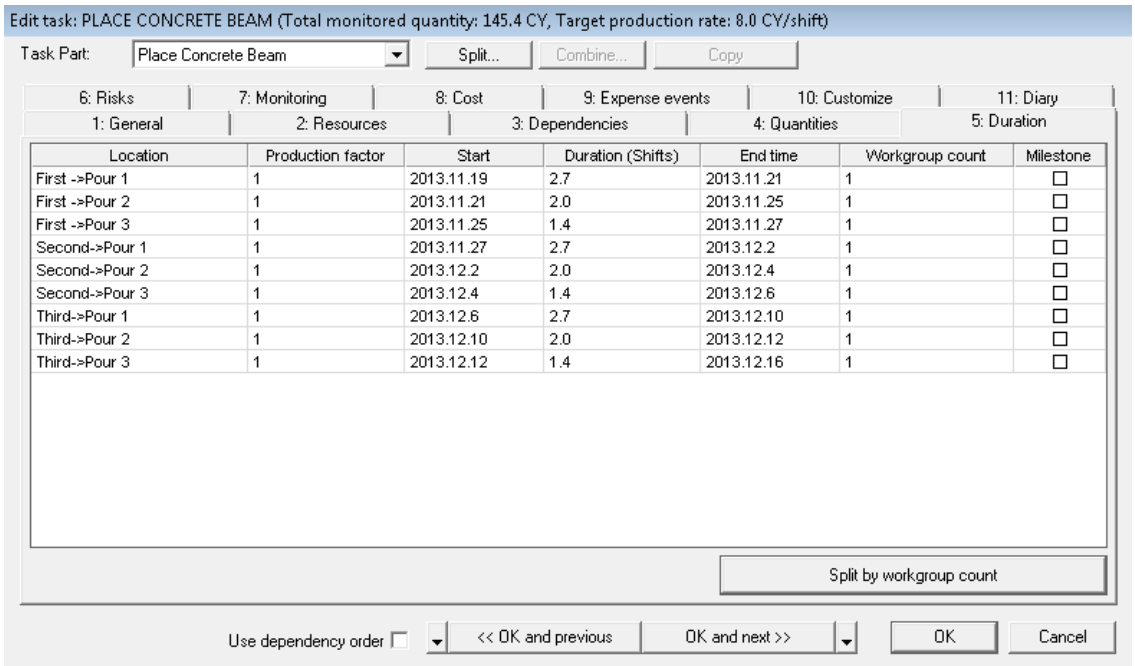
Left -click the “Bill of Quantities” button.

Code:	To identify the schedule task.

Item:	To identify the schedule task.
Consumption: person hours per unit:	Describes how many hours it takes to complete one unit of work.
Currency per units:	The cost per quantity unit (for example, the cost per M 2 of plasterboard walls or the cost per shift for items measured in shifts).
Currency:	This is the total cost for the schedule task, and is calculated automatically.
Cost type:	Refer to the section on Cost.
Quantity Location columns:	The consumption units required to complete each location.
Unit:	The base unit being used, as selected from a drop-down menu.
Precision:	The precise location for a schedule task and the distribution of quantities should be chosen to match the precision selected in Tab 1; General. A lower level of precision can be selected here and the quantities will be stored as entered. However, Control 2008 will roll them up and apply them to the level selected in Tab 1; General. **Note:** When this happens and a lower level of precision for the schedule task is required, select the lower level of precision in Tab 1. This will then open a dialog boy asking how the quantities will be distributed.
Copy all and Paste function:	Refer to Managing Quantities with a spreadsheet.

Tab 5: Duration

The “Tab 5: Duration” sub-dialog box summarizes the factors that affect the duration of a selected schedule task in each location.



Location:	Locations are shown at the schedule task precision level, and can only be edited via the “General” tab.
Production factor:	Describes the relative difficulty of a schedule task, where a production factor of one refers to a “normal” production or work rate. A less efficient or more difficult site is rated less than one and a more efficient or less difficult site is rated greater than one. Changing the production factor alters the duration of the schedule task, and changes are recorded in the “Feasibility Log”.
Start:	The commencement date of the schedule task.
Duration (Shifts):	The expected duration, as a number of shifts, to complete the schedule task.
End time:	Automatically calculated by adding the duration to the start time.
Milestone:	Enables the selection of the location as a milestone for that task.

Tab 13: Customize

The “Tab 13: Customize” sub-dialog box allows changes to the appearance of a schedule task in various program windows.

Schedule view:	Drop-down menu: Contains a list of automatically available or user generated (custom) view settings for which any changes will be applied. No other views will be changed.
	Copy button: Copy settings to all schedule views.
	Color: To select the color for this tasks line.
	Check boxes: Schedule task belonVico to the master schedule. Show in the Control chart. To display or hide the task in the Control view.
Gantt char settings:	Check boxes: Show in Gantt chart: To display or hide the task in the Gantt view. Show resources. To display or hide the number and type of resource crews in the Gantt view. Show a legend beside the bar in the Gantt view.
	The lowest level to display drop-down menu: Limits the display of the location breakdown in the Gantt view.

Customize Flowline view:	Check boxes: Show in Flowline: To display or hide the task in the Flowline view. Show resources: To display or hide the number and type of individual resources after each Explanation text in the Flow- line view. Show workgroup count: To display or hide the number of resource crews in the Flowline view (At the top end). Number of explanation texts: It is possible to display the task name in each location by selecting a task and dragging it to the required location. This option sets the number of sets of texts displayed. Font button: Used to change the Explanation font text. Line width in pixels: Sets the width of the task line. Order: Choose the display order from Ascending, Descending or Automatic (follows the task sequence).

Entering Schedule Task via the Edit Task

When entering a new schedule task via the “Edit task” dialog box it is best to follow the following sequence:

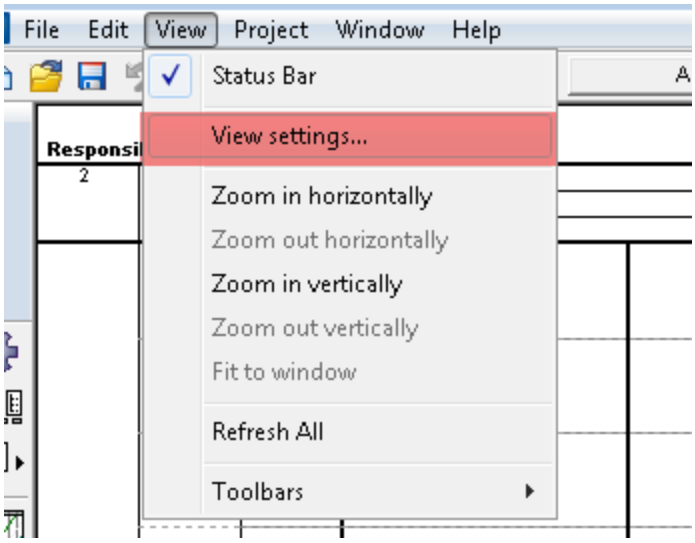
1. Open the 'Tab 1: General' dialog box
    - Enter the schedule task Code and *Name*
    - Set the Location precision, i.e. the accuracy to be used by he scheduling system
    - Select the appropriate *Work continuity* settings
    - Select the appropriate calendar
2. Open the 'Tab 4: Quantities' dialog box:
    - Check it matches the level of precision already set in the 'Tab 1 General' dialog box.
    - Enter the relevant data via the *Bill of Quantities* button
3. Open the 'Tab 2: Resources' dialog box:
    - Allocate resources, including the optimum crew configuration and number of crews required, to achieve a workable schedule.
4. Open the 'Tab 3: Dependencies' dialog box:
    - Enter the relevant data using the Create a dependency button

5. Open the 'Tab 5: Duration' dialog box:
    - Adjust the production factor as necessary, to allow for any potentially slower or faster work due to anticipated variations in local complexity. For example, the production factor may be used to model learning effects.

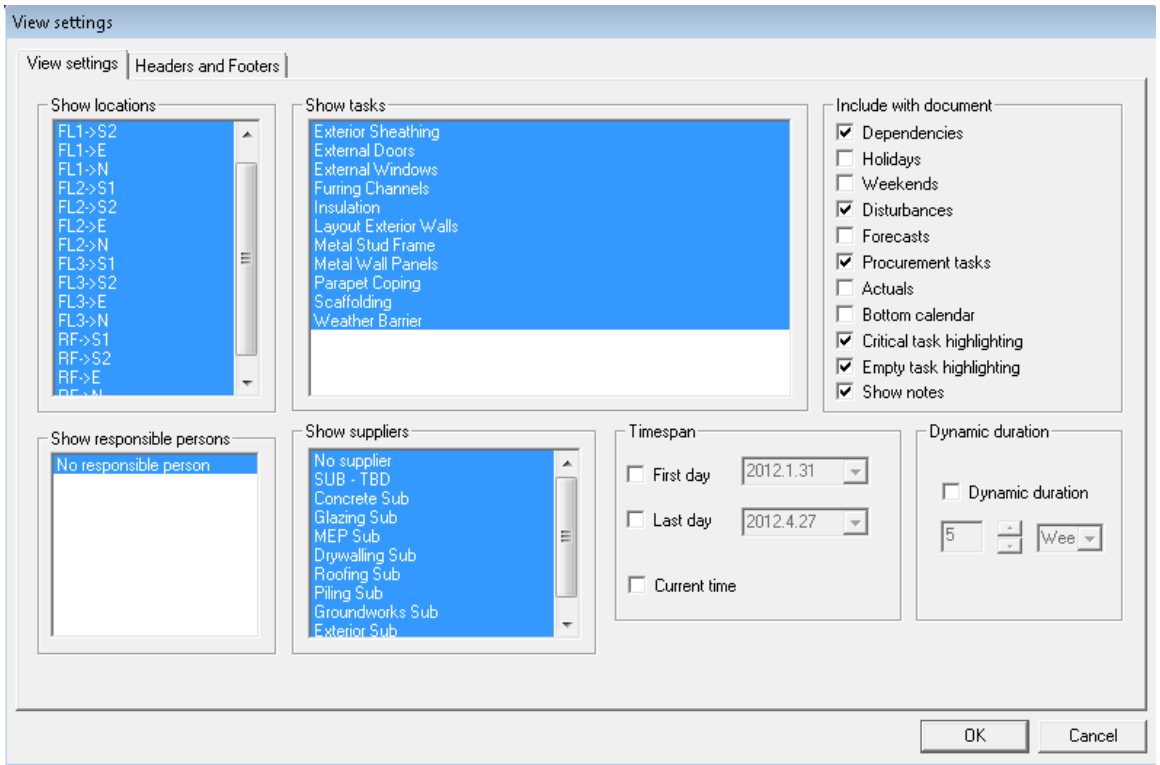
View Settings

Use the View setting to customize your schedule planner showing only the relevant information of your schedule in the time. In the View settings you can filter the locations, tasks, calendar, suppliers, etc.

To open View settings dialog, expand the View menu item and click on 'View Settings...'



The View settings dialog appears



View Items	Description
Show Locations	Select the locations you want to be visible. Every non selected item will be automatically hidden.
Show Tasks	Select the tasks you want to be visible. Every non selected item will be automatically hidden.
Show responsible person	Filter the tasks based on the responsible person what is defined separately for each task in the Edit Task dialog.
Show Suppliers	Suppliers are only visible in Resource graph and Resource registry view. They can be hidden in both of these views by turning off the visibility in the View settings.
Timespan	Use the Timespan to focus on the relevant period of the schedule.
Include with document	Check the items you want to make visible.

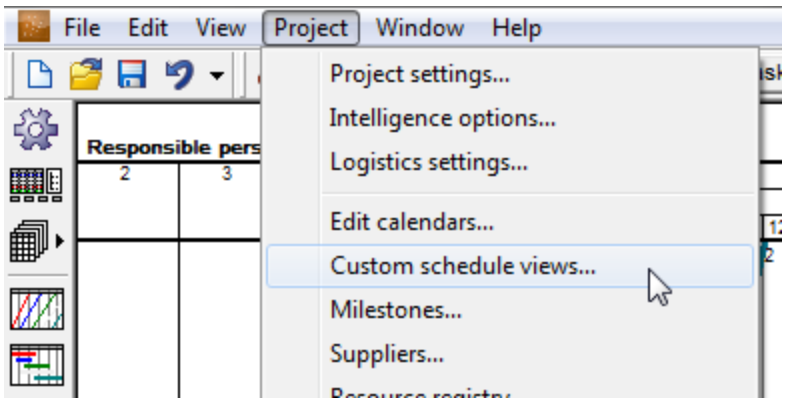
View Items	Description
Dynamic duration	Use it to set up the visible period of the schedule.

Creating Custom Schedule Views

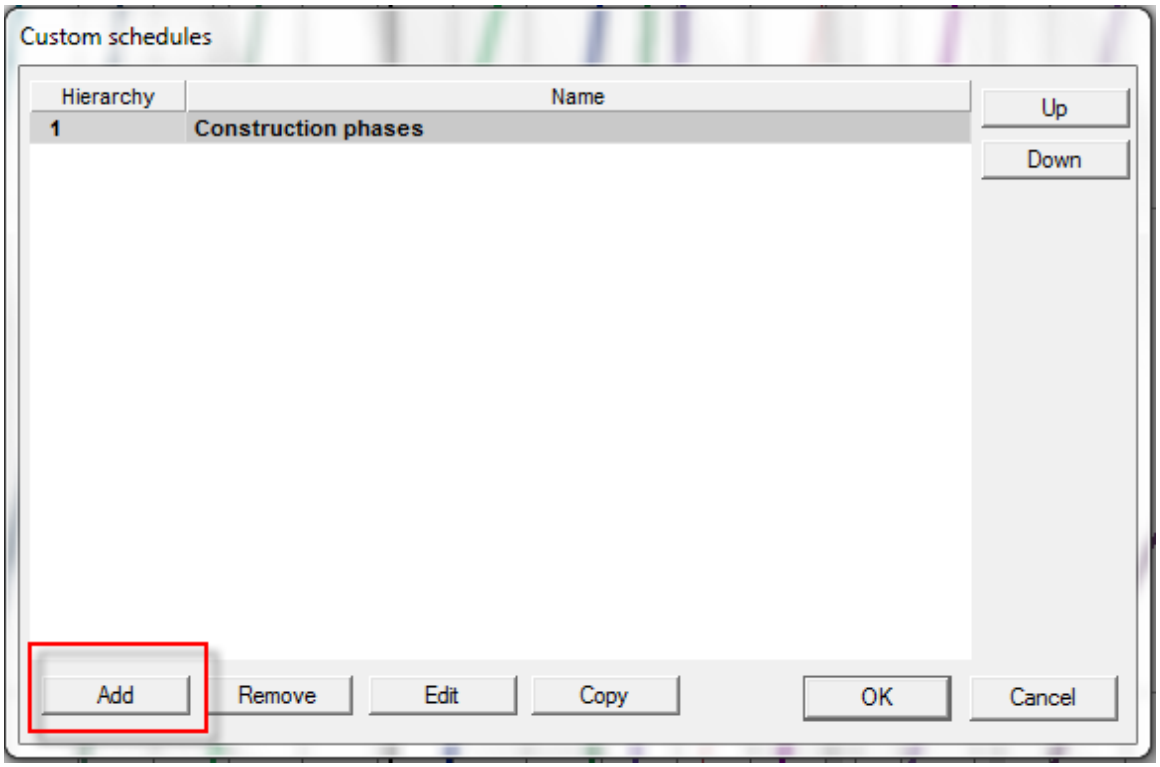
Custom schedule views are named filters that can be opened from the toolbar.

To define and use custom schedule views

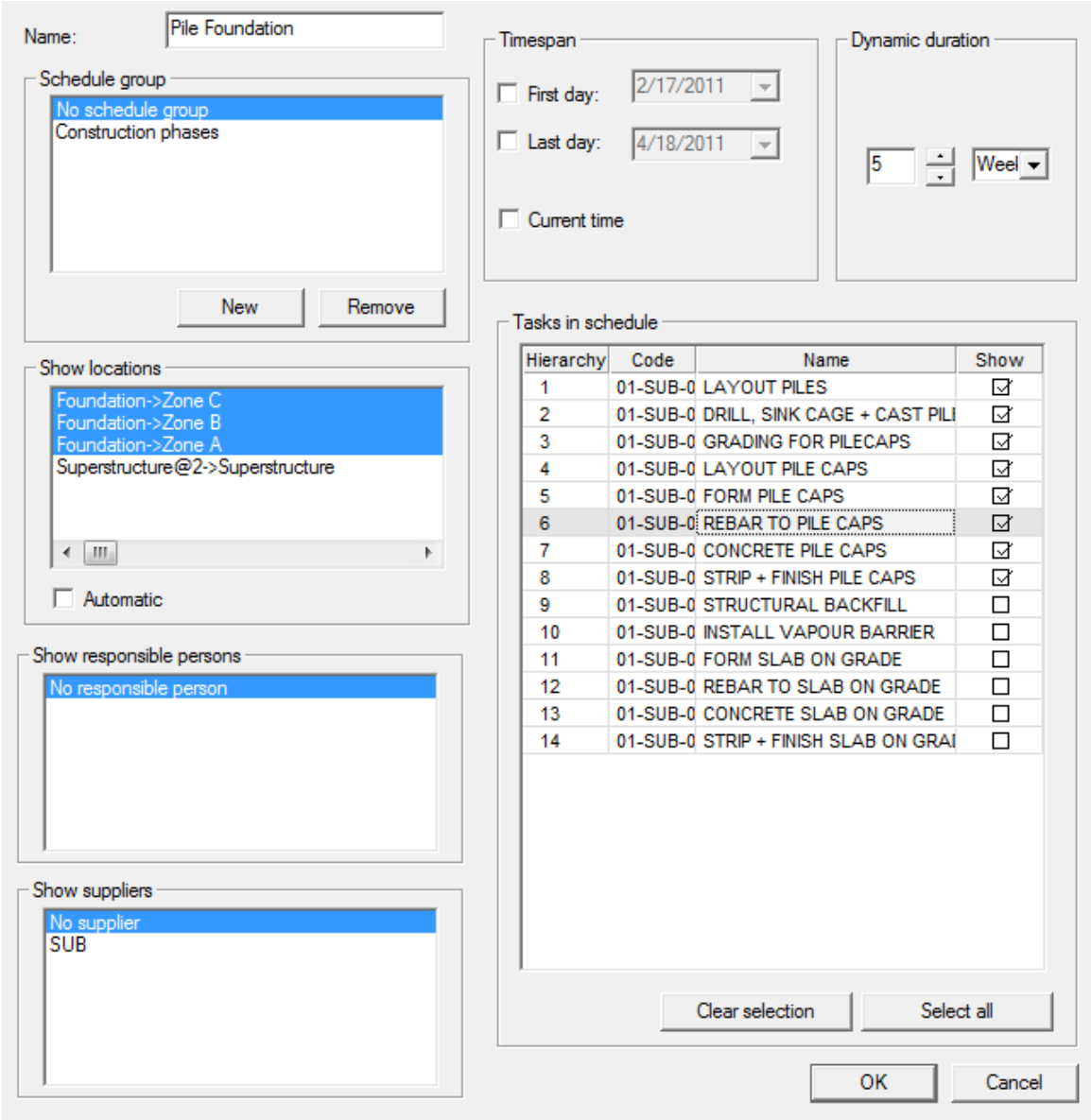
1. Open Schedule Planner.
2. In the **Project** menu, click **Custom schedule views**.



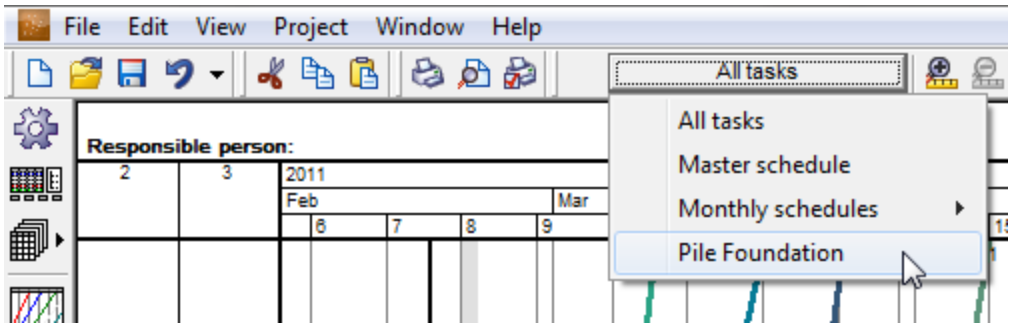
3. In the **Custom schedules** dialog, click **Add**.



4. In the **Custom schedules** dialog, select the following items in which the custom view should be listed:
    - Schedule group
    - Locations
    - Tasks



5. To save the custom view, click **OK**.
6. On the toolbar, activate the new custom view from the view selector.

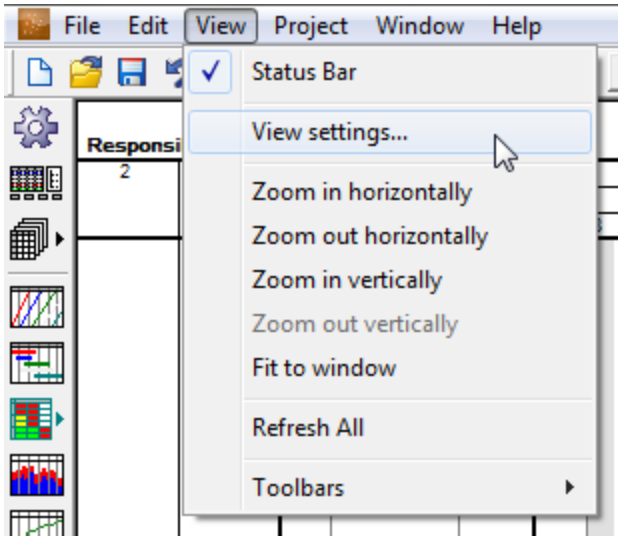


Using the View Filter Settings

Large projects contain many tasks, locations, and dependencies. You can define targeted views of the schedule information.

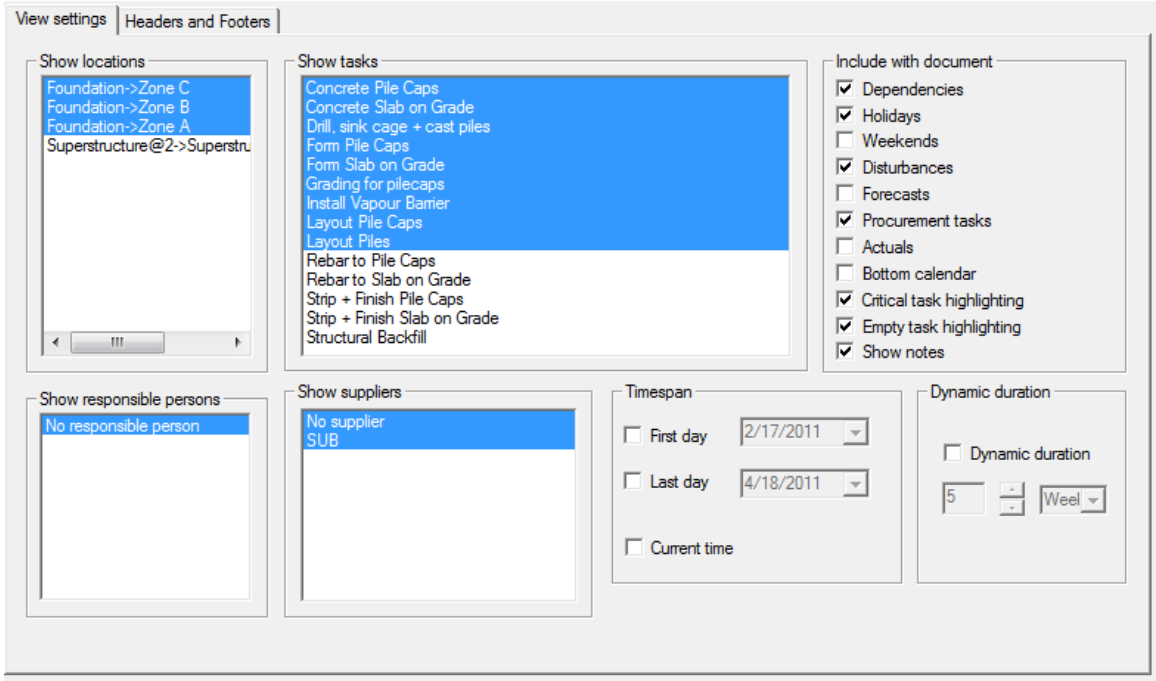
To optimize the schedule view using filters

1. Open Schedule Planner.
2. In the **View** menu, click **View settings**.



3. In the **View settings** dialog, select the items that you want to be visible.

   The **View settings** dialog contains filter and visibility settings for locations, tasks, timing, and schedule data. You can select multiple items by pressing either the **Shift** key or the **Ctrl** key while clicking on desired items.



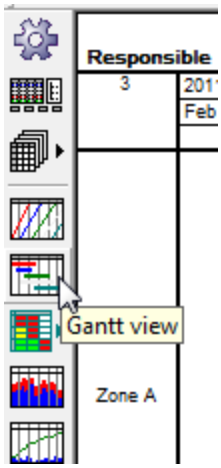
4. Click **OK**.

Viewing and Sorting the Gantt Chart

In addition to the Flowline view, Schedule Planner provides a Gantt view that can be used to view the schedule in a traditional bar chart format.

To use the Gantt chart view in Schedule Planner

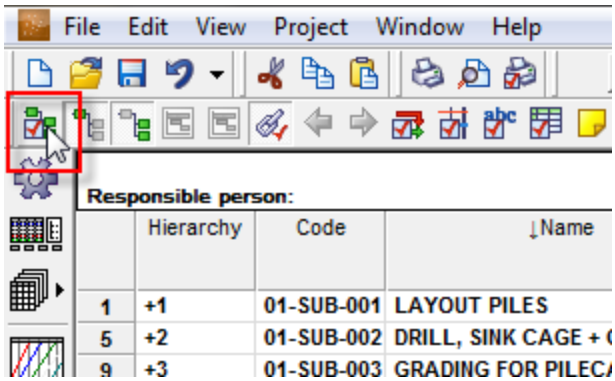
1. Open Schedule Planner.
2. On the left toolbar, click the **Gantt view** button.



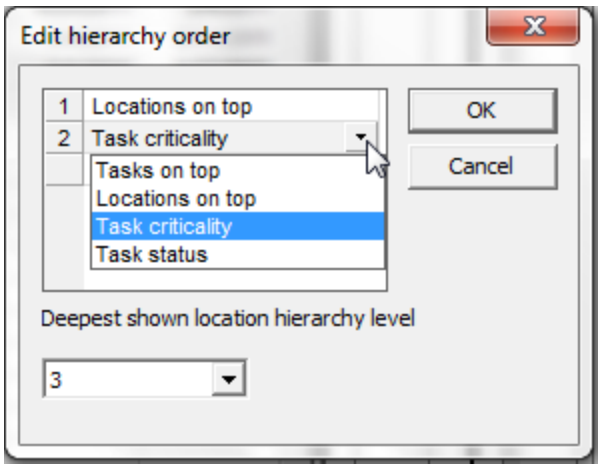
By default, tasks are shown as the top level in the task hierarchy with the individual activities (tasks per location) below.

	Hierarchy	Code	Name	Quantity	Unit	Duration	Start	End time
1	-1	01-SUB-001	LAYOUT PILES	224	EA	14	2/17/2011	3/9/2011
2	1.1		Foundation->Zone C	48	EA	3	2/17/2011	2/22/2011
3	1.2		Foundation->Zone B	112	EA	7	2/23/2011	3/3/2011
4	1.3		Foundation->Zone A	64	EA	4	3/3/2011	3/9/2011
5	-2	01-SUB-002	DRILL, SINK CAGE + CAST PILES	224	EA	16.3	2/24/2011	3/21/2011
6	2.1		Foundation->Zone C	48	EA	5.3	2/24/2011	3/3/2011
7	2.2		Foundation->Zone B	112	EA	4.1	3/4/2011	3/10/2011
8	2.3		Foundation->Zone A	64	EA	7	3/10/2011	3/21/2011
9	+3	01-SUB-003	GRADING FOR PILECAPS	1400	LF	15.6	3/4/2011	3/28/2011
13	+4	01-SUB-004	LAYOUT PILE CAPS	1120	LF	17.9	3/16/2011	4/8/2011
17	+5	01-SUB-005	FORM PILE CAPS	1680	SF	29.4	3/24/2011	5/4/2011
21	+6	01-SUB-006	REBAR TO PILE CAPS	7.8	TON	15.6	4/19/2011	5/11/2011
25	+7	01-SUB-007	CONCRETE PILE CAPS	77.8	CY	5.8	5/5/2011	5/13/2011
29	+8	01-SUB-008	STRIP + FINISH PILE CAPS	3080	SF	4.8	5/10/2011	5/17/2011

3. To modify the default hierarchy, click the **Edit hierarchy** button.

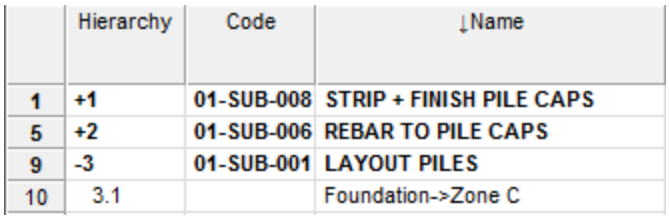


4. In the **Edit hierarchy order** dialog, create a custom hierarchy based on multiple criteria, and then click **OK**.

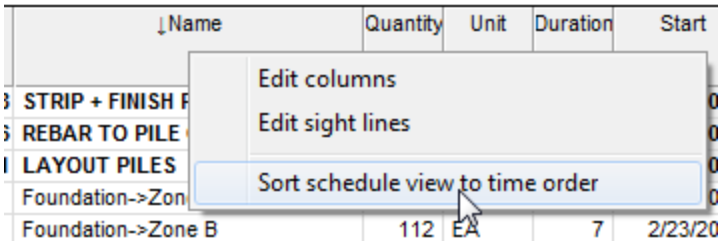


5. To sort the schedule tasks based on a visible property, double-click the column header.

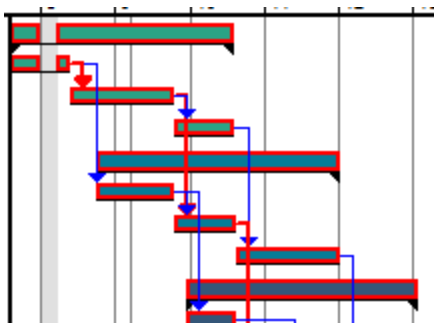
   An arrow indicates the 'sort by' column and the sort order.



6. To view the Gantt chart in 'waterfall' mode, right click a column header, and then click **Sort schedule view to time order**.



In the chart, thick, red arrows indicate a critical dependency.



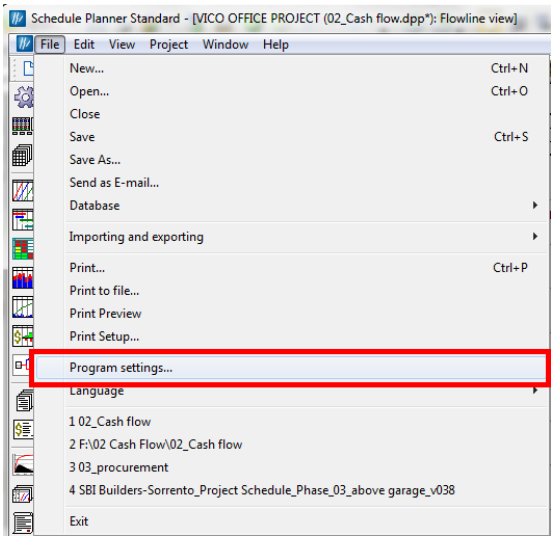
7. To change the task bar colors, select the task name, and then click **Customize**.

Resetting Toolbars

In Schedule Planner several features are accessible from the toolbar. Toolbars can be shown or hidden from the View menu. If you are missing toolbars, you can reset the toolbar. This will show all toolbars.

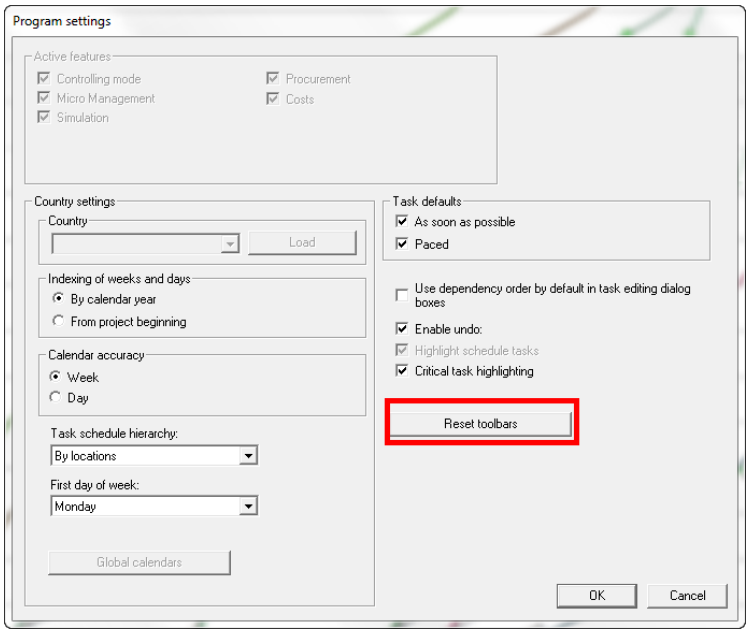
To reset toolbars

1. Expand the File menu item and select the **Program Settings**



The Program Settings dialog appears.

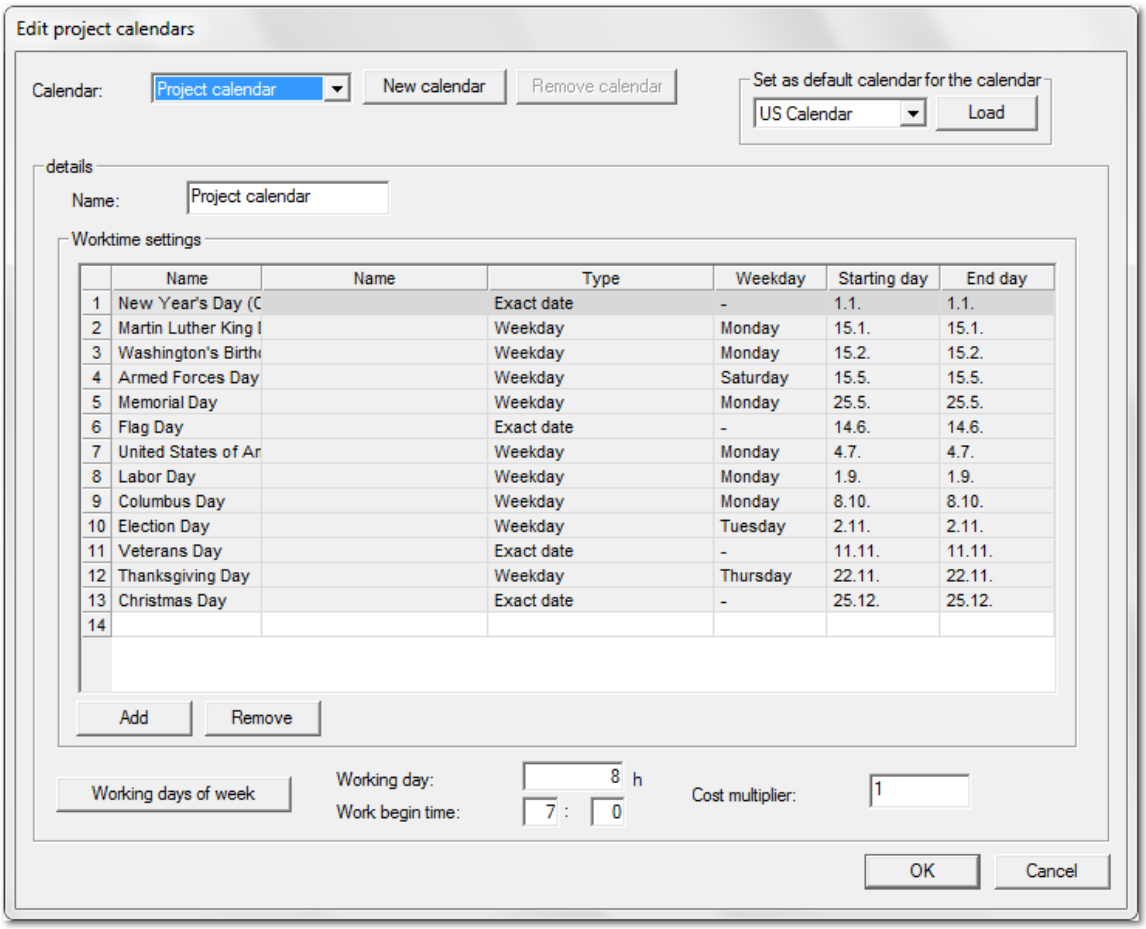
2. Click on the Reset toolbar button.



Project Calendars

Calendars affect task durations and project duration. Schedule Planner has three calendar types:

Calendar Types	Description
Global Calendar	Default calendar available in schedule Planner
Project Calendar	Specific to the project (including rain days, union holidays or restored days off for example). Effective on every task unless a Task Calendar has been applied to the task.
Task Calendar	Certain tasks required custom calendars. For example, a crew would like to work six days a week or six hours a day. Some holidays may apply to some tasks but not to others. In this case you can create unique calendars and apply them to a task.



Setting Up a Project Calendar

The correct choice of calendar for the project and its tasks is vital for successful scheduling. In Schedule Planner there are global calendars, a project calendar, and task calendars. Global calendars provide a selection of regional calendars containing the annual holidays specific to that region.

The project calendar is a special task calendar used as the calendar for all project settings, and is created to plan for given non-working days and special one-off events. It is also the task default calendar, unless an alternative task calendar is selected. The project calendar dictates how the calendar is displayed in the different Schedule Planner views. For example, non-working days, such as weekends and holidays, will be shown as shaded areas.

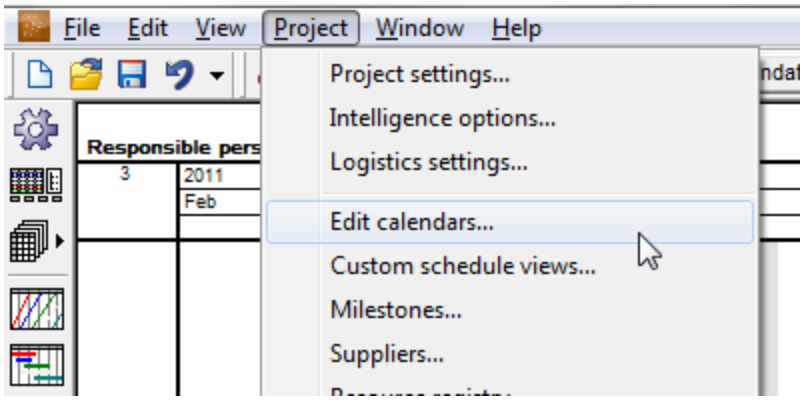
Individual tasks can be allocated their own calendar, chosen from the task calendars. Task calendars are created to enable work to be planned using different shifts, working day patterns, or holidays.

Calendars can be created from a combination of

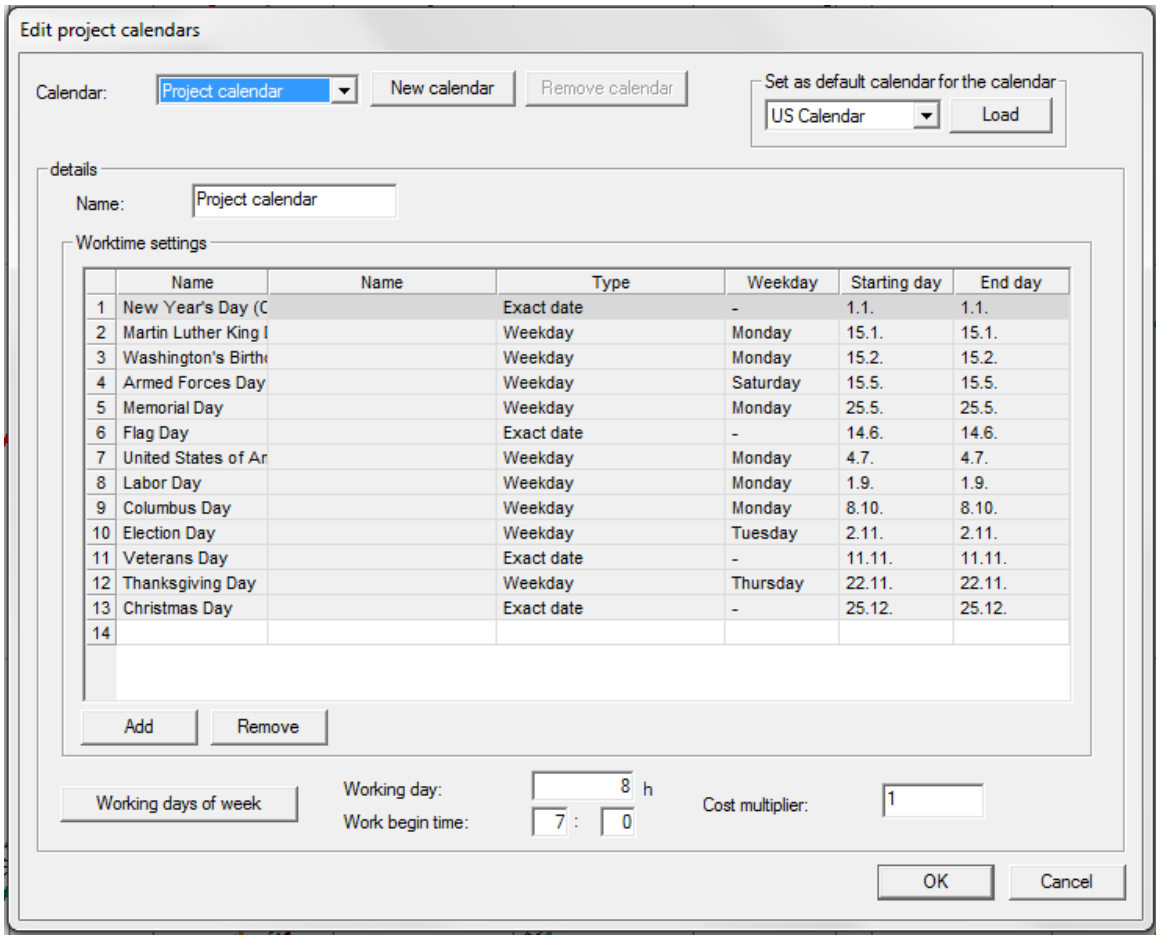
- The Schedule Planner “Edit Project Calendars” dialog box
- The Schedule Planner “Task calendars” dialog box
- Importing calendar templates

To set up the project's calendar

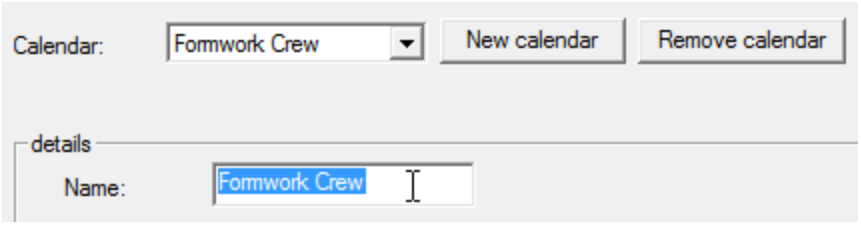
1. Open Schedule Planner.
2. In the **Project** menu, click **Edit calendar**.



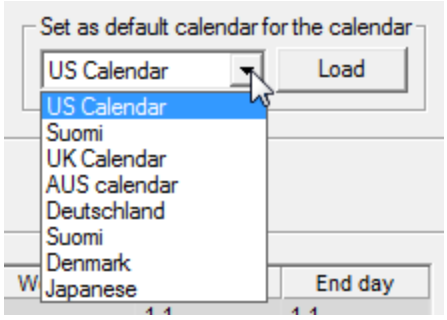
The **Edit project calendars** dialog appears.



3. To create a calendar, click **New Calendar**, and change the name in the **details** section.



4. To set the calendar that will be the basis for the project calendar, select the calendar from the **Set as default calendar** list.



5. In the **Worktime settings** section, modify the list of holidays.

Type	**Every year**: The holiday falls on the same date each year, e.g. Christmas Day—25th December. **Weekday**: The holiday occurs on the same day each year, e.g. the first Tuesday in November. **Exact date**: The holiday falls on the exact date only once.
Weekday	Specify the exact weekday when the holiday occurs. (Only available for Weekday type).
Starting day	Specify the first day of the holiday period.
End day	Specify the last day of the holiday period.

6. To define the work week, click **Working days of the week**.
7. Specify number of hours per work day and start of the work day.

   For example, enter a factor for the cost multiplier for overtime calendars.

Changing Calendar Bar Properties

Most of the views such as Flowline, Gantt, Resource Graph, Resource Histogram, and Cash Flow have a top calendar displayed in the interface by default. This calendar helps to identify start and finish dates.

You can change the level of detail displayed across the top of the calendar view.

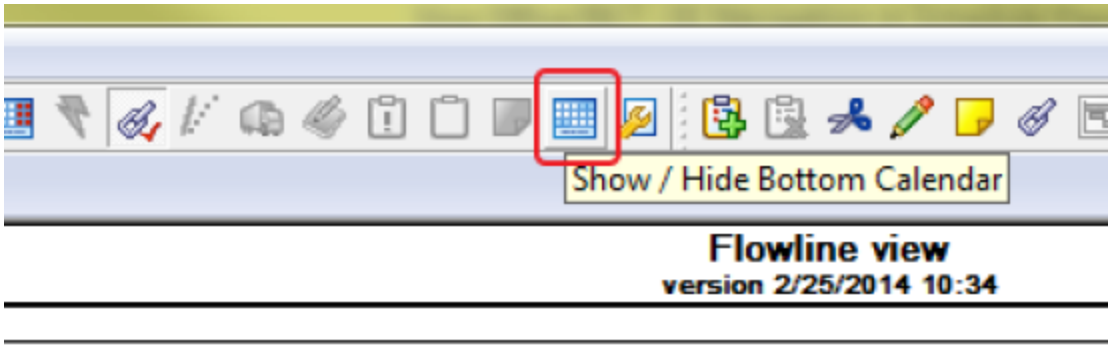
To change Calendar Properties

1. Open the standard schedule view, and right click on the **calendar bar**.
2. Click on the **Properties** button.

The Properties dialog box appears.

3. Change the view settings as required, then click **OK**.

Tip: You can enable or disable the bottom calendar by using the **Show/Hide Bottom Calendar** button on the toolbar.

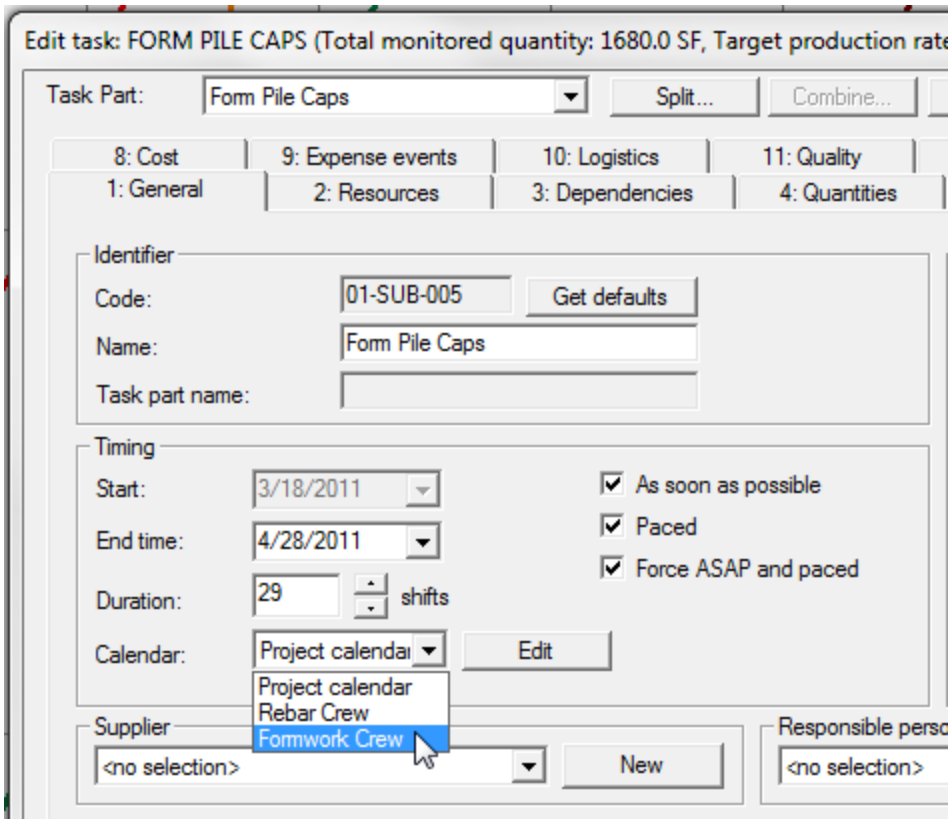


Assigning a Calendar to a Task

When overwork or an otherwise special schedule is required for a task, a new project calendar can be created. (For more information, see "Setting Up a Project Calendar " on page 479.) After defining the new calendar, it should be assigned to the concerned tasks.

To assign a custom calendar to a task

1. Open Schedule Planner.
2. To open the properties of the task, double-click either the flowline or the Gantt bar, and then click **Advanced**.
3. In the **Timing** section, select the custom calendar from the list of available project calendars.

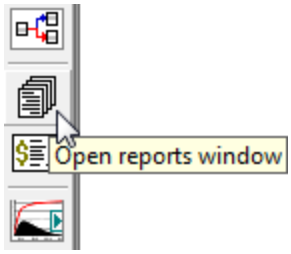


4. To apply the new calendar, click **OK**.

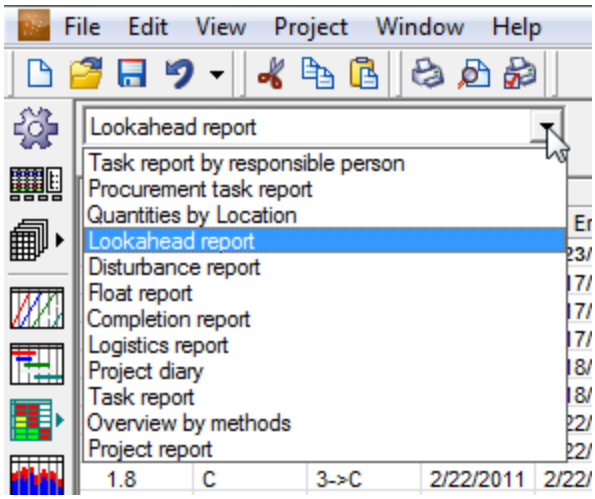
Using Schedule Reports

To use Schedule Planner to generate reports

1. Open Schedule Planner.
2. On the left toolbar, click the **Open reports window** button.



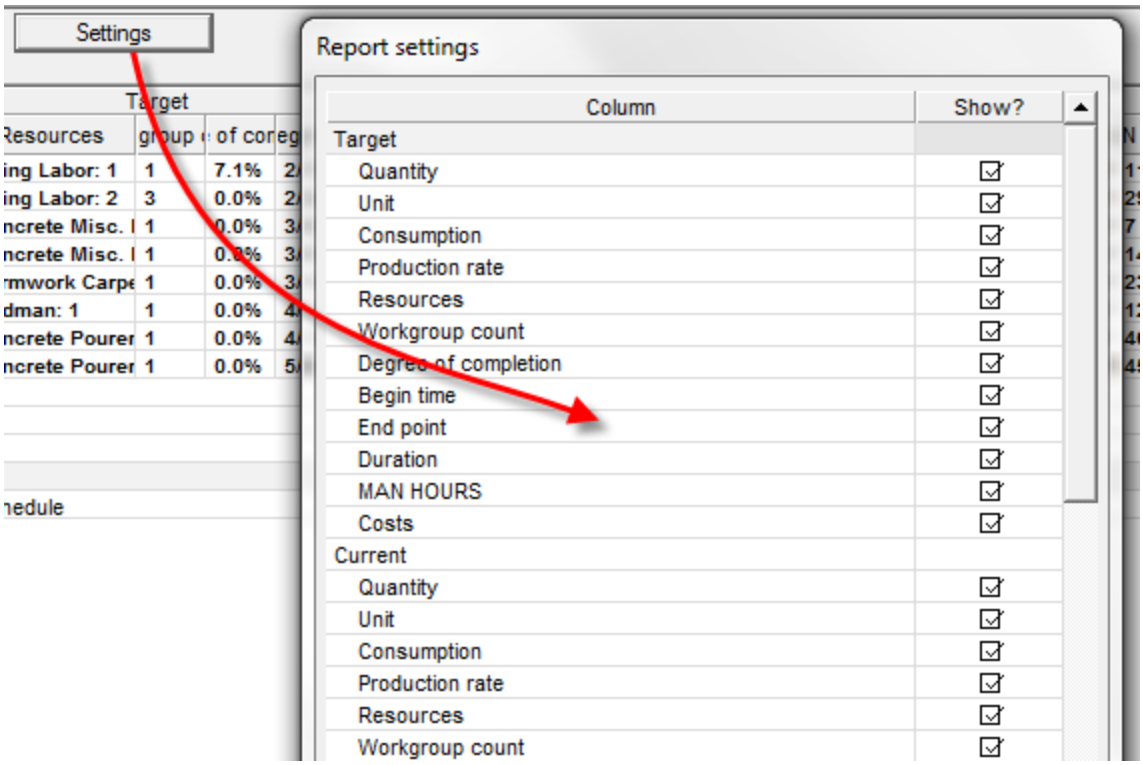
3. From the report list at the top-left of the view, select the report to generate.



The following reports are available:

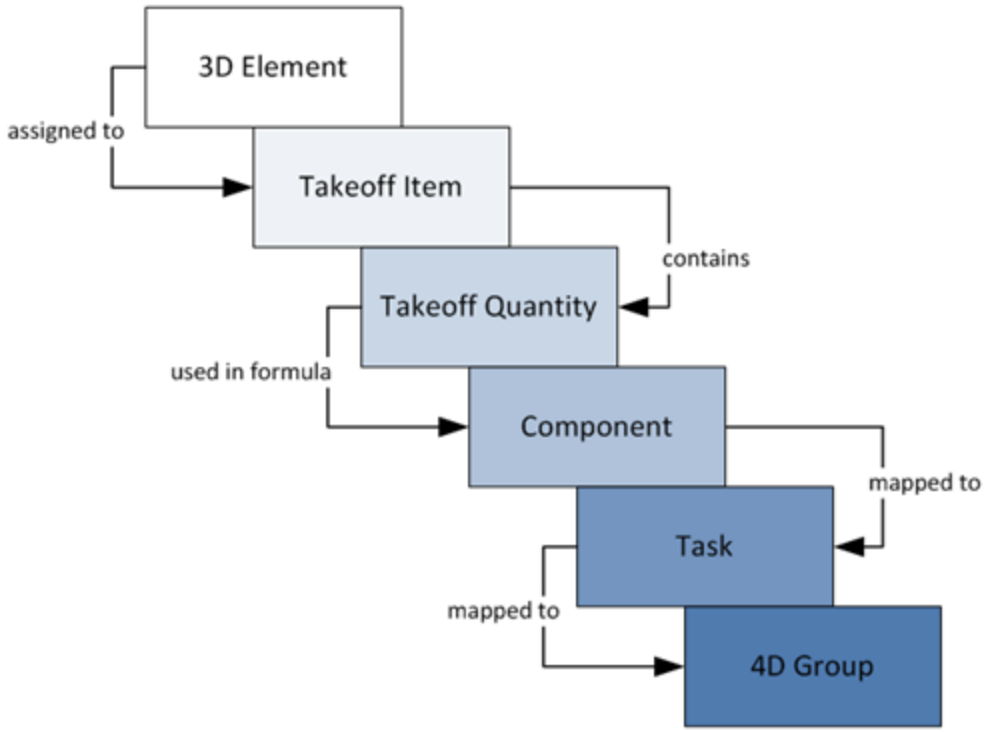
- **Task report by responsible person:** The list of tasks in the project grouped by responsible person.
- **Procurement task report:** The current status of the defined procurement tasks with quantities required per location and 'Need By' dates.
- **Quantities by Location:** An overview of all method assemblies and resource components that have been mapped to schedule tasks in the Task Manager view by location.
- **Lookahead report:** An overview of labor resources required per location with start and end date and production rates.
- **Float report:** An overview of float (free float and total float) per task in the project.
- **Completion report:** The completion percentage of tasks with resource quantities per location.
- **Task report:** The completion and start/end dates per task.
- **Overview by methods:** An overview of tasks with method assemblies and resource components.
- **Project report:** An overall project overview.

4. To specify the columns that will be visible in the report view, click **Settings**.


Settings
Report settings
Column
Show?
Target
Quantity
Unit
Consumption
Production rate
Resources
Workgroup count
Degree of completion
Begin time
End point
Duration
MAN HOURS
Costs
Current
Quantity
Unit
Consumption
Production rate
Resources
Workgroup count

Manage 4D

The creation of 4D simulations is an integrated part of the Vico Office workflow and does not require any additional effort to create and maintain. 3D model elements are connected to tasks through takeoff items and Cost Planner components. As a result, after mapping Cost Planner components and assemblies to tasks, the 4D simulation is created implicitly and is ready to use for review and communication of the created schedule.



The **4D View** allows for defining and mapping tasks to 4D groups, which can then be used to specify the behavior and representation of linked elements when tasks occur, thus creating the 4D simulation.

A 4D group is a collection of similar tasks for which behavior and color settings for the 4D simulation can be defined. For more information, see "Defining a 4D Group" on the next page.

4D group behavior is defined through the selection of one of the predefined behaviors (Build, Demolish, or Temporary) and a color with a translucency setting.

Code	Name	Behavior	Color	Transparency
Formwork		Build		0%
Rebar		Build		0%
Concrete Work		Build		0%

To open the Define 4D Simulation task

1. Right-click the Workflow Panel header, and then click **Schedule Planner**.
2. In the **4D Simulation** workflow group, click **Define 4D Simulation**.

   The default viewset includes the 4D Task Groups and Task Manager.

To open the Explore 4D task

1. Right-click the Workflow Panel header, and then click **Schedule Planner**.
2. In the **4D Simulation** workflow group, click **Explore 4D**.

   The default viewset includes the 4D View.

Defining a 4D Group

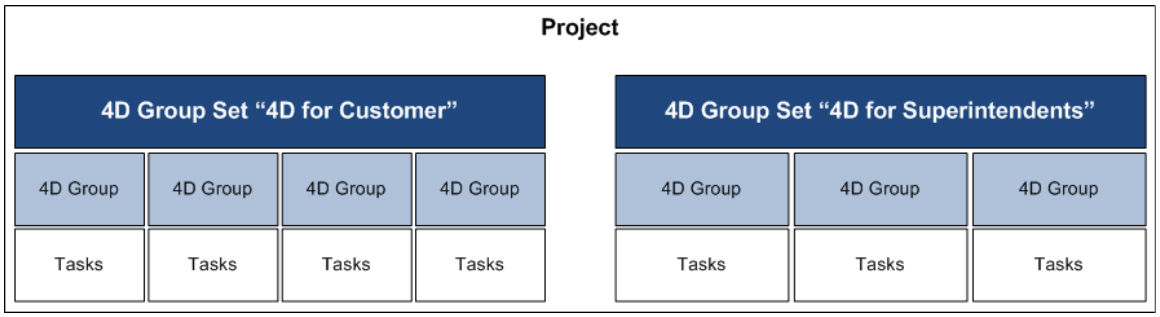
Before a 4D simulation can be viewed and used for analysis and communication purposes, you must set up 4D groups and 4D representation settings.

When you set up a 4D simulation, you can create 4D group sets and 4D groups:

- 4D group set: A collection of task to 4D group mappings and representation settings, and results in a 4D simulation mode. More than one 4D group set may exist in a project, which allows for defining purpose specific 4D simulations by creating different 4D groups and 4D group representation settings for different audiences (for example, '4D for customer' and '4D for superintendents').
- 4D group: A group of (similar) tasks that will be represented the same way during playback of the 4D simulation. 4D groups have a color and assigned behavior, which occurs when associated tasks take place during playback of the project's schedule in the simulation.

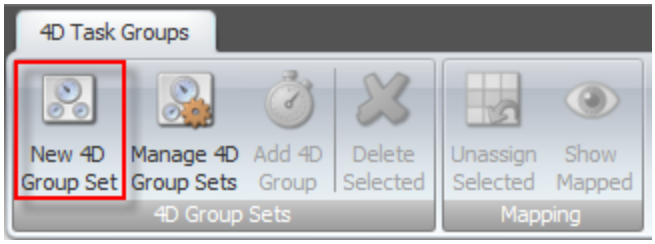
Example:

Two 4D simulations are defined: one for 'Customer' and one for 'Superintendents'.

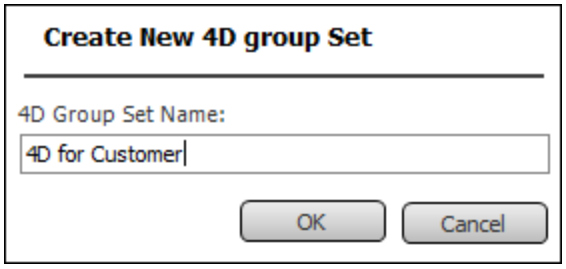


To setup a 4D simulation

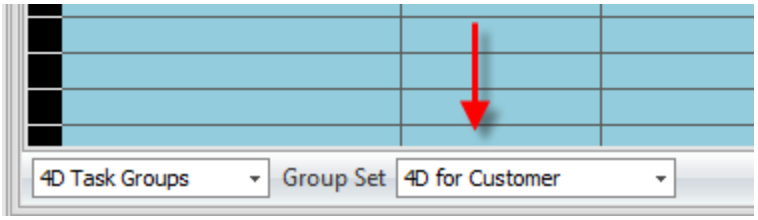
1. Open the 4D Simulation task.
2. On the **4D Task Groups** ribbon tab, click **New 4D Group Set**.



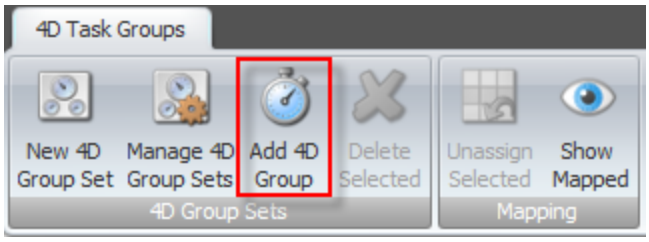
3. Enter a name for the new 4D group set, and then click **OK**.



The new 4D group set is activated, as indicated in the status bar.

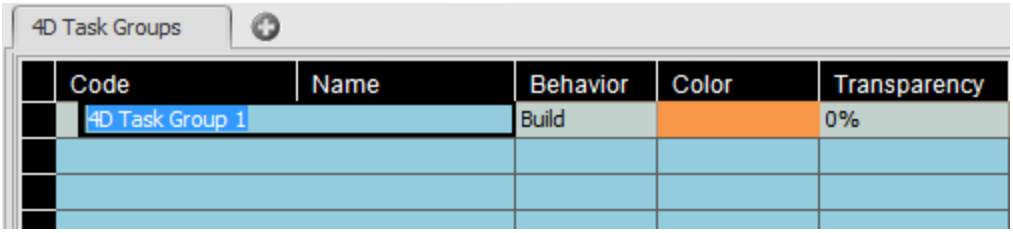


4. To add 4D groups, click **Add 4D Group**.

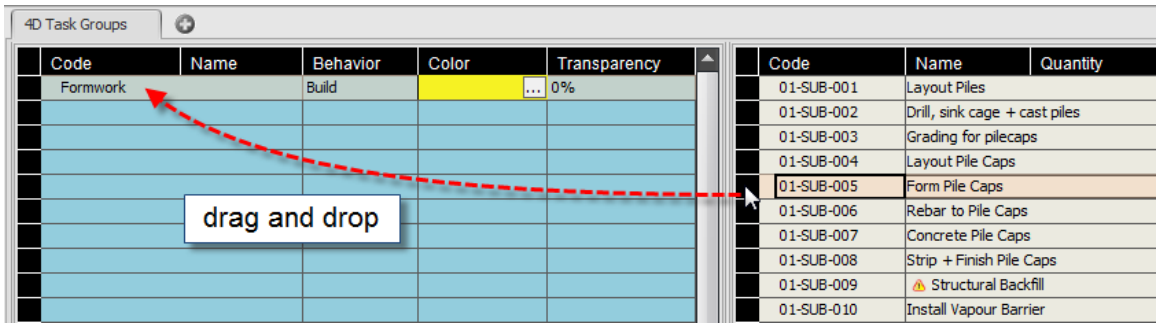


The new 4D group is shown in the grid.

5. In the grid, change the name as desired, and select the type of behavior to be associated with the 4D group.
   - **Build** (default behavior): Elements linked to the task are hidden at the start of the 4D simulation, appear in the 4D group's color during the task's duration, and remain visible at the completion of the task.
   - **Demolish**: Associated elements are visible at the start of the 4D simulation, appear in the 4D group's color during the task's duration, and are hidden at the completion of the task.
   - **Temporary**: Elements mapped to the 4D group are hidden at the start of the 4D simulation, appear in the 4D group's color during execution of the task, and are hidden again at the completion of the task.



6. To pick the desired color for the 4D group, click the **Color** cell. If you do not wish to color a 4D Task Group, click **Reset to CAD color**.
7. *Optional:* In the **Transparency** cell, set the degree of transparency for associated items that are shown when the task occurs.
8. To map tasks to the defined 4D groups, drag and drop them from the **Task Manager** view on the right into the desired 4D group on the left.



9. To create the 4D groups that are required for visualization of the designed schedule for the purpose of the defined 4D group set, repeat steps 5 to 8.

Preparing the 4D Simulation

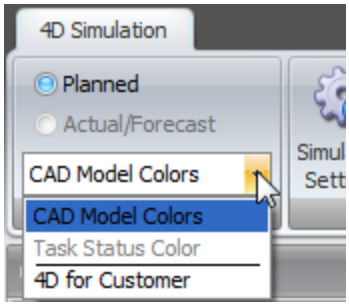
You can interactively view the 4D simulation that is defined using 4D groups in the **4D Explorer** view, which has functionality for playback, date selection, and information to be presented on top of the simulated model.

This view is part of the Vico Office Client.

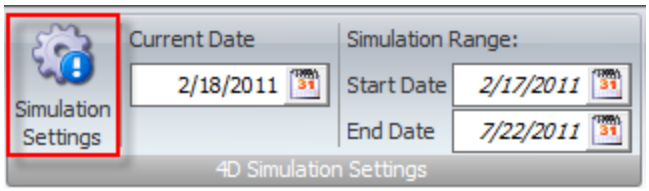
To prepare the defined 4D simulation for communication and analysis purposes

1. Open the Explore 4D task.
2. To select the desired 4D simulation configuration, select either **CAD Model Colors** or a previously defined 4D group sets on the **4D Simulation** ribbon tab.

   The **Task Status Color** mode becomes available as soon as production control information has been entered for the project.



3. To define the presentation of the 4D simulation, click **Simulation Settings** on the ribbon.

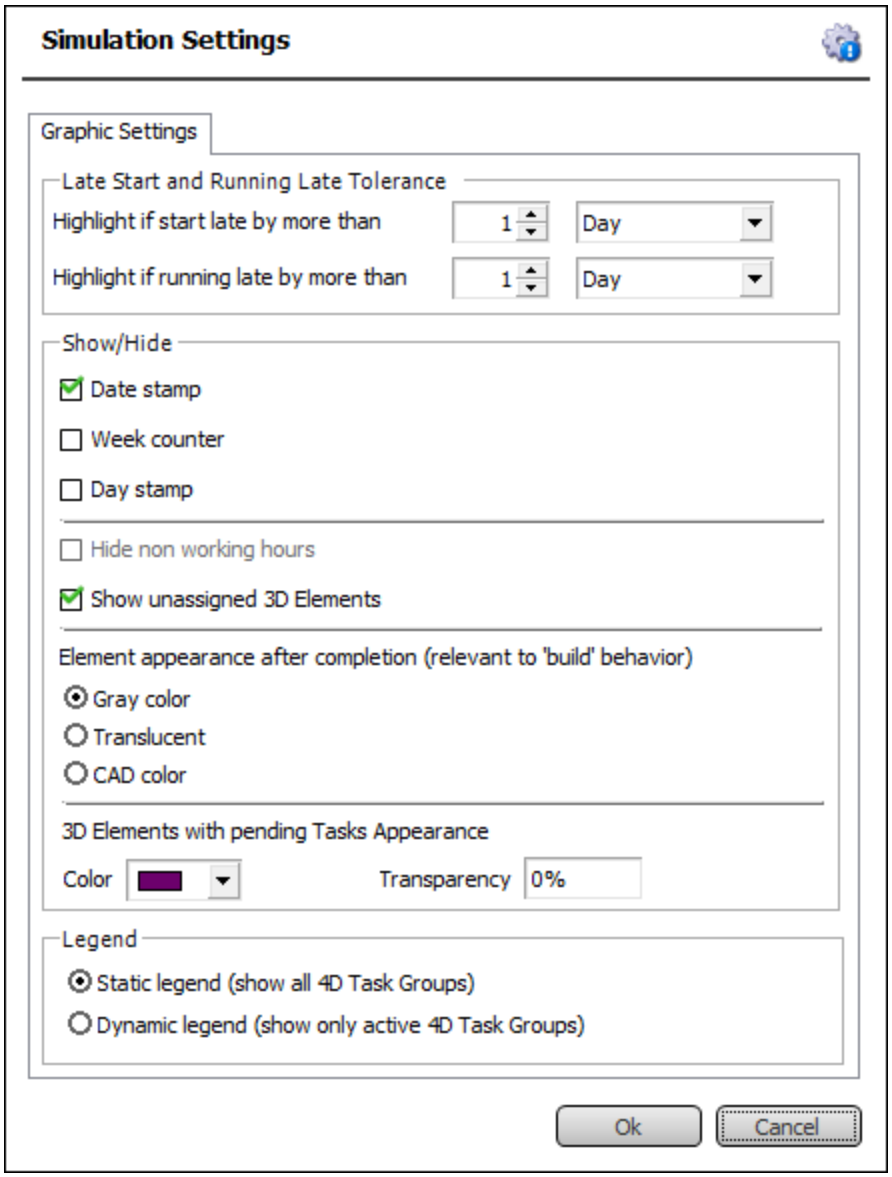


The **Simulation Settings** dialog provides configuration options for these aspects of the 4D simulation:

- **Late Start and Running Late Tolerance** (applicable only when production control is entered for the project): Define when elements should be marked as "Started Late" and "Running Late".
- **Show/Hide**: Select additional information to be presented on top of the 4D view in the top-left corner of the simulation.
  - **Date stamp**: Show the current date.
  - **Week counter**: Show the current week (counted from the beginning of the simulation/schedule).
  - **Day stamp**: Show the current day (counted from the beginning of the simulation/schedule).
- **Show unassigned 3D Elements**: Hide or show elements that are not associated with any task in the schedule. When the check box is cleared, only those elements that have been associated with tasks are visible throughout the simulation playback.
- **Element appearance after completion**: Select the color (gray, translucent or the color assigned in the original CAD model) of the completed elements.

  This setting is relevant only to 4D groups with "Build" behavior because these are the only elements that remain visible after associated tasks are finished.
- **3D Elements with pending Task Appearance**: Set the color of those elements that are between two tasks (one task has been completed, the second one has yet to start).
- **Legend**: Select how the legend is displayed. The legend is only available if one of the 4D group sets is selected in step 2.
  - **Static legend**: Shows an overview of all defined 4D groups and colors.

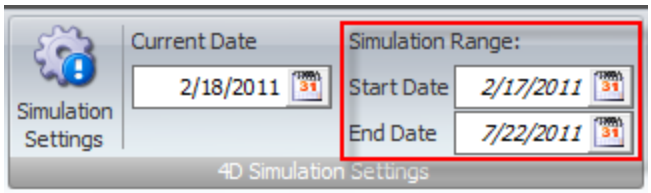
- **Dynamic legend** Updates when tasks in a 4D group occur.



Playing the 4D Simulation

To view the defined 4D Simulation

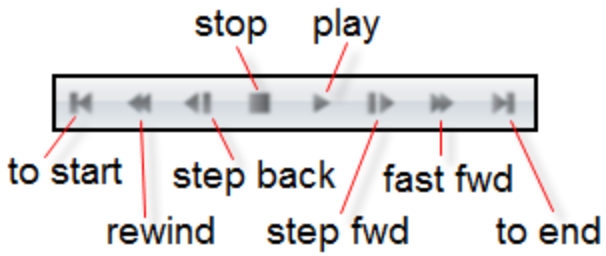
1. Open the Explore 4D task.
2. On the **4D Simulation** ribbon tab, in the **4D Simulation Settings** group, set the date range for which the simulation should be displayed.



If you select a fixed date as a Start date, it appears with a normal font (not italicized). However, if you click the calendar icon and select 'Earliest Task Start / Latest Task End', the dates are automatically adjusted according to the first task start / last task end date. In this case, the dates are italicized.

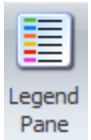
3. To start the playback of the 4D simulation, click the **Play** button ( ) on the view toolbar.

During playback of the simulation, you can stop, step back, step forward, rewind, and fast forward using the VCR controls on the view toolbar.



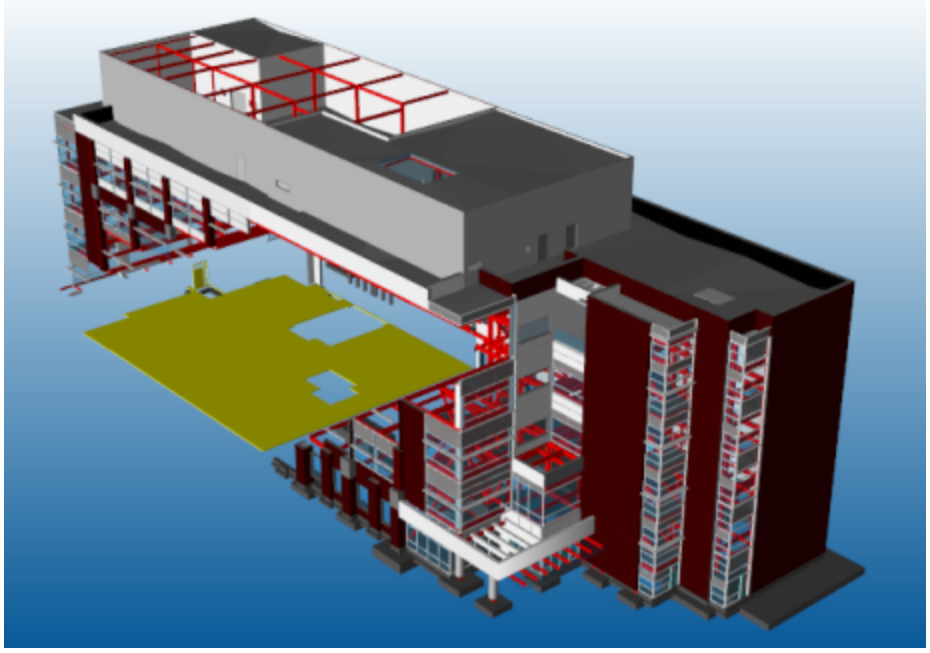
4. To show or hide the **Legend** pane, click **Legend Pane** button.

   Note: The button is only enabled when a 4D group set is selected as the 4D presentation mode.



Manage Constructability Issues

In Vico Office, managing constructability by model analysis and automated clash detection is embedded in the workflow. The same model that is used for quantity takeoff is also used for cost planning and constructability analysis.



The Vico Office Constructability Manager module provides support for constructability analysis in a 3-step process:

1. Detect clashes

   Clash detection can be performed by specifying criteria of elements that should be analyzed (layer, element type) and then running automated detection. Detected clashes are grouped per element, so that the collection of clashes becomes easier to process. During the review of the detection results, clashes can be classified as constructability issues, which then moves the clash to a secondary list, separate from the clash list.

2. Manage constructability issues

   The list of constructability issues can be used as input for meetings and constructability issue tracking. Further details can be added to constructability issues by saving view points, adding markup, and attaching documents and images. Comments allow for 'meeting notes'. All information in the collection of constructability issues can be included in a constructability report.

3. Manage requests for information (RFIs)

   When a constructability issue requires further information from project partners, it can be escalated to an RFI. In this case, the constructability issue is copied, with its saved view points and markup, to the Manage RFIs viewset.

To open the Manage Issues task

1. Right-click the Workflow Panel header, and then click **Constructability Manager**.
2. In the **Constructability** workflow group, click **Manage Issues**.

   The default viewset includes the Issue List View and 3D View.

–Or–

1. Right-click the Workflow Panel,and then click **Document Controller**.
2. In the **Document Management** workflow group, click **Document Control**.
3. Click the **Document Controller, 3D, and Issues** tab.

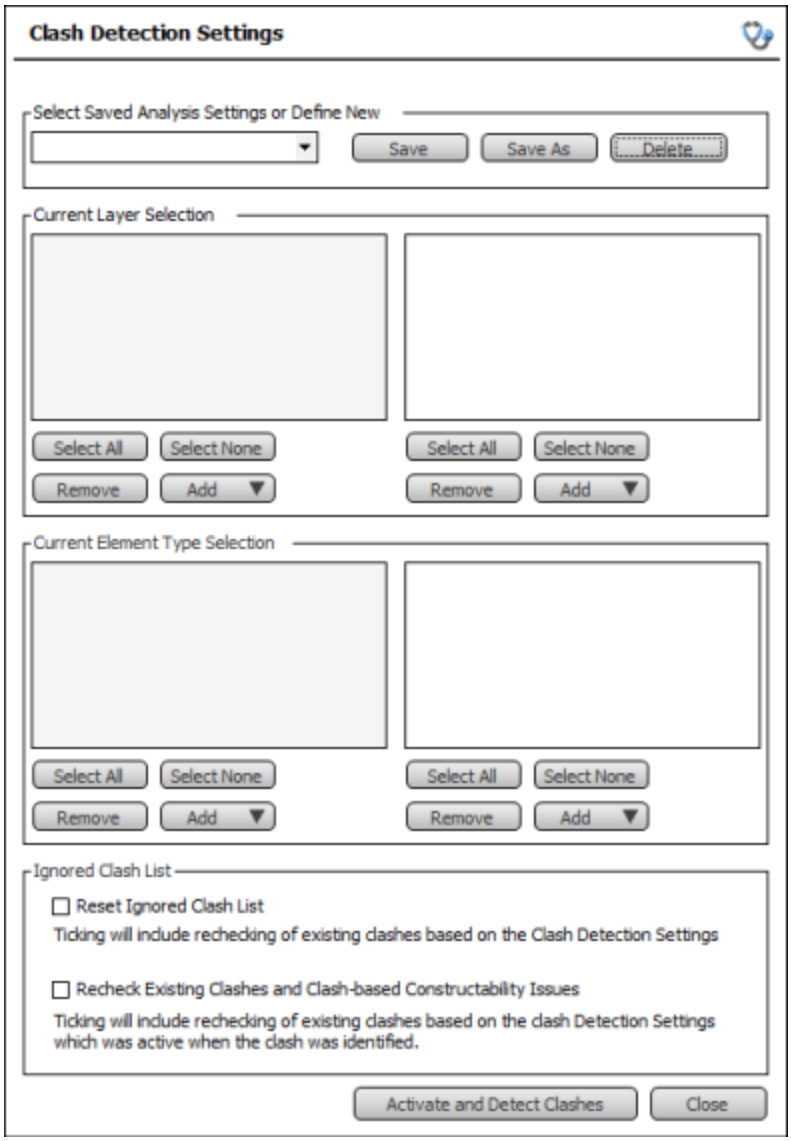
   The default viewset includes the Document Register View, Issue List View, and 3D View.

Defining Clash Detection Settings

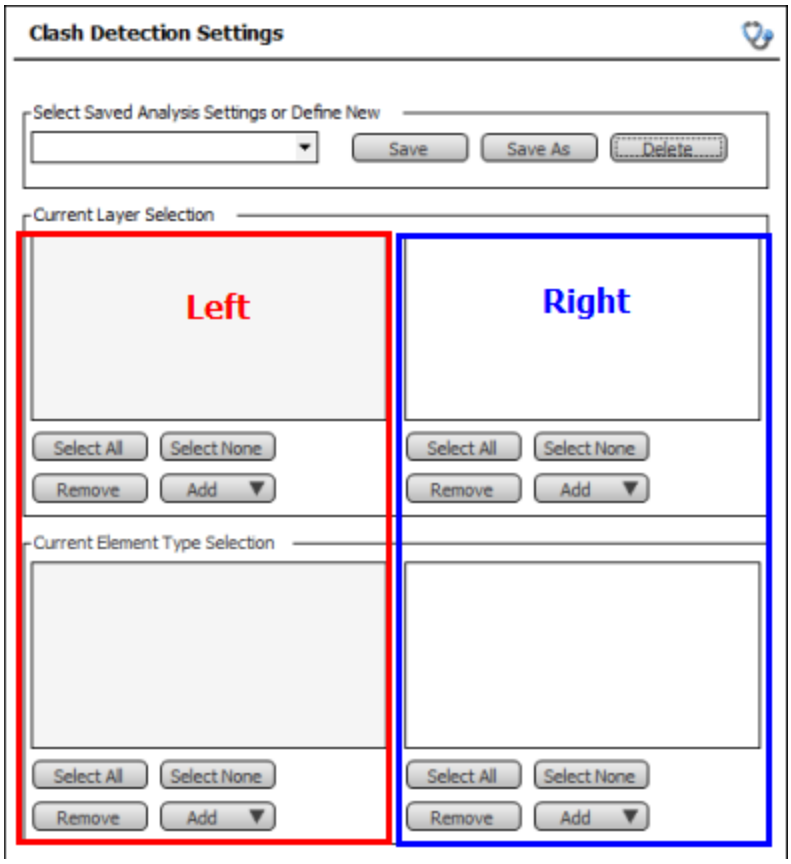
To define settings for automatic clash detection

1. Open the Manage Issues task.
2. On the **Constructibility Manager** tab, click **Detection Settings**.

   The **Clash Detection Settings** dialog appears.



Clash detection settings are defined by specifying two collections of elements that are compared with each other. The elements in the left collection are compared with the elements in the right collection.

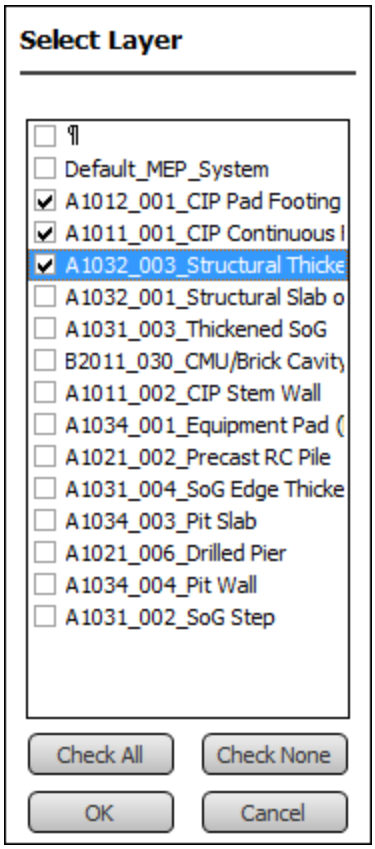


Define the left and right collections by specifying the layers and element types that should be included in each.

3. Select the layers from which elements should be included in each collection.
   a. In the **Current Layer Selection** section, click **Add** on the left side.

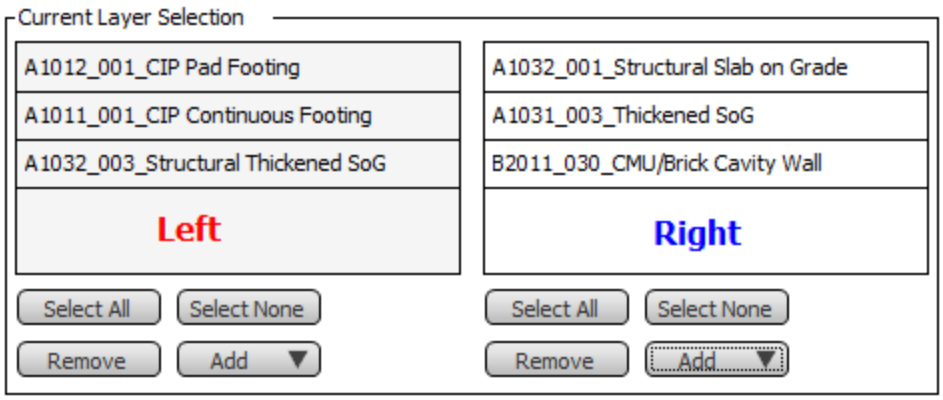
   The list of layers in the current model is displayed.

   b. Select the layers that should be included in each collection, and click **OK**.



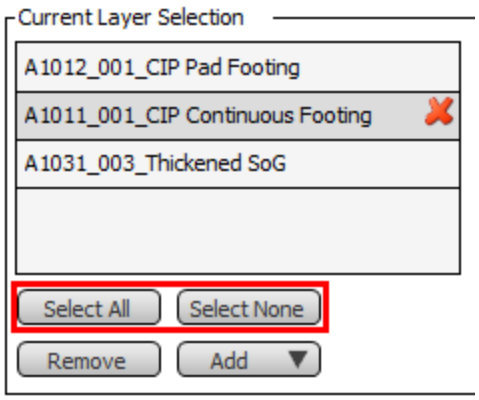
c. To select the layers on the right of the **Current Layer Selection** section, repeat steps a and b.

The **Current Layer Selection** section shows which layers were selected for the left and right.

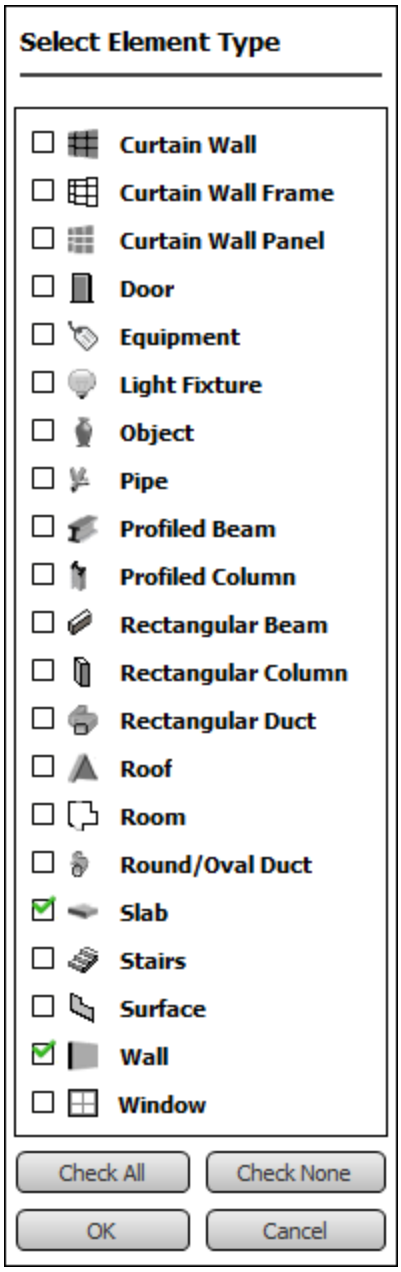


4. *Optional:* Modify the layer selections.

- To remove a layer, select the layer, and then click the **X** symbol to its right.
- To remove all the layers, click **Select All** > **Remove**.



5. Specify the element types that will be included in each collection.
   a. In the **Current Element Type Selection** section, click **Add** on the left side.
   b. Select the element types that will be included in the collection, and then click **OK**.



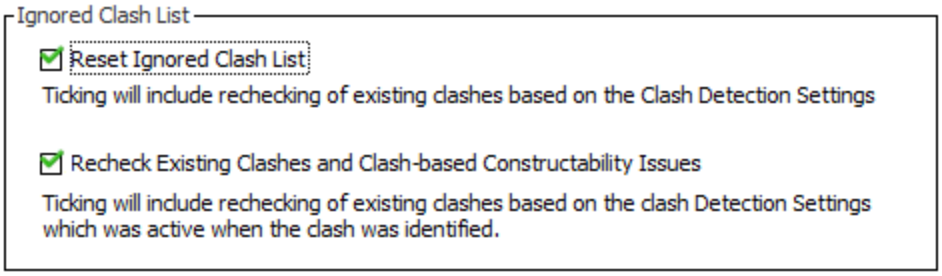
c. To select the element types for the right side, repeat steps a and b.

Note: Revit models do not contain layers, so only element types can be used for definition of the left and right collections for these models.

6. Select how existing clashes should be handled:

- **Reset Ignored Clash List**: All the clashes that were previously removed from this list with clash detection results (by ignoring them) are added to the list again when they are detected.

- **Recheck Existing Clashes and Clash-based Constructability Issues**: All existing geometry clashes are verified, ensuring that they still exist in the project. This setting is recommended when newer versions of project models have been activated after a previous clash detection.



The defined settings are not saved yet; this is indicated by the red background of the box in the **Select Saved Analysis Settings or Define New** section.

7. To save the current settings, click **Save**.

   –Or–

   To save the settings under a different name, click **Save As**.

   Note: If necessary, you can delete existing sets by clicking **Delete**.

8. *Optional:* To use the defined setting immediately, click **Activate and Detect Clashes**.

   Note: The selected (active) analysis setting is used when **Detect Clashes** is clicked.

9. Close the dialog and continue working.

Running a Clash Detection

To run an automatic clash detection

1. Open the Manage Issues task.
2. Define the clash detection settings, and ensure that the desired setting is active.
3. On the **Constructability Manager** ribbon tab, click **Detect Clashes** to start the detection process.

   The clash detection process is run using the defined settings.

   At the end of the process, detected clashes are listed on the **Detected Clashes** tab.

Detected Clashes (7542) | Constructability Issues (1)

Clash #	Location	ElementType	Found
CL-129	Roof level	WALL and WALL	18/02/10 05:02
CL-126	Roof level	WALL and WALL	18/02/10 05:02
CL-12608	Level 5	WALL and SLAB	18/02/10 05:04
CL-12606	Level 5	WALL and SLAB	18/02/10 05:04
CL-12603	Level 5	WALL and SLAB	18/02/10 05:04

Reviewing Clashes and Constructability Issues

All 'hard' clashes that result from running an automatic clash detection are listed on the **Clashes** tab in the List Issues view.

Clashes (11) | Issues (0) | RFIs (0)

Code	Date Created	Element Type	Element IDs	Location
CL-000007	2015.02.11. 13:13	DUCT_FITTING; DUCT_RECTANGULAR	630011; 630013	Project
CL-000019	2015.02.11. 13:13	DUCT_RECTANGULAR; PIPECONDUIT	629987; 630079	Project
CL-000020	2015.02.11. 13:13	DUCT_RECTANGULAR; PIPECONDUIT	629987; 630110	Project
CL-000021	2015.02.11. 13:13	DUCT_RECTANGULAR; PIPECONDUIT	629987; 630199	Project
CL-000022	2015.02.11. 13:13	DUCT_RECTANGULAR; PIPECONDUIT	630005; 630273	Project
CL-000023	2015.02.11. 13:13	DUCT_RECTANGULAR; PIPECONDUIT	630005; 630079	Project

To review the collection of detected clashes

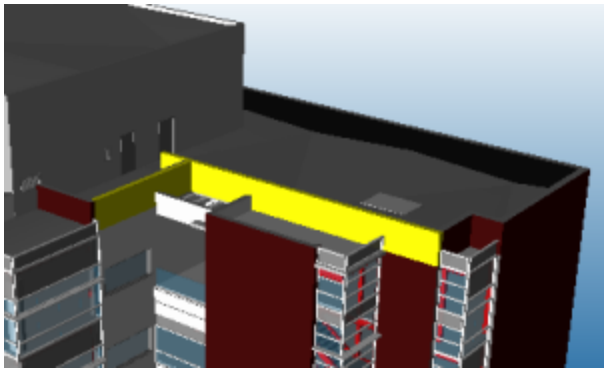
1. Open the Manage Issues task.
2. To review a clash, select it in the list.

   The selected clash is highlighted in gray with an orange row indicator.

Clashes (11) | Issues (0) | RFIs (0)

Code	Date Created	Element Type	Element IDs	Location
CL-000007	2015.02.11. 13:13	DUCT_FITTING; DUCT_RECTANGULAR	630011; 630013	Project
CL-000019	2015.02.11. 13:13	DUCT_RECTANGULAR; PIPECON...	629987; 630079	Project
CL-000020	2015.02.11. 13:13	DUCT_RECTANGULAR; PIPECONDUIT	629987; 630110	Project
CL-000021	2015.02.11. 13:13	DUCT_RECTANGULAR; PIPECONDUIT	629987; 630199	Project
CL-000022	2015.02.11. 13:13	DUCT_RECTANGULAR; PIPECONDUIT	630005; 630273	Project
CL-000023	2015.02.11. 13:13	DUCT_RECTANGULAR; PIPECONDUIT	630005; 630079	Project

In the model, the elements that are involved in the selected clash are highlighted in yellow.



3. On the Running Mode ribbon tab, use the tools to see only the clashing elements.

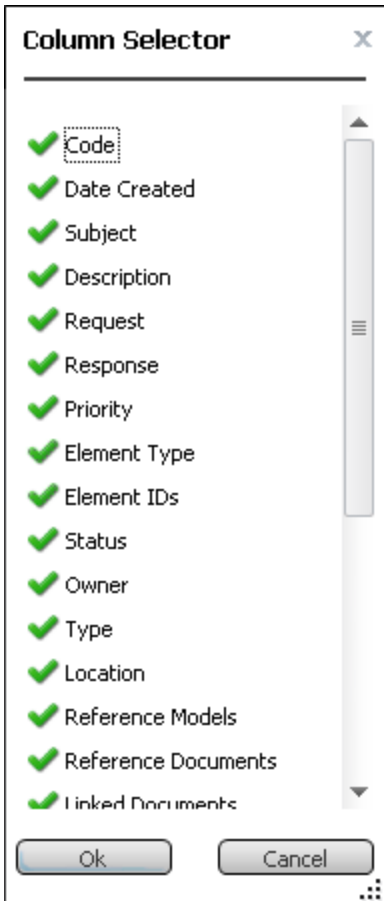
Sorting and Filtering Clashes and Constructability Issues

The list of detected clashes or constructability issues to manage can get quite long. Therefore, it is sometimes beneficial to filter the list based on specific properties, such as 'Element Type' or 'Date Found'.

To filter the list of clashes and constructability issues

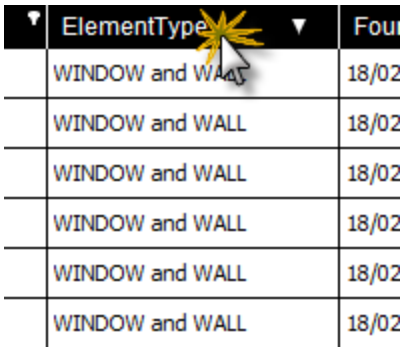
1. On the **Clashes** or **Issues** tab of the Issue List View, ensure that the column that you want to use for sorting and/or filtering is active.
   a. Open the Manage Issues task.
   b. Right-click any column header, and then click **Column Selector** to add any missing columns.
   c. In the **Column Selector** dialog, select the columns that you want to appear in the spread-

sheet.



2. To sort a column in ascending order, click the column header.

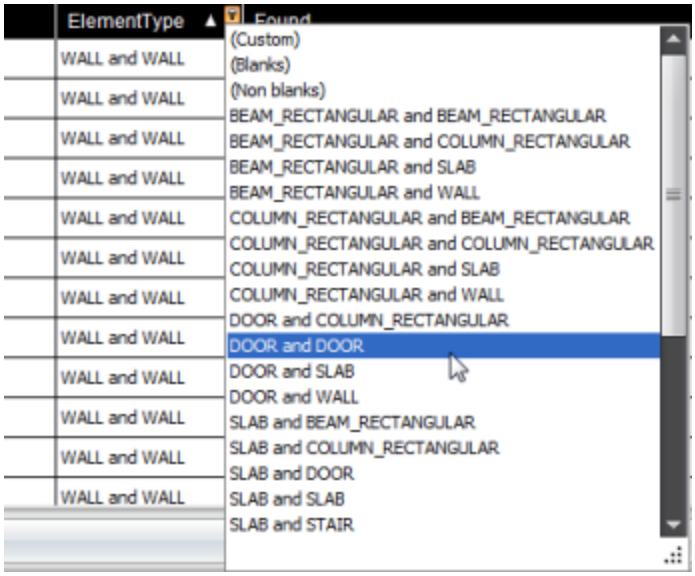
   Tip: To sort by descending order, click the column header again.



3. Filter the list for a specific value.

a. Click the small funnel icon.

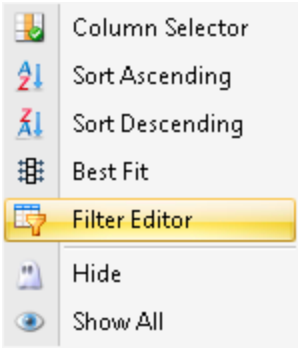
A list of values in the selected column appears.



b. Click the desired value to filter out all items that match this criteria.

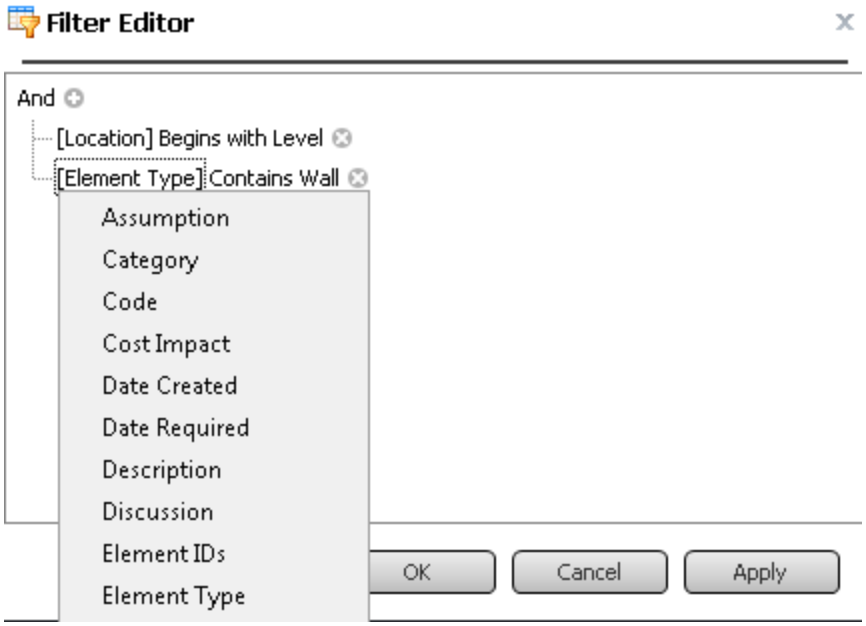
4. Define a custom filter that combines multiple search criteria.

a. Right-click a column header, and then click **Filter Editor**.

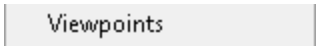


b. In the Filter Editor, define the criteria based on which you want to filter the list.

- Use **AND** and **OR** operators to refine or expand your filter.
- All properties of clashes and constructability issues are available for the custom filter.

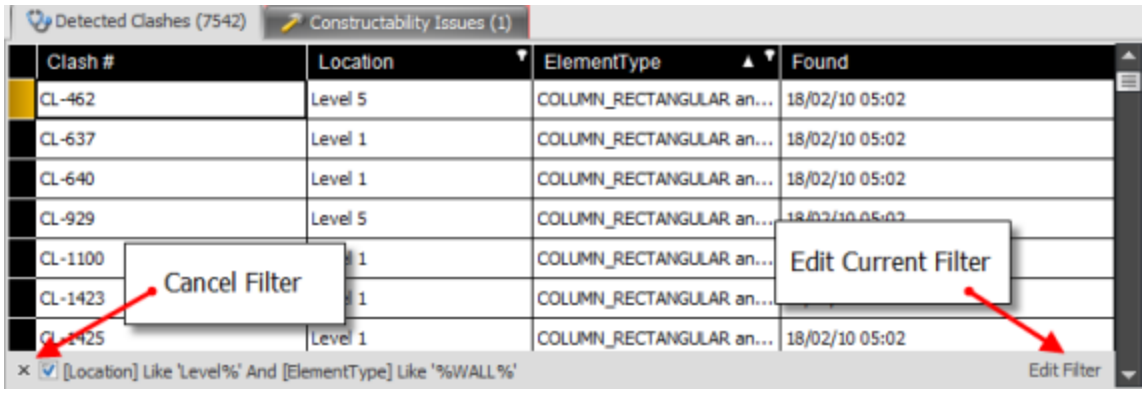

Filter Editor
And
[Location] Begins with Level
[Element Type] Contains Wall
Assumption
Category
Code
Cost Impact
Date Created
Date Required
Description
Discussion
Element IDs
Element Type
OK
Cancel
Apply


Assumption
Category
Code
Cost Impact
Date Created
Date Required
Description
Discussion
Element IDs
Element Type
Grid Reference
Linked Cost Item
Linked Documents
Linked Task
Location
Owner
Priority
Reference Documents
Reference Models
Request
Requested By
Response
Status
Subject
Time Impact


Viewpoints

c. To use your custom filter, click **OK** or **Apply**.

Note: Cancel the filter by closing it on the **Filter Status Bar**, or edit it by clicking **Edit Filter**. Previously applied filters are listed in the bottom of the list, so you can easily restore them.

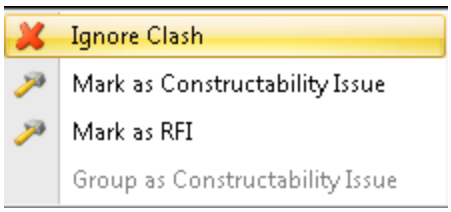


Removing a Clash

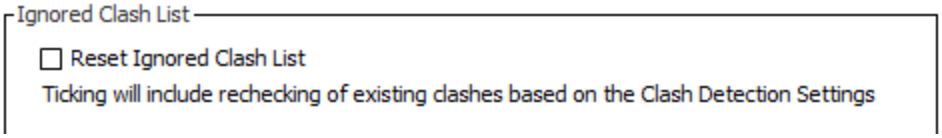
When a detected clash is not a problem that needs to be tracked because its geometry is defined as intended, you can prevent that clash from showing up in your list of clash detection results.

To delete a clash from the list of clash detection results

1. Open the Manage Issues task.
2. In the clashes list, select a clash.
3. Right-click the selected clash, and then click **Ignore Clash**.



The selected clash is removed from the list. When you re-check the model, it does not appear unless you select the **Reset Ignored Clash List** option in the **Clash Detection Settings**.



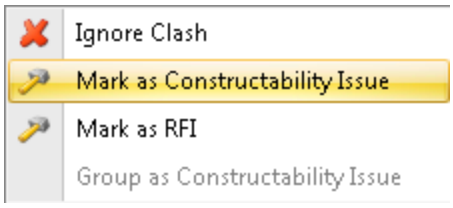
Converting Clashes to Constructability Issues

You can review the list of detected clashes and either remove the items from the list or mark them as constructability issues. Items marked as contructability issues are included in the list that is used to generate the project's constructability report.

Individual clashes or groups of clashes can be turned into constructability issues. For example, you may find that a group of clashes are related to the same problem in the design or model.

To turn a clash into a constructability issue

1. Open the Manage Issues task.
2. Select the clash that you have reviewed and identified as a constructability issue.
3. Right-click the clash, and then click **Mark as Constructability Issue**.

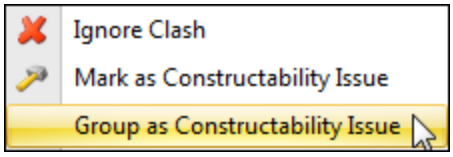


The clash is removed from the clashes list and is moved to the issues list.

To convert a group of clashes into a single constructability issue

- Select the concerned clashes, right-click the selection, and then click **Group as Constructability Issue**.

  The **Clash Context Menu** appears.



Adding a View Point to an Issue

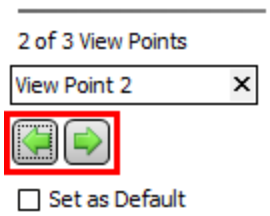
You can create a view point to zoom in on a specific area of a drawing, model, or reference plane. A view point also allows you to add markups. One or more view points can be associated with an issue.

You can save view points in constructability issues to store the view in which the issue can be seen optimally. After saving, when you select the constructability issue again, the saved view point is restored. When reviewing the issue, you can select a view point from the Issue Manager to view the related details.

To add a view point to a constructability issue

1. Open the Manage Issues task.
2. On the **Issues** tab, select a constructability issue.
3. To obtain a good view of the elements involved, use the 3D navigation tools.
4. On the **View & Markup Tools** ribbon tab, click **Add View Point**.
5. Add as many view points to the selected constructability issue as needed.

   You can restore a view point by using the arrow keys to cycle through the collection of saved view points.



6. To change the default view point to the active view point, select the **Set as Default** check box.
7. To view the view point, open the issue in **Card Mode**.

Tip: The last column on the right of an issue in **Card Mode** provides a list of available view points.

- Select a view point from the list or scroll through using the green arrows.
- To mark a view point as the default view to be displayed, select the **Set as Default** check box.
- To see the view point details in the **3D View**, click the **Open** button.

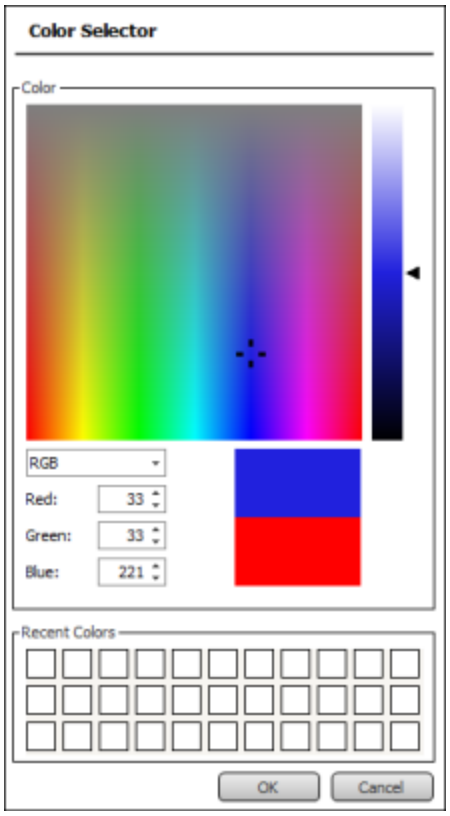
Adding Markup to a View Point

View points that you have saved with a constructability issue allow for adding multiple markups, to further clarify the problem that is captured by means of the issue.

To add markups to a saved view point

1. Open the Manage Issues task.
2. Select a constructability issue and a view point in that issue.
3. Click the **View & Markup Tools** ribbon tab.

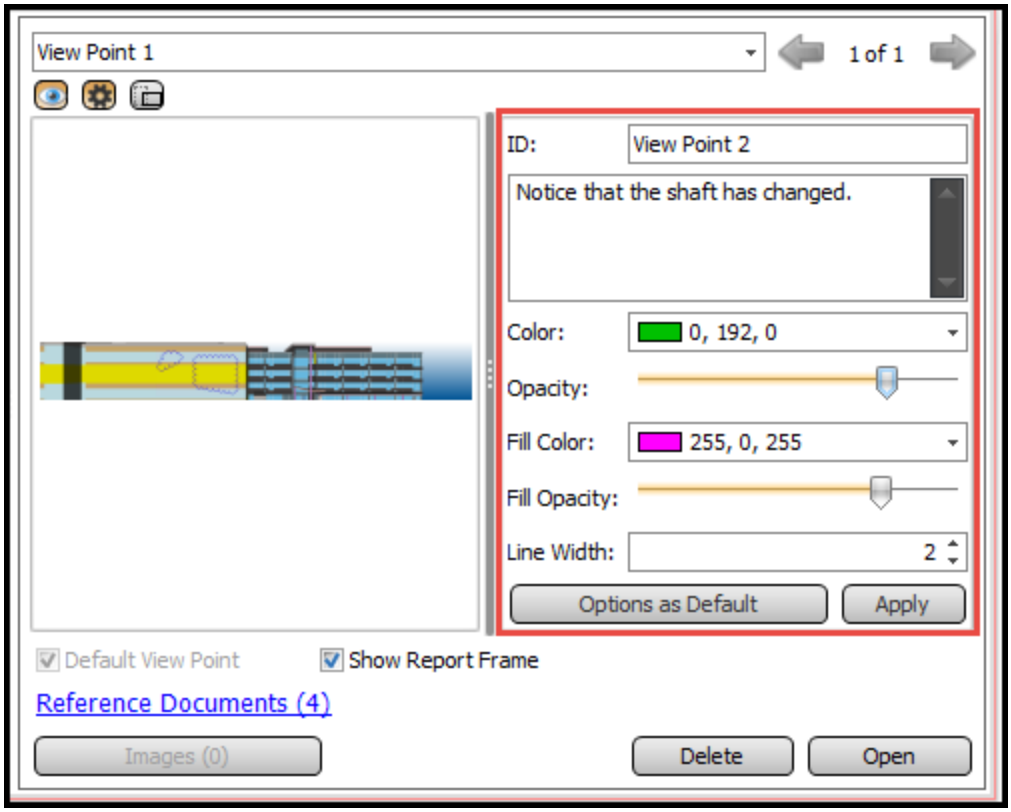
   The tab contains the **Markup Tools** group, which you can use to annotate the active saved view point.
4. On the ribbon, click **Pick Color**, and then select the color to be used for the markups.



5. On the ribbon, click one of the available tools, and add your markups.
   - **Freehand Tool:** Add line work to the view point as if you were using a pen. This allows you to add information in 'sketch mode'.
   - **Add Cloud:** Pick points around the areas of interest. The Constructability Manager automatically translates these points into a cloud shape. Multiple clouds can be created. Optionally set the appearance of your cloud. Switch to the Issue Card View and set your cloud appearance.
     - When selecting the color of cloud, it is recommended that you select a color that will yield the highest contrast. For example, if you are marking up a drawing that

has a brighter hue, selecting a darker color for the cloud will yield the best contrast.

- If you are placing a cloud markup on a drawing that has a fill color, you can choose to reduce the opacity of the cloud.
- Click **Apply** to set the appearance of the cloud.



- **Add Text:** Type text in the selected color in the model space.
- **Erase:** Delete any unwanted markup.
- **Finish Markup:** Click Finish Markup after entering all your markups.

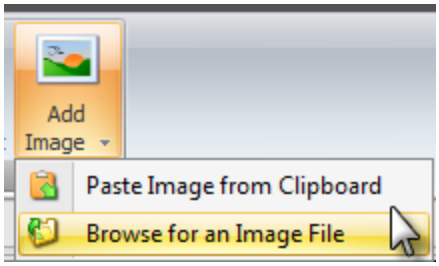
Note: All the markups are saved with the view point and are included in the constructability reports that can be generated with the Report Editor.

Attaching Images

In addition to view points, you can also save images with constructability issues. This functionality is added to let you attach segments of design documentation or pictures from the actual work.

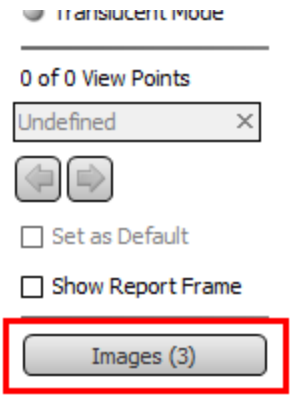
To attach images to constructability issues

1. Open the Manage Issues task.
2. Select a constructability issue.
3. On the **View & Markup Tools** ribbon tab, click **Add Image**.
4. Click one of the following options:
   - **Paste Image from Clipboard:** Insert the content of the Windows clipboard.
   - **Browse for an Image File:** Select an image file from a folder on your system.



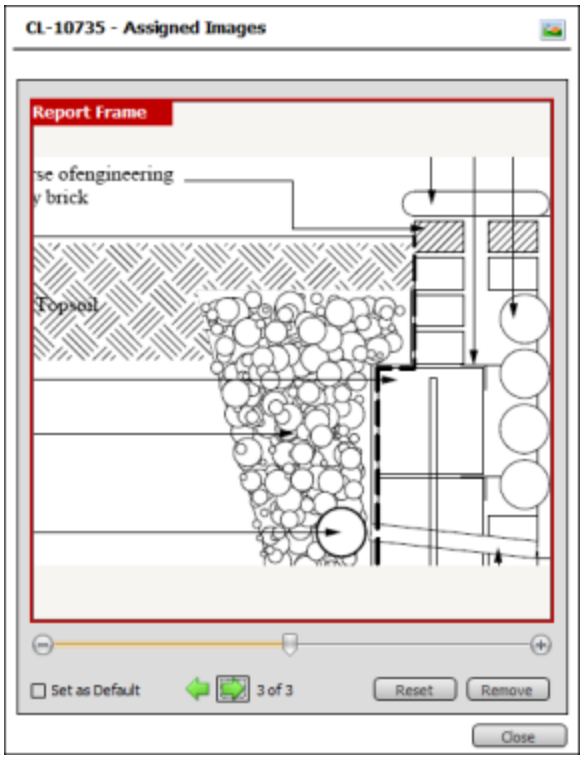
Images attached to a constructability issue are accessible in the **Card mode**. In the Constructability Issue panel to the right side of the Constructability Manager, click the **Images** button.

5. To review your attached images, click **Images**.



6. Review the images.
   - To cycle through the collection of attached images, use the arrow keys.
   - To zoom in and out, click the **+** and **-** buttons.
   - To set the image as the default, select the **Set as Default** check box.

- To delete the current image from the constructability issue, click **Remove**.



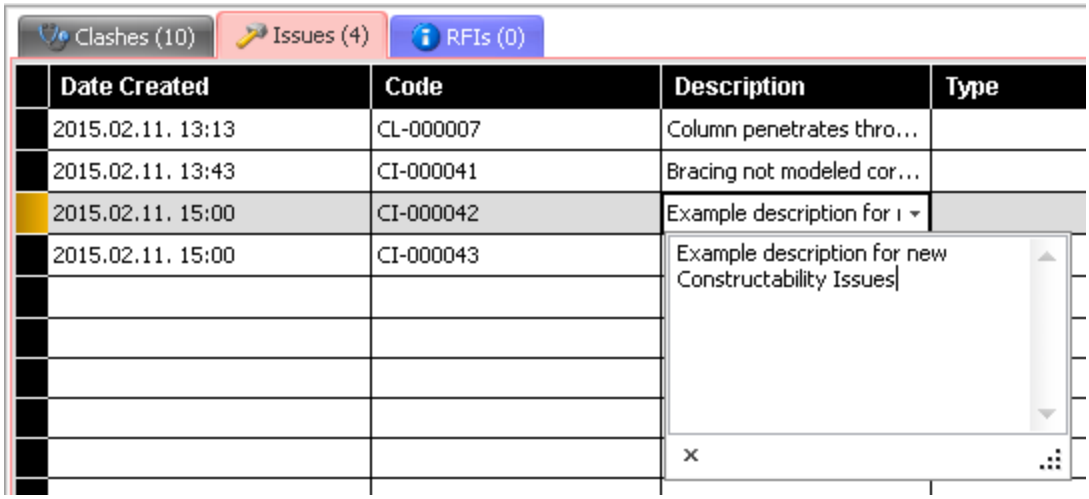
Adding a Constructability Issue

Sometimes a constructability issue (CI) is not the result of a detected clash, but rather a problem in the design that is detected during exploration of the project model. In this case, you can add constructability issues manually. You can also insert constructability issue objects in the model, so it is easier to review detected issues later.

To manually add a constructability issue to the project

1. Open the Manage Issues task.
2. On the **Issues List View**, click the **Issues** tab.
3. On the **Constructability Manager** tab, click **Add Issue**.

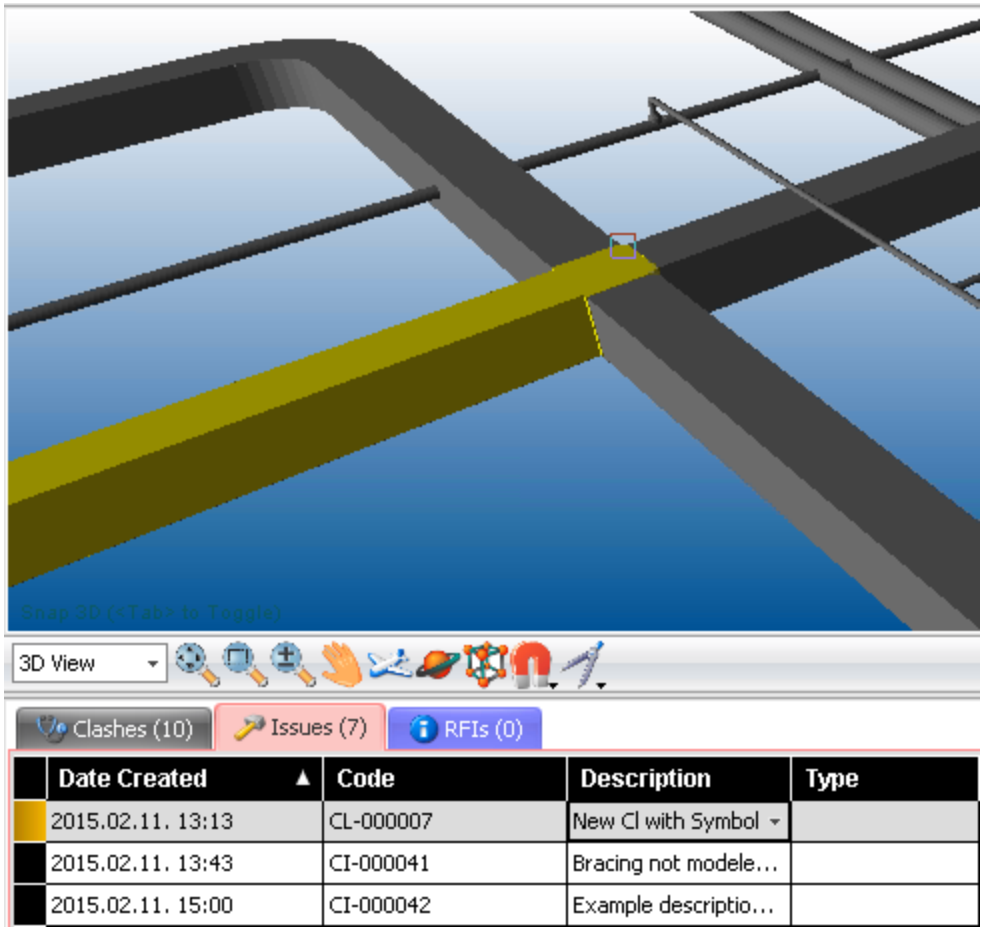
   An empty constructability issue is added to the list.
4. In the empty fields of the new issue, enter the information for the issue.



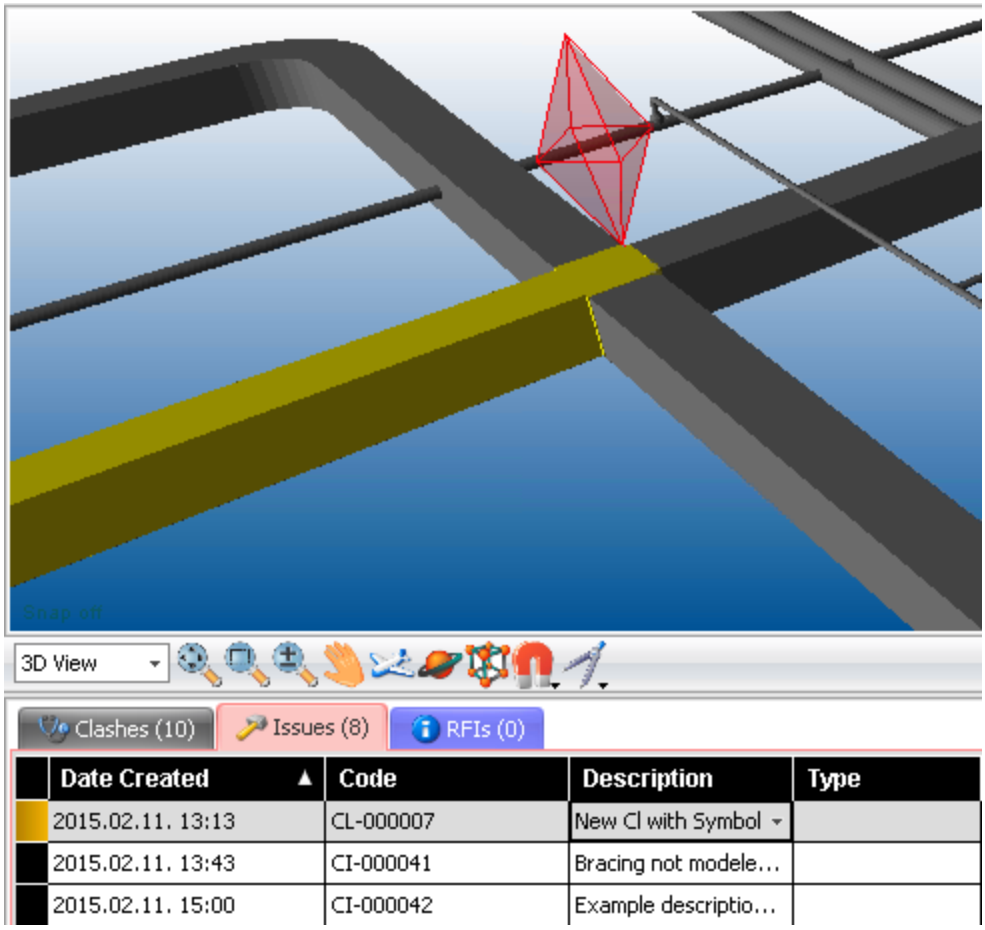
5. To insert a constructability issue with a marker in the **3D View**, click **Add Issue with Symbol** on the **Constructability Manager** ribbon tab.

   You can snap to the location in the 3D model where you detected the constructability issue.

6. To insert the constructability issue symbol, click the location in the model.



A constructability issue symbol is inserted in the model, and a new constructability issue is added to the list. The inserted symbol is highlighted when the related issue is selected in the list of constructability issues.



Adding BCF Issues

BIM Collaboration Format (BCF) is a universally accepted method of transferring issue information via XML files. It helps IFC users track and communicate around their design management issues. Users can also view constructability items in other supported IFC applications, as well as in and out of Vico Office.

Using Vico Office, import BCF files, which will automatically create BCF issues. Alternatively, you can manually add a BCF issue to the Issue List.

To import a BCF file

1. Open the Manage Issues task.
2. On the **Constructability Manager** tab, click **Import BCF.**
3. Select the BCF file to import and click **Open**.

   When importing a BCF file, all imported issues are marked as BCF.

To manually add a BCF issue

1. Open the Manage Issues task.
2. On the **Issue List View**, click the **Issues** tab.
3. On the **Constructability Manager** tab, click **Add BCF Issue**.

   - or -

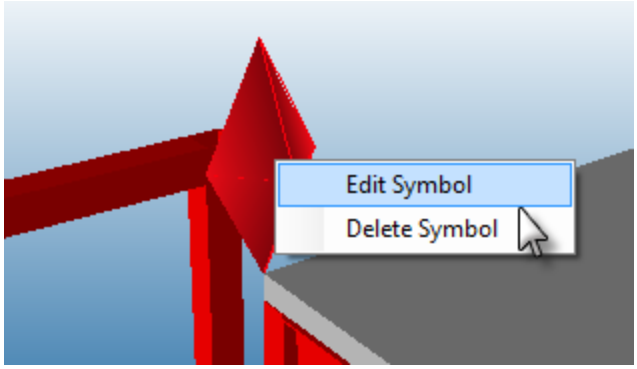
   Right-click on the Issues tab and select 'Create BCF Issue' from the context menu.

   A new row is added for the BCF issue. The 'Is BCF' check box is automatically selected to identify it as a BCF issue.
4. In the empty fields of the new BCF issue, enter any necessary information for the issue.

Changing the Location of CI Symbols

To modify the insertion point of a constructability issue symbol

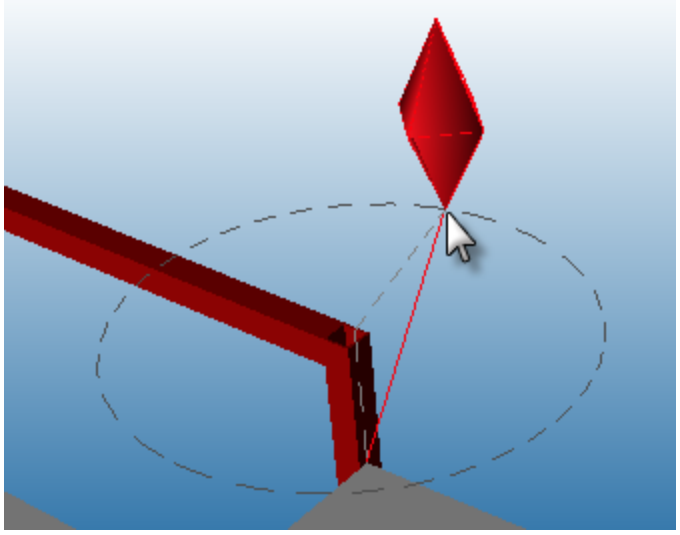
1. Open the Manage Issues task.
2. On the **3D View** ribbon tab, click **Selection Mode**.
3. Zoom to the constructability issue symbol that you would like to edit.
4. Right-click the symbol, and then click **Edit Symbol**.



   A circle and two lines are presented to indicate the current position of the CI symbol.
5. To drag the object to the desired location, click the bottom point of the object, and hold the mouse button while moving it.

   A leader is automatically added between insertion point and new location of the constructability

issue symbol.

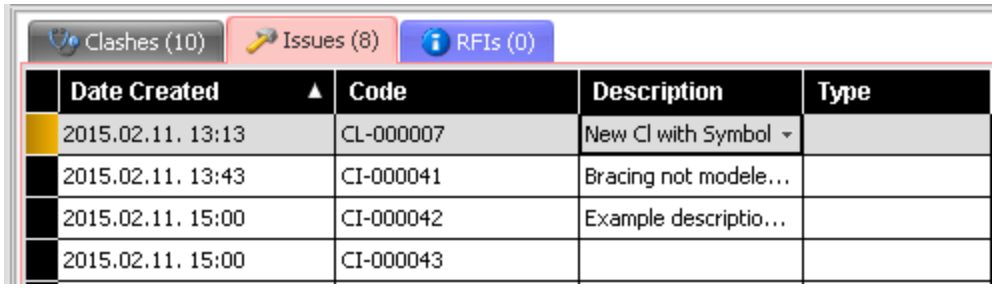


Adding Elements to a CI

After you add a constructability issue (CI) manually, either by inserting a constructability issue object or by adding a constructability issue to the list, you can associate elements from the model with it. By doing so, you enable Vico Office to automatically zoom to the area in the project where the issue was found.

To associate elements with a manually added constructability issue

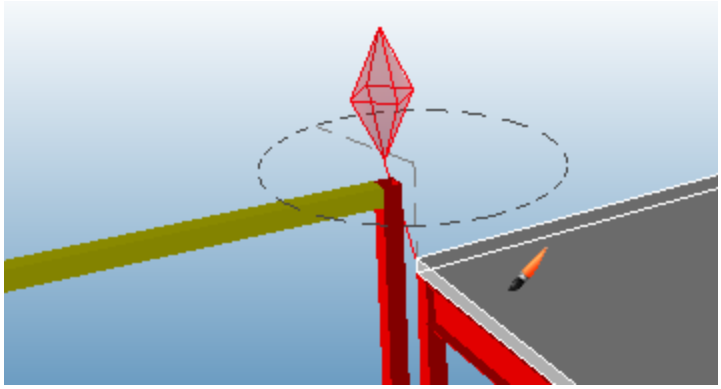
1. Open the Manage Issues task.
2. In the issues list of the Constructability Manager, select the constructability issue that you want to link 3D model elements.



3. On the **View & Markup Tools** tab, click **Add Elements**.
4. Move your cursor into the **3D View**.

The cursor changes into a paint brush.

5. Click the elements that you would like to associate with the selected constructability issue.

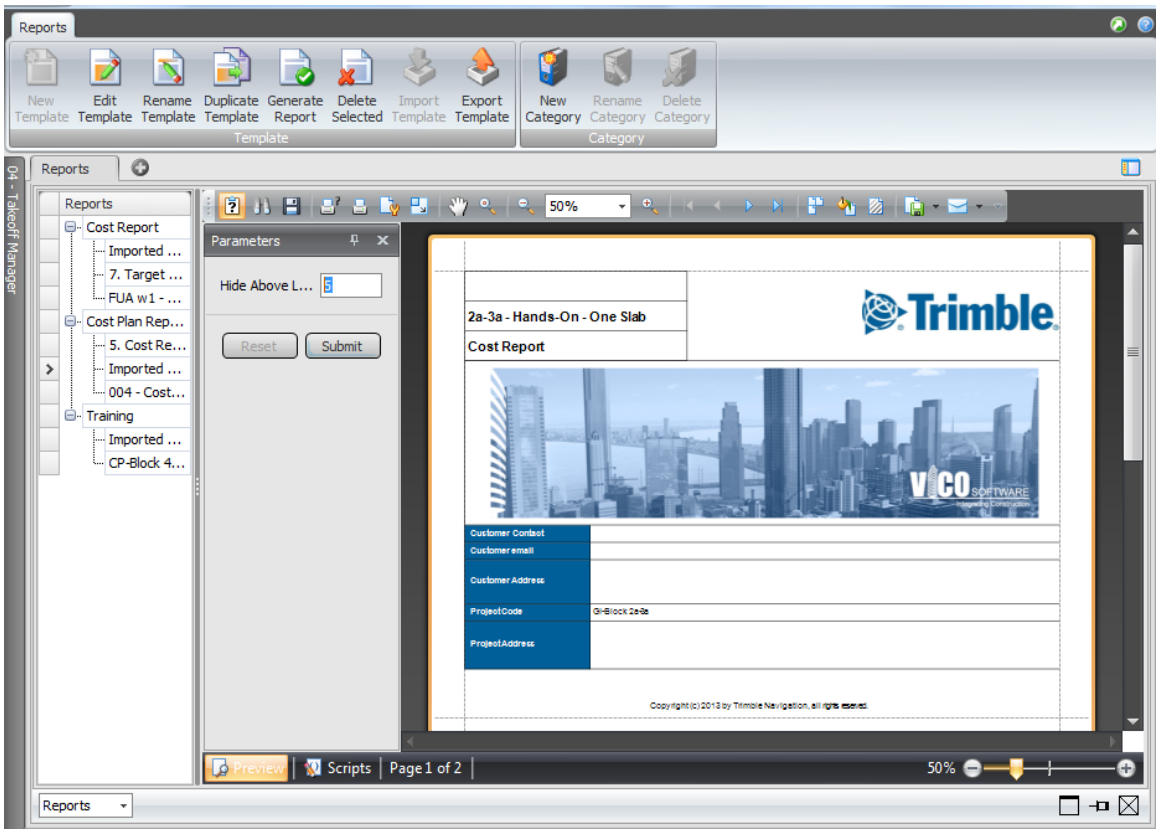


Note: This process also works with existing constructability issues, to which you would like additional elements on top of the elements that were found as 'clashing' during an automatic clash detection process.

Generating Reports

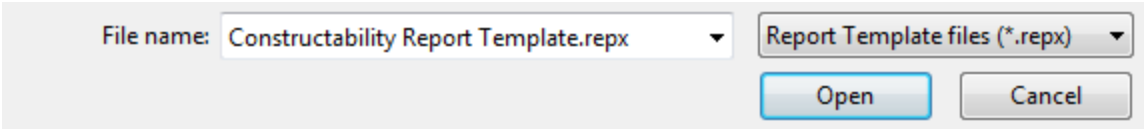
You can define custom report templates in the Report Editor.

Load predefined report template to the Vico Server by creating a report category (folder). The report template is applied to the current project data.



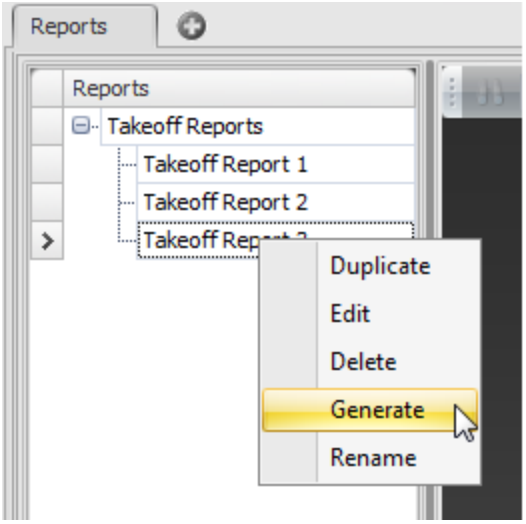
To generate a report with the current collection of constructability issues

1. Open the Create Reports task.
2. To create a category if none exist or to separate the constructability reports from the other reports, click **New Category** on the Reports ribbon tab.
3. To open the constuctability report template, click **Import Template**.
4. Browse to **Program Files/Vico Software/Vico Office/Report Templates**, and then select **Constructability Report Template**.



5. Click **Open**.
6. Right-click the report, and then click **Generate**.

Your report with the current collection of constructability issues is generated and includes the view points that you saved with the issues, as well as the attached images.



Tip: To run a report:

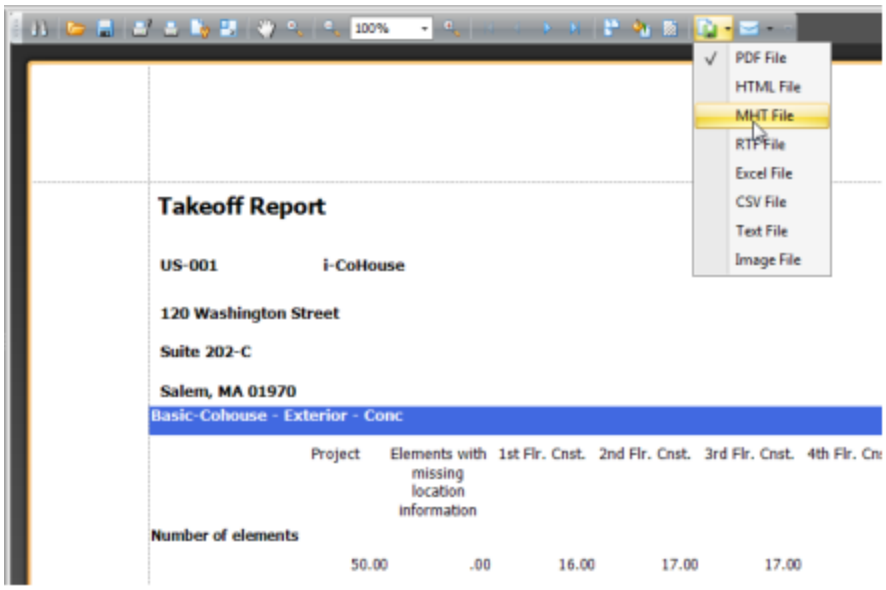
- Double-click the report.

  –Or–

  Click the **+** button next to report type to expand the section.

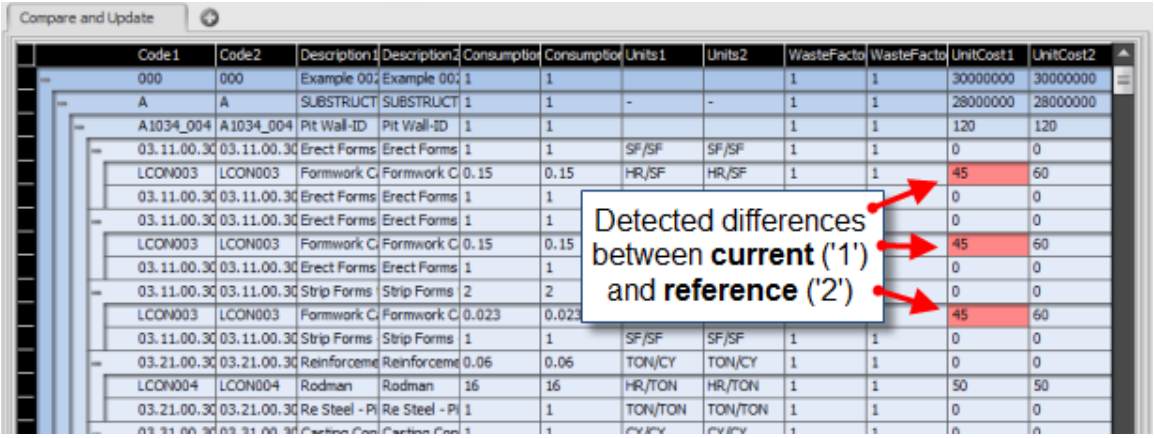
  1. In the left navigation of the **Reports** tab, select the **Report** row.
  2. On the ribbon, click **Generate Report**.

7. Save the report as a PDF file.


100%
PDF File
HTML File
MHT File
RTF File
Excel File
CSV File
Text File
Image File
Takeoff Report
US-001
i-CoHouse
120 Washington Street
Suite 202-C
Salem, MA 01970
Basic-Cohouse - Exterior - Conc
Project
Elements with missing location information
1st Flr. Cnst.
2nd Flr. Cnst.
3rd Flr. Cnst.
4th Flr. Cn
Number of elements
50.00
.00
16.00
17.00
17.00

Compare & Update

In the **Compare & Update** task, you can compare the current project status to earlier saved versions - called 'snapshots' in Vico Office - and other projects. This view shows the compared project information side-by-side and also color codes the cells where it finds differences between the current project status and the selected reference.



Code1	Code2	Description1	Description2	Consumption	Consumption	Units1	Units2	WasteFacto	WasteFacto	UnitCost1	UnitCost2
000	000	Example 002	Example 002	1	1			1	1	30000000	30000000
A	A	SUBSTRUCT	SUBSTRUCT	1	1	-	-	1	1	28000000	28000000
A1034_004	A1034_004	Pit Wall-ID	Pit Wall-ID	1	1			1	1	120	120
03.11.00.30	03.11.00.30	Erect Forms	Erect Forms	1	1	SF/SF	SF/SF	1	1	0	0
LCON003	LCON003	Formwork C	Formwork C	0.15	0.15	HR/SF	HR/SF	1	1	45	60
03.11.00.30	03.11.00.30	Erect Forms	Erect Forms	1	1					0	0
03.11.00.30	03.11.00.30	Erect Forms	Erect Forms	1	1					0	0
LCON003	LCON003	Formwork C	Formwork C	0.15	0.15					45	60
03.11.00.30	03.11.00.30	Erect Forms	Erect Forms	1	1					0	0
03.11.00.30	03.11.00.30	Strip Forms	Strip Forms	2	2					0	0
LCON003	LCON003	Formwork C	Formwork C	0.023	0.023					45	60
03.11.00.30	03.11.00.30	Strip Forms	Strip Forms	1	1	SF/SF	SF/SF	1	1	0	0
03.21.00.30	03.21.00.30	Reinforceme	Reinforceme	0.06	0.06	TON/CY	TON/CY	1	1	0	0
LCON004	LCON004	Rodman	Rodman	16	16	HR/TON	HR/TON	1	1	50	50
03.21.00.30	03.21.00.30	Re Steel - Pl	Re Steel - Pl	1	1	TON/TON	TON/TON	1	1	0	0

This is the result of a 'Cost' comparison between current project status and a reference. The software indicates that the cost per unit has changed from 45.00 to 60.00.

Besides detecting differences between 'current' and 'reference', the Compare & Update function also lets you synchronize the reference with the current project; you can do this per selected item or for all detected differences.

Compare & Update can compare data of the following types:

- Cost
- Cost including takeoff items
- Takeoff items
- Tags
- Models
- Constructability issues
- RFIs
- Project data
- Location systems

- LBS structure
- Task groups
- Tasks
- Target Costs
- Cost types
- Schedule Planner file
- Layout points
- Documents
- Work packages
- Takeoff Pads

To open the Compare & Update task

1. Right-click the Workflow Panel header, and then click **Master Workflow**.
2. In the **Reporting & Data Mining** workflow group, click **Compare & Update**.

   The default viewset includes the Compare & Update view.

Starting a Comparison

You can look for changes between current project data and data from an earlier saved snapshot or from a reference. The reference can be another project or data set that contains company standard information such as unit cost.

To start a comparison between the current project data and a reference

1. Open the Compare & Update task.
2. On the **Compare & Update** ribbon tab, click **Setup Comparison**.
3. In the **Compare and Update Settings** dialog, select the project snapshot or other project to compare the current project status with, and then click **OK**.

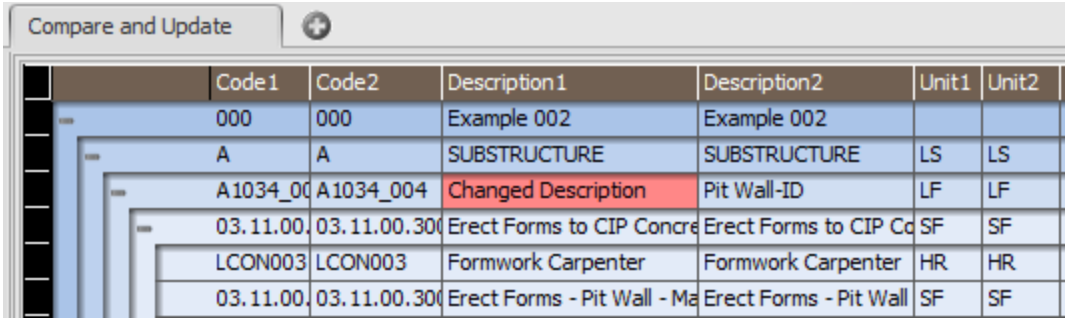
   You can compare one snapshot or other project to the current project status at a time.

   By default, the **Cost Comparison Preset** is loaded, and the cost assemblies and components of current project ('1' columns) and selected reference ('2' columns) are presented side-by-side.
4. To compare a different type of content, click **Comparison Preset**, and then select one of the available options:

- **Cost**: The default option and compares assemblies and components as defined in Cost Planner.
- **Cost Takeoff:** Compares assemblies and components, as well as the takeoff items and takeoff quantities that were used in the component formulas.
- **Takeoff:** compares takeoff items and takeoff quantities and allows for analysis of quantity variance.
- **Tags**: Compares the collection of tags and tag values.
- **Models**: Compares models and model versions and allows for quickly copying model content from one project to another.
- **Constructability Issues:** Compares the collection of managed constructability issues with ID, Name, Comment and Date Found.
- **RFIs**: Provides a comparison between the set of requests for information between current status and selected reference.
- **Project data:** Compares the project settings between the current project to the referenced one.
- **Location systems**: Compares the location systems names and any linked tasks between the current project and the referenced one.
- **LBS structure:** Compares the LBS structure
- **Task groups**: Compares the task groups
- **Tasks:** Compares the tasks and allows for analysis of the linked location systems, the groups to which they belong, and any linked components and TOQs.
- **Target Costs**: Compares the target rate and cost
- **Cost types:** Compares the cost types that were defined for the projects
- Schedule Planner file:
- **Layout points:** Compares the layout points, which includes various attributes, such as color, size, and reference points.
- Documents
- **Work packages**: Compares the projects' work packages, including the mapped components, markup adjustments and linked tag values.
- Takeoff Pads

After selecting the comparison preset, the result is presented in the Compare & Update grid.

Differences between the two datasets (current and reference) are displayed in red cells.

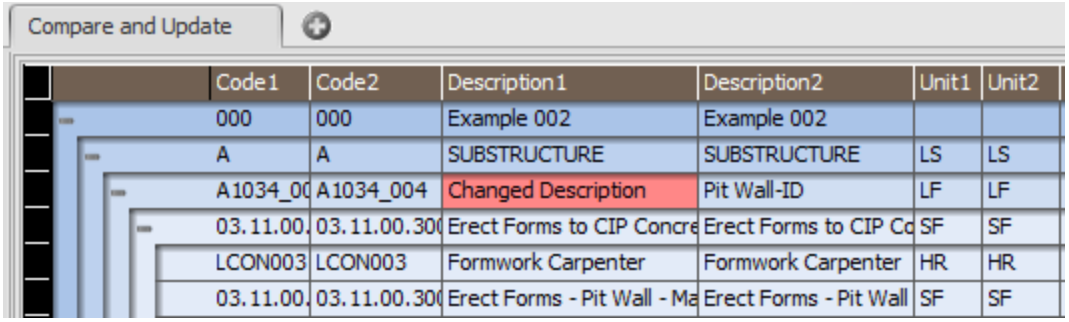


Updating the Current Project

After running a comparison between the current project data and selected reference, differences between the two data sets are highlighted in red. You can synchronize the two versions, so the content that is different in the reference is automatically copied to the current project.

To update the current project data to match the selected reference

1. Open the Compare & Update task.
2. With a comparison of current project status to reference, analyze the **Compare & Update Grid** to see if there are any differences between the two data sets.



3. If there are differences, and you want to make the content in the current project identical to the content in the selected project, click **Update All** on the **Compare & Update** ribbon tab.

   Vico Office automatically copies all content that is different or missing in the current project from the reference to the current project.

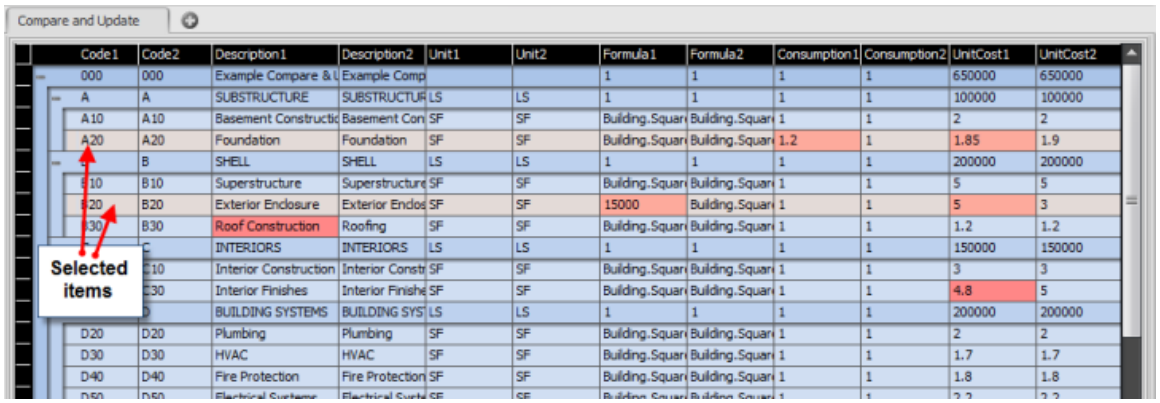
Updating Selected Items

Rather than copying all the different or missing content from the reference to the current project, you can copy a selected subset of data.

To copy only selected items from the reference to the current project

1. Open the Compare & Update task.
2. To select the items that you would like to update, click them.

   Tip: To select multiple items, hold the **SHIFT** or **CTRL** key while clicking the items.



3. After completing the selection, click **Update Selected**.

   The content of the selected items are copied from the reference to the current project, and the cells that were previously red are now identical.

Isolating Differences

Large data sets may contain differences that are detected in various places in the project, so differences may be hard to find. You can isolate the differences in the data set to be able to quickly review these.

To show only content that has differences

1. Open the Compare & Update task.
2. Select a reference for comparison and a preset to view the difference.
3. On the **Compare & Update** ribbon tab, click **Isolate Differences**.

   Only the content with differences between the reference and the current project is displayed. The content without differences is hidden.

Copying Models

The Compare & Update view is a great tool for synchronizing cost and other project data, but can also be used to copy models from one project to another. Using the 'Models' preset, model data can easily be

transferred.

To copy models from one project to another in the Compare & Update view

1. Open the Compare & Update task.
2. Select the project that contains the model or models that you want to copy.
3. On the **Compare & Update** ribbon tab, click **Comparison Preset**, and then click **Models**.

   Vico Office presents the list of models and model versions. Models and versions that exist in the selected project but not in the current project are marked red.
4. Select the models that you would like to copy to the current project, and then click **Update Selected** on the **Compare & Update** ribbon tab.

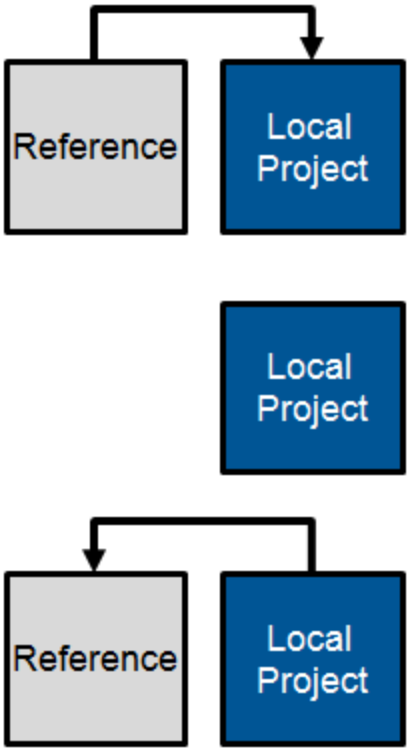
   All the model data of the selected models is now copied to the current project.
5. To make them visible in the current project, activate the copied models in the Model Register task.

Working Offline

Offline work is supported through the Compare & Update function in Vico Office.

To work offline on a project that exists on a project server

1. Create a project on the system that will be taken offline.
2. Run the **Compare & Update** function, and copy all project content from the project server to the new project.
3. Connect to the project server and open the project from the server.
4. Run the **Compare & Update** function, and copy the changes to the server.


Reference
Local Project
Local Project
Reference
Local Project

Manage Layout Points

The **Layout Manager** view integrates the design and construction processes. You can place virtual survey points into the desired position in the BIM and publish these points for use in the Total Station. This allows you to really "build the design" and prevent costly errors. Comparison of "As Built" to "As Designed" is enabled by importing the points measured on the site back into Vico Office.

The **Layout Manager** view provides the required functionality to support this process. A typical workflow includes creating a folder structure to store the points, defining project origin, adding layout points, exporting the points to a CSV file and importing "As Build" points back to VO. The goal here is to check for critical tolerances, as MEP in particular, can be very congested.

In the **Layout Manager** view, you can:

- Create layout points.
- Export model points to the field device, so the operator can easily mark points in field.
- Bring field points back into Vico Office for validation and checking.

The **Layout Manager** view ensures accurate construction processes, prevents construction errors, and helps to obtain an "As Built" document set.

To open the Manage Layout Points task

1. Right-click the Workflow Panel header, and then click **Layout Manager**.
2. In the **Layout Management** workflow group, click **Manage Layout Points**.

   The default viewset includes the Layout Manager view and 4D View.

Adding Folders and Setting Folder Properties

The **Layout Manager** view supports an n-tiered folder structure, so you can organize and manage the layout points. Points can be moved from one folder to another. The Project folder is the root folder.

To create a folder

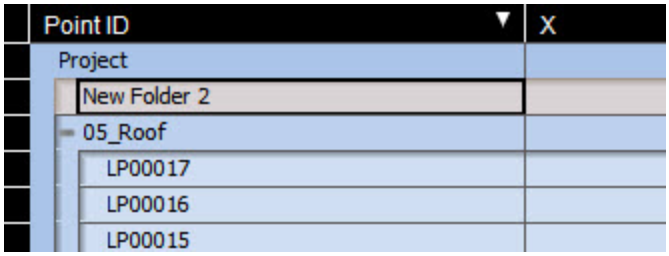
1. Open the Manage Layout Points task.
2. Select the parent folder.
3. On the **Manage Layouts** ribbon tab, click **Add Folder**.

   –Or–

   In the context menu, click **Add Folder**.

A new folder with a default name is created under the selected folder.

4. Double-click or use the context menu option to rename the folder.

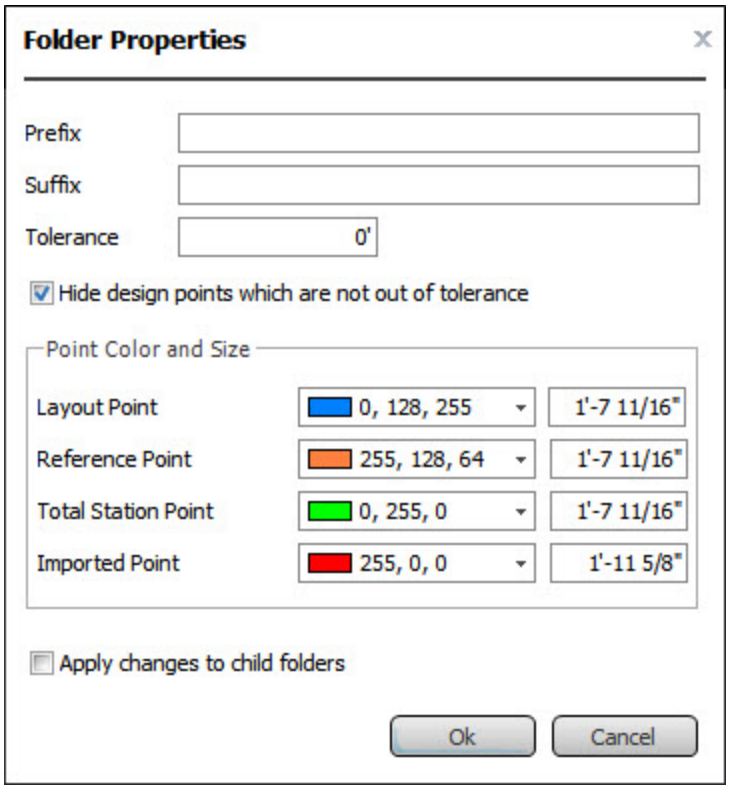


Folder Properties

Folder properties include default prefixes and suffixes for newly added points, tolerance values (when comparing design points and imported actual points), and control over the size and color of the included points in the 3D view.

To set folder properties

1. Right-click a folder name, and then click **Folder Properties**.
2. Review and change the properties.

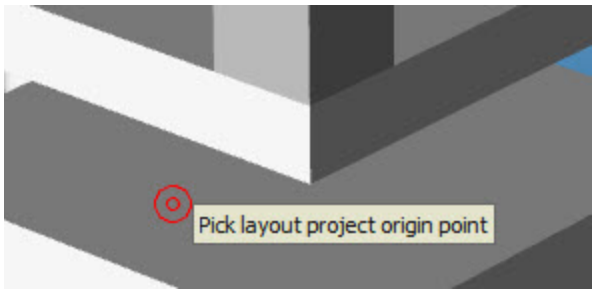


Setting and Editing Project Origin

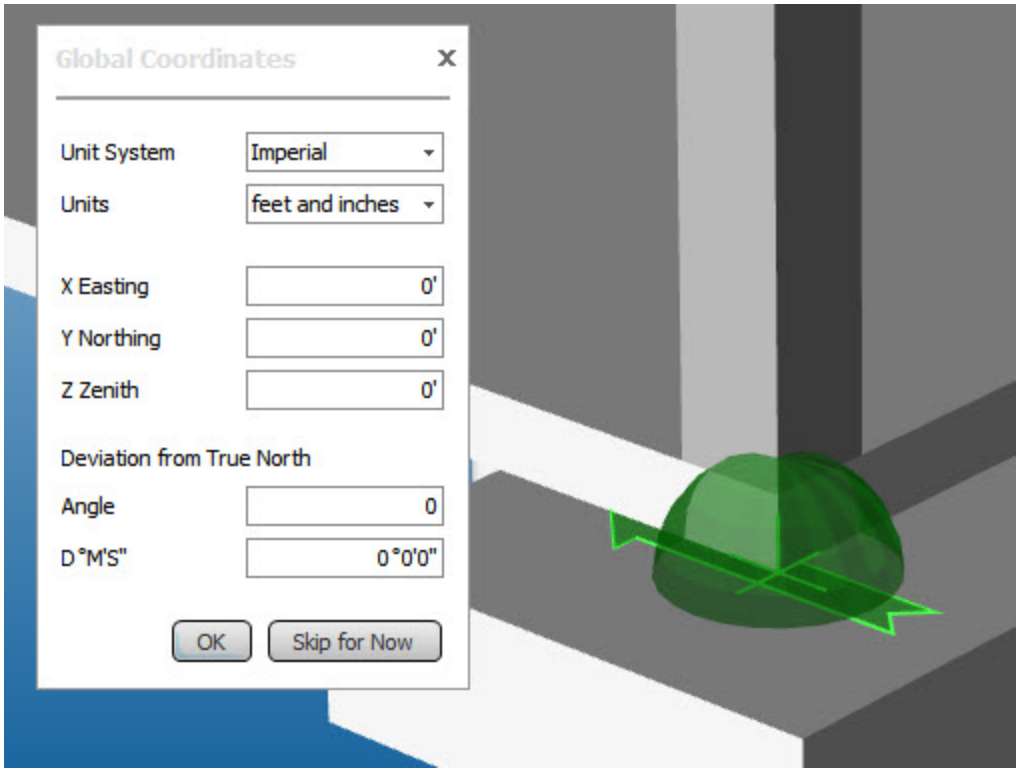
The project origin point defines the origin (0,0,0) of the project coordinate system from which all layout point coordinates are driven. To connect the local project origin point with a survey point that represents a known point in the physical world, use global coordinates.

To set the project origin

1. Open the Manage Layout Points task.
2. On the **Manage Layouts** ribbon tab, click **Set Project Origin**.
3. Snap to a point in the 3D model.



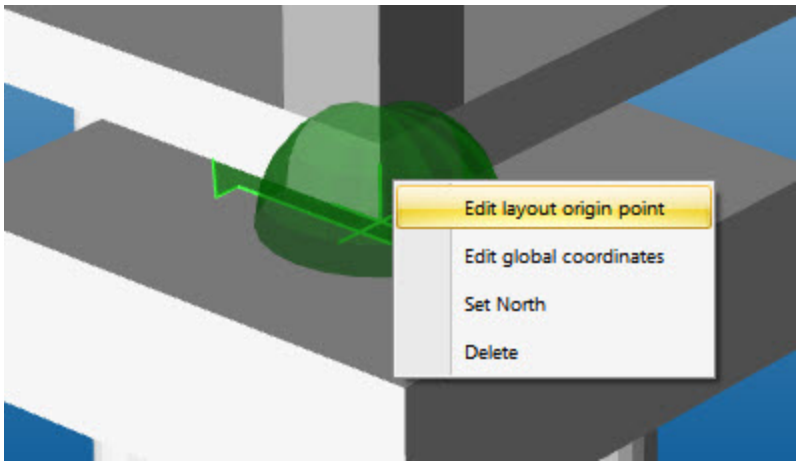
4. *Optional:* Edit the global coordinates values.



5. Click **OK**.

To edit the project origin

- Right-click the project origin point, and then click **Edit layout origin point**.



To edit global coordinates

1. Right-click the project origin point, and then click **Edit Global Coordinates**.
2. In the **Global Coordinates** dialog, set the **Unit System** and **Units**, which can be different from the project units.
3. Specify the X Easting, Y Northing, and Z Zenith values and the deviation from True North, and then click **OK**.

   The global coordinates for all layout points are calculated automatically.
4. On the **Manage Layouts** ribbon tab, click **Global Coordinates** to toggle between local and global coordinates.

Adding and Editing Layout Points

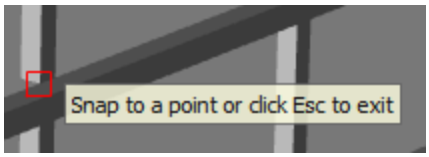
To add a layout point

1. Open the Manage Layout Points task.
2. Select a folder in the spreadsheet.
3. On the **Manage Layouts** ribbon tab, click on the **Add Point**.

   –Or–

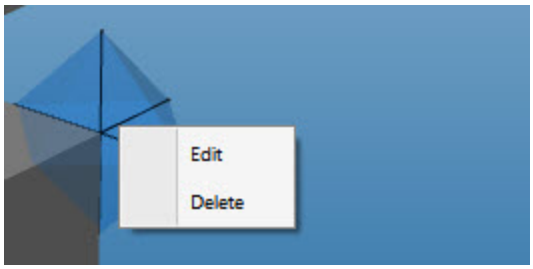
   In the folder context menu, click **Add Point**.
4. Snap to a point in the 3D model.

5. Add additional points, or click **Esc** to exit.



To edit a layout point

1. Right-click a point in the 3D view, and then click **Edit**.



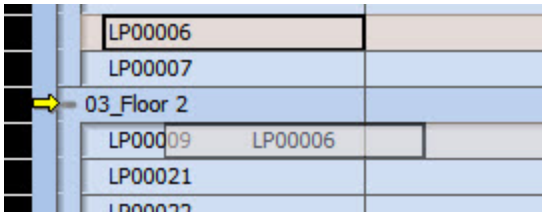
2. Snap to the desired point in the 3D model.

To delete a layout point

1. Right-click a point in the 3D view, and then click **Delete**.
2. In the confirmation dialog, click **OK**.

To move a layout point to another folder

1. Click and drag a layout point.
2. Point to cursor at the target folder, and then release the mouse button.



Add Elements, Highlight and Isolate

3D elements can be associated with layout points. Associated elements are highlighted when a related layout point is selected. Additionally, to verify the context of a specific set of points in the 3D View, the elements can be isolated.

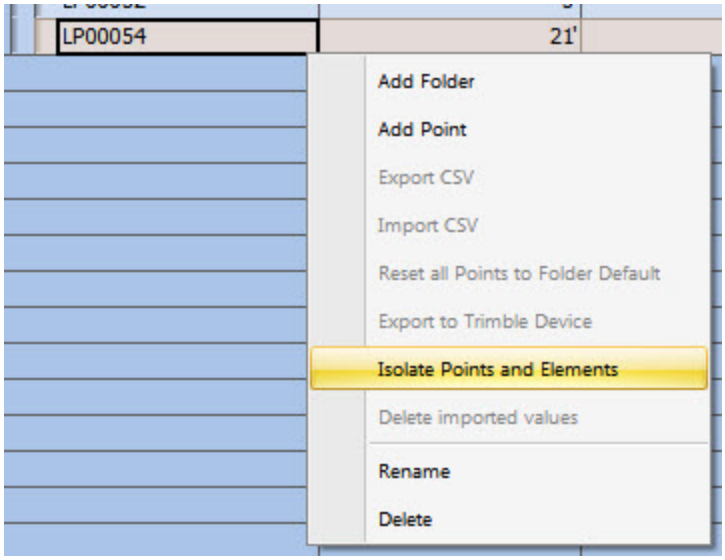
To associate a 3D element with a layout point

1. Open the Manage Layout Points task.
2. Select a folder, a point or a set of points.
3. On the **Manage Layouts** ribbon tab, click **Add Elements**, and then select a 3D element in the **3D View**.

   The 3D element is associated with the selected points.
4. Select a related Layout Point - 3D Element highlights.

To isolate 3D elements

1. Open the Manage Layout Points task.
2. Right-click a folder or a point with associated 3D elements, and then click **Isolate Points and Elements**.



The selected point and the associated 3D element are isolated in the **3D View**.

Exporting Layout Points

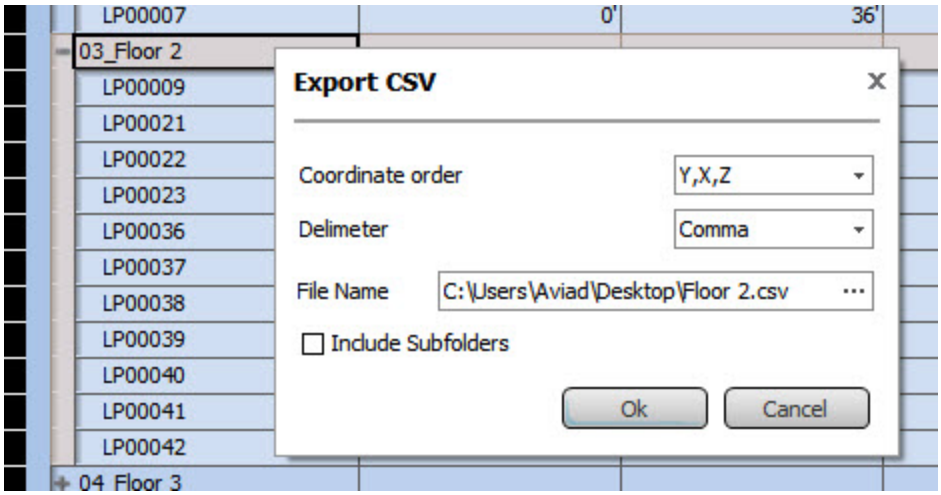
Export points from Vico Office into the handheld device and shoot the points out on the jobsite. This process streamlines the field placement of structural, architectural, mechanical, electrical, and plumbing (MEP) engineering systems.

To export layout points

1. Open the Manage Layout Points task.
2. Select a folder to export.
3. On the **Manage Layouts** ribbon tab, click the **Export CSV** button.

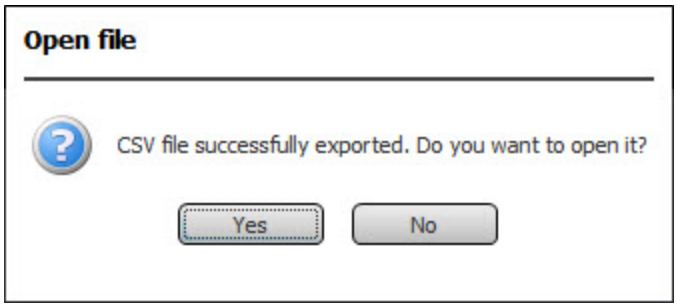
   –Or–

   In the context menu, click **Export to CSV**.
4. In the **Export CSV** dialog, select the required coordinate order, set the delimiter type, specify file name, and select the **Include Subfolder** check box to include points from all subfolders.



5. Click **OK**.

6. In the **Open File** dialog, click **Yes** to view the output file.



Importing Layout Points

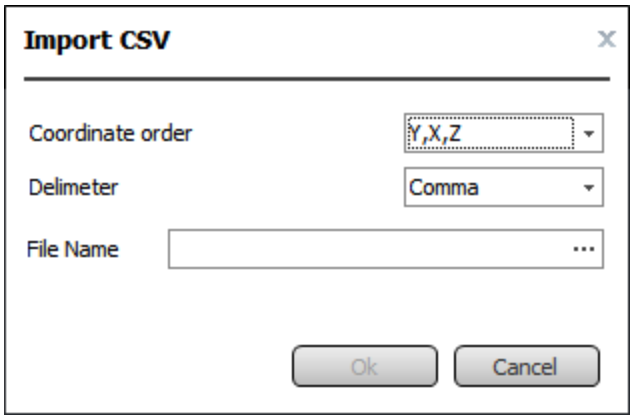
By importing points back to Vico Office project team van verify the quality of construction and check acceptable tolerances using the building model. When as-built conditions are combined and overlaid with the model, the contractor can make sure that all structures are built according to specification.

To import layout points

1. Open the Manage Layout Points task.
2. Select the target folder.
3. On the **Manage Layouts** ribbon tab, click **Import CSV**.

   –Or–

   In the context menu, click **Import to CSV**.
4. In the **Import CSV** dialog, select the required coordinate order, set the delimiter type, and select the file to import.



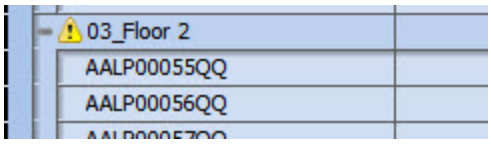
5. Click **OK**.

   The **Layout Manager** view automatically adds the **X'**, **Y'**, **Z'** columns for the imported points. **Distance**, **Out of Tolerance**, and **Percent** columns are also available.

6. Analyze the imported data.

   a. Check the defined tolerance in the folder properties.

      An exclamation mark to the right of the folder name indicates that the folder includes "out of tolerance" points.



   b. Check the included points properties.

      - The **Distance** column presents the distance between the design and the actual points.
        - Black font: Design=actual value.
        - Green font: Distance between the design and the actual points is within the defined tolerance.
        - Red font: Distance between the design and the actual points exceed the defined tolerance.
      - The **Out of Tolerance** columns specify the exceeded value of the distance on top of the defined tolerance.
      - The **Percent** column specifies the exceeded value as a percentage of the defined tolerance.
      - The **Delta X, Y and Z** columns represent the delta on each of the axes between the design and the actual points.

Force match

Automatic matching of the imported points to the design points is based on the Point ID. If the Point ID of the imported point is not equal to the design point, a new row is added in the target folder. This row includes only actuals (imported values). To match the imported row item with a design point, drag and drop the imported row on the respective design point row.

Work Packages

In work packages, you can group estimate work items in the way you intend to procure them. The work package module is used to establish the link between work items and subcontractor pricing by mapping cost assemblies and components to defined work packages.

Bids can be evaluated, compared, and allocated to the estimate, thus, providing more opportunities to find the optimum bid for your wallet.

The **Work Package Manager** module includes two dedicated tasks:

- Define Work Packages: Create work packages that can be investigated from different points of view.
- Manage Bids: Add, normalize, and compare quotes.

To open the Define Work Packages task

1. Right-click the Workflow Panel header, and then click **Work Package Manager**.
2. In the **Work Packages** workflow group, click **Define Work Packages**.

To open the Manage Bids task

1. Right-click the Workflow Panel header, and then click **Work Package Manager**.
2. In the **Work Packages** workflow group, click **Manage Bids**.

   The default viewset includes the Bid Manager view.

Define Work Packages

The **Define Work Package** task includes the following default viewsets that are used for creating and investigating work packages:

- **Work Package Manager:** Create work packages and summary work packages.
- **Work Package Manager & Cost Plan:** Map the cost components and assemblies (work items) to each work package while comparing the estimated costs with the bidder's given values. After you map the components and assemblies to each work package, they contain the model-based quantities that bidders can use later.
- **Work Package Manager & 3D:** Review the scope of the work packages and verify that there were no mistakes during the mapping process by checking the assigned elements. You can reassign them into different work packages as needed and look at work packages side-by-side with the 3D View.

- **Work Package Manager & Chart:** Graphically view the costs of each work package in a bar chart or a pie chart.

The default viewsets include the following views:

- Work Package Manager view
- Cost Planner view
- Graph View
- 3D View

To open the Define Work Packages task

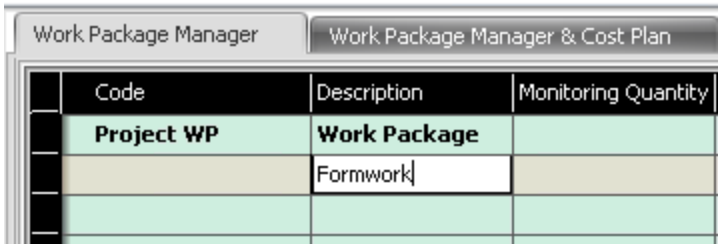
1. Right-click the Workflow Panel header, and then click **Work Package Manager**.
2. In the **Work Packages** workflow group, click **Define Work Packages**.

Creating a Work Package

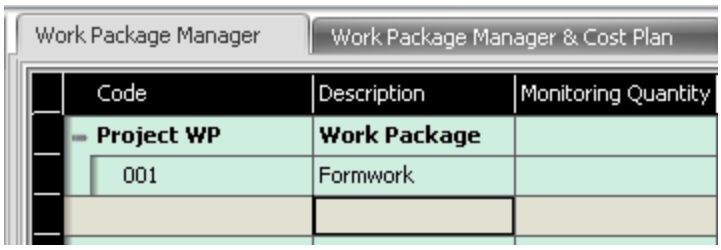
Work packages are typically defined by trades. In larger projects, a scope may be subdivided into multiple packages.

To create a work package

1. Open the Define Work Packages task.
2. Click an empty cell, and then type the name of the package.



The newly created work packages are numbered (Work Package 001, Work Package 002, and so on) and added below the selected one.

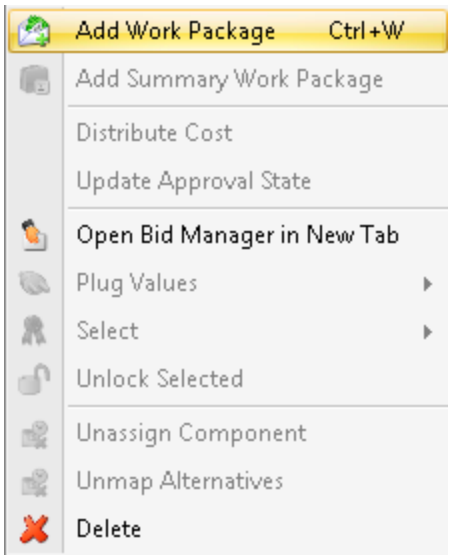


Note: Codes are automatically generated individually for each work package, but you can modify these codes at anytime.

Alternative Steps for Creating a Work Package

You can create also create a work package by doing one of the following:

- Select an existing work package (or the project work package that is a default summary work package), and then click **Add Package** on the **Work Package Manager** ribbon tab.
- Right-click an existing work package (or project work package), and then click **Add Work Package**.



- Click an existing work package, and then press **Ctrl** + **W**.

The hierarchy of work packages can be changed by adding them to a summary work package. For more information, see **"Adding a Summary Work Package" on page 544**.

Work packages can also be imported from Excel. For more information, see "Exporting to/Importing from Microsoft Excel" on page 570.

Deleting a Work Package

You can delete work packages that do or do not have content. You can also delete awarded work packages; however, you must change its status before deleting it.

To delete a work package without content

1. Open the Define Work Packages task.
2. Select the work package that you want to delete.

   You can select multiple work packages.
3. On the **Work Package Manager** ribbon tab, click **Delete Selected**.

   –Or–

   Right-click the selected work package, and then click **Delete**.

   The selected work packages are deleted.

To delete a work package with content

1. Open the Define Work Packages task.
2. Select the work package that you want to delete.
3. On the **Work Package Manager** ribbon tab, click **Delete Selected**.

   –Or–

   Right-click the work package, and then click **Delete**.
4. In the confirmation dialog, click **OK.**

   The components are unassigned, and the work package is deleted.

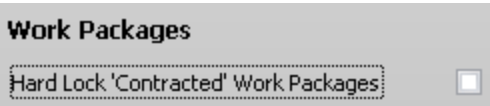
Deleting an Awarded Work Package

The status of an awarded work package must be changed before you can delete it.

To delete an awarded work package

1. Open the Define Work Packages task.
2. Select the work package that you want to delete.
3. Right-click the work package, and then click **Unlock Selected**.

   Note: If the bidder was selected as Contracted, click **Define Settings** in the Workflow Panel, and then clear the **Hard Lock 'Contracted' Work Packages** check box.

To indicate that the work package is not awarded but was before, the box icon/lock icon changes to an opened lock .

4. On the **Work Package Manager** ribbon tab, click **Delete Selected**.

   –Or–

   Right-click the work package, and then click **Delete**.

   The work package is deleted. The mapped components are also unassigned, making them available in the **Cost Planner** view again.

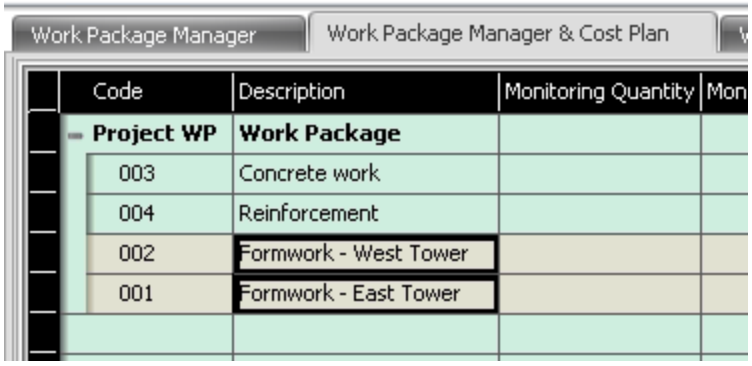
Adding a Summary Work Package

After creating work packages, you can group them in summary work packages. Summary work packages allow for subdividing a scope of work into multiple sub work packages.

Note: The **Add Summary Package** button is enabled only after selecting at least two work packages.

To create a summary work package

1. Open the Define Work Packages task.
2. Select a set of work packages.

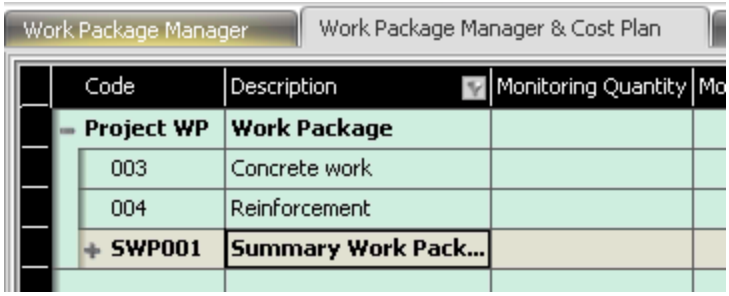


3. On the **Work Package Manager** ribbon tab, click **Add Summary Package**.

   –Or–

   Right-click the selected set, and then click **Add Summary Work Package** from the drop-down menu.

   A summary work package is created with all the selected work packages and added to the bottom of the list.



Note: The summary information in the summary work package is read-only and is based on the calculated data from the work packages.

To edit a summary work package

1. Open the Define Work Packages task.
2. To expand the summary work package, click the plus (+) icon.
3. To add existing work packages to the summary work package, drag them inside of the summary work package.
4. To remove work packages from the summary work package, drag them outside of the summary work package.

   After changing the content of the summary work package, values are automatically updated.

Note: The **Project** line item is a summary work package, and work packages cannot removed from it.

Deleting a Summary Work Package

Important: When you delete a summary work package, each included work package is deleted as well.

To delete an empty summary work package

1. Open the Define Work Packages task.
2. Select the summary work package that you want to delete.
3. On the **Work Package Manager** ribbon tab, click **Delete Selected**.

   –Or–

   Right-click the summary work package, and then click **Delete**.

   The selected summary work package is deleted.

To delete summary work packages with work packages

1. Open the Define Work Packages task.
2. Select the summary work package that you want to delete.

3. On the **Work Package Manager** ribbon tab, click **Delete Selected**.

   –Or–

   Right-click the summary work package, and then click **Delete**.

   A confirmation dialog asks you to confirm whether you want to delete the work packages included in the summary work package.

4. To keep the work packages, click **Cancel**, and then remove the work packages from the summary work package before deleting it.

   –Or–

   To delete the summary work package and its included work packages, click **OK**.

Deleting a Summary Work Package with Awarded Content

Change the status of the awarded work packages that are contained in the summary work package before deleting it. If the summary work package contains individual work packages, you must first remove them.

To delete a committed summary work package

1. Open the Define Work Packages task.
2. To expand the summary work package and see the committed work package, click the plus (+) sign.
3. Right-click the committed items, and then click **Unlock Selected**.

   To indicate that the work package is not awarded, the lock icon changes to an opened lock .

4. Select the summary work package, and then click **Delete Selected** on the **Work Package Manager** ribbon tab.

   –Or–

   Right-click the summary work package, and then select **Delete**.

   If there are work packages in the summary work package, you are prompted to either delete or keep the work packages.

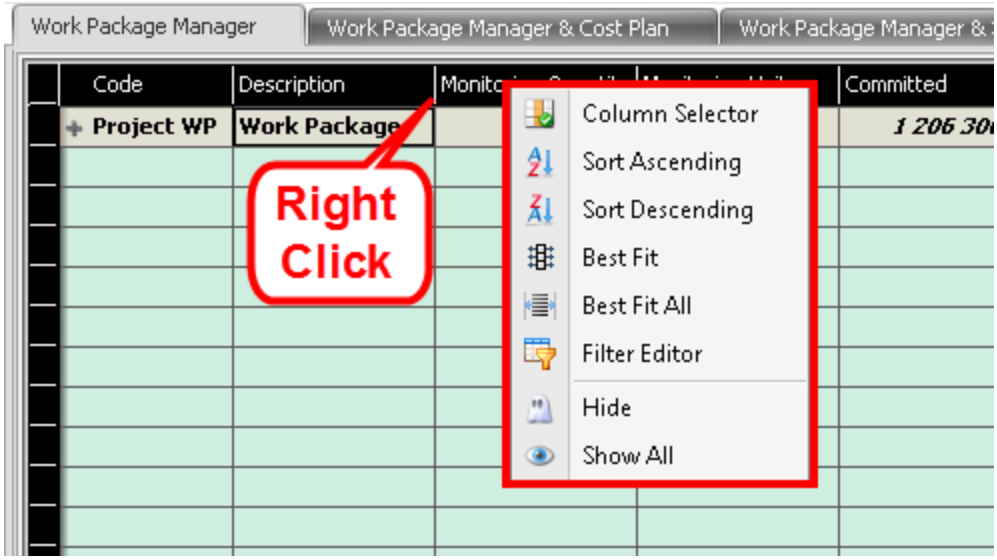
5. To keep the work packages, click **Cancel**, and then remove the work packages from the summary work package before deleting it.

   –Or–

   To delete the summary work package and its included work packages, click **OK**.

View Options in the Work Package Manager

When you right-click the header of the Work Package Manager spreadsheet, a set of filtering options and a spreadsheet editor are available to help you set up the most convenient view.



View Option	Description
Column Selector	Choose the columns that you want to be visible in the spreadsheet. The chosen columns are indicated with a green check mark.
Sort Ascending	Sort the line items from A-Z.
Sort Descending	Sort the line items from Z-A.
Best Fit	Size the current column to show the entire content in one line.
Best Fit All	Size every column to show the entire content in one line.
Filter Editor	Filter the spreadsheet for a specific content.

View Option	Description
Hide	Hide the current column.
Show All	Show every column without selecting them one by one.

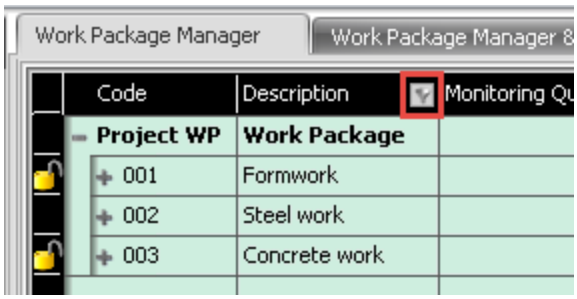
Filtering in the Work Package Manager View

Filtering the work package content can be helpful to create a focused view on a subset of work packages or buyout items for further analysis. You can filter the work packages based on any of the data fields in the **Work Package Manager** view. You can also filter by work packages and by mapped components.

To filter by work package

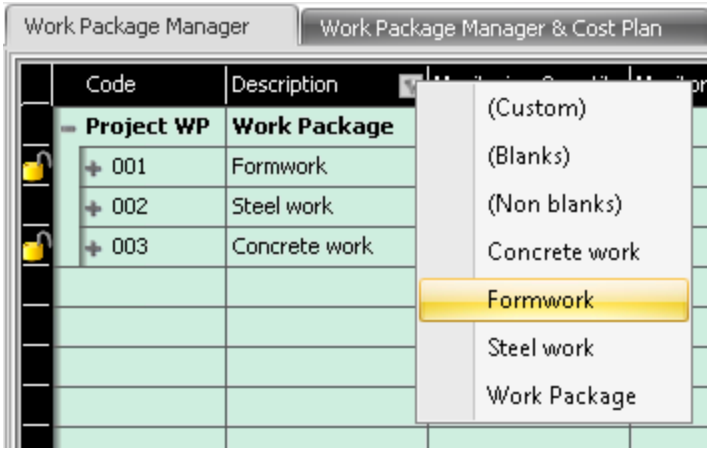
1. Open the Define Work Packages task.
2. Point the cursor to the column header.

   A funnel icon appears in the column header.

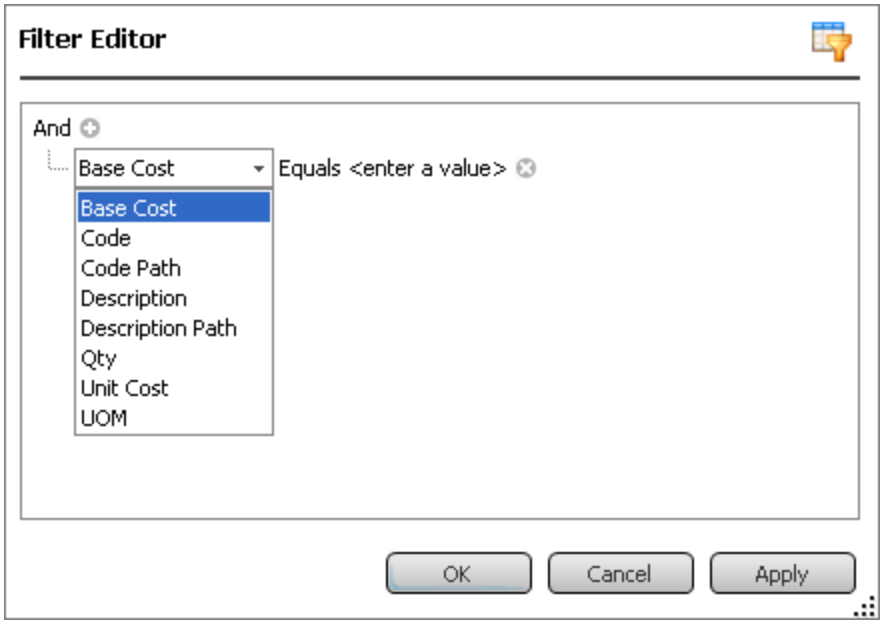


3. To view the filtering options, click the funnel icon.

   The list contains the content, including the project level and **(Blanks)**, that exist in the selected column.
4. To quickly apply a filter, click an option in the list.



5. Alternatively, apply a custom filter.
   a. Point to the column header, and then click **Custom**.
   b. In the **Filter Editor** window, set up the filtering options.



   c. Click **OK**.

      The filtered work packages are displayed with all the mapped buyout items.

To filter by components or assemblies

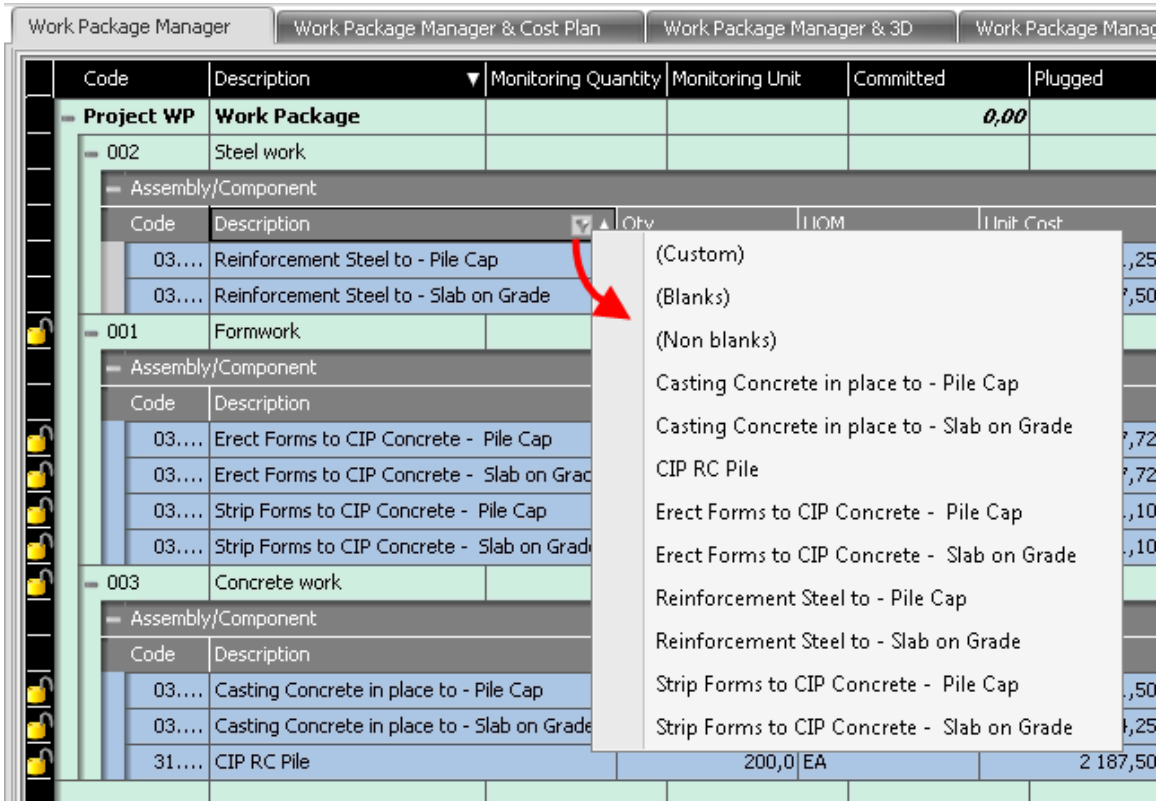
1. Open the Define Work Packages task.
2. Expand the list of the mapped buyout items.

3. Point the cursor to the column header.

   A funnel icon appears in the column header.

4. To view the filtering options, click the funnel icon.

   For the selected column, the list includes all the components and assemblies that are mapped to any of the work packages, including the blank cells.

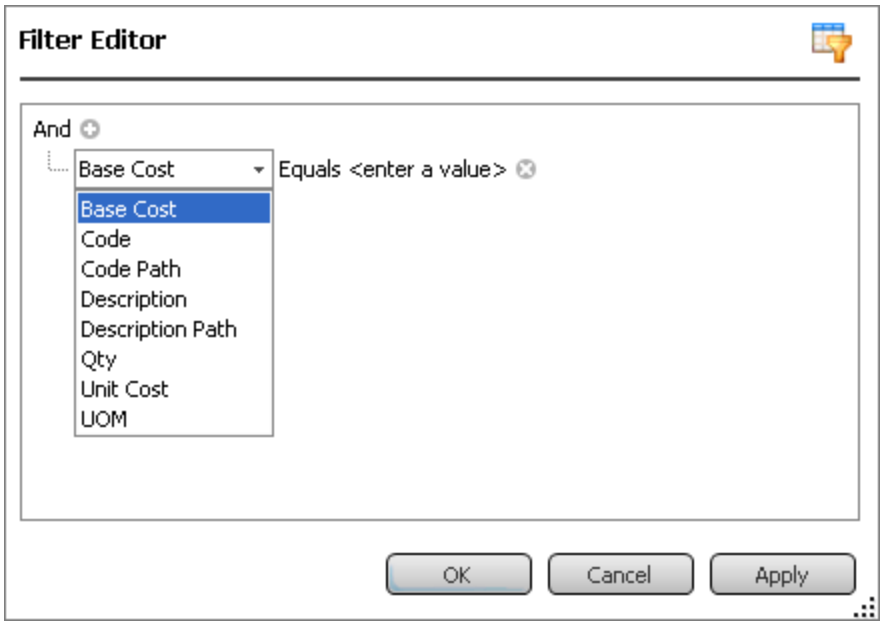


5. To quickly apply a filter, click a value in the list.

6. Alternatively, apply a custom filter.

   a. Point to the column header, and then click **Custom**.

   b. In the **Filter Editor** window, set up the filtering options.



c. Click **OK**.

The filtered buyout items in each work package are displayed.

Assigning a Buyout Item

After you create a work package, you can map cost components or assemblies to it. Data of buyout items is then be visible in the **Work Package Manager** view.

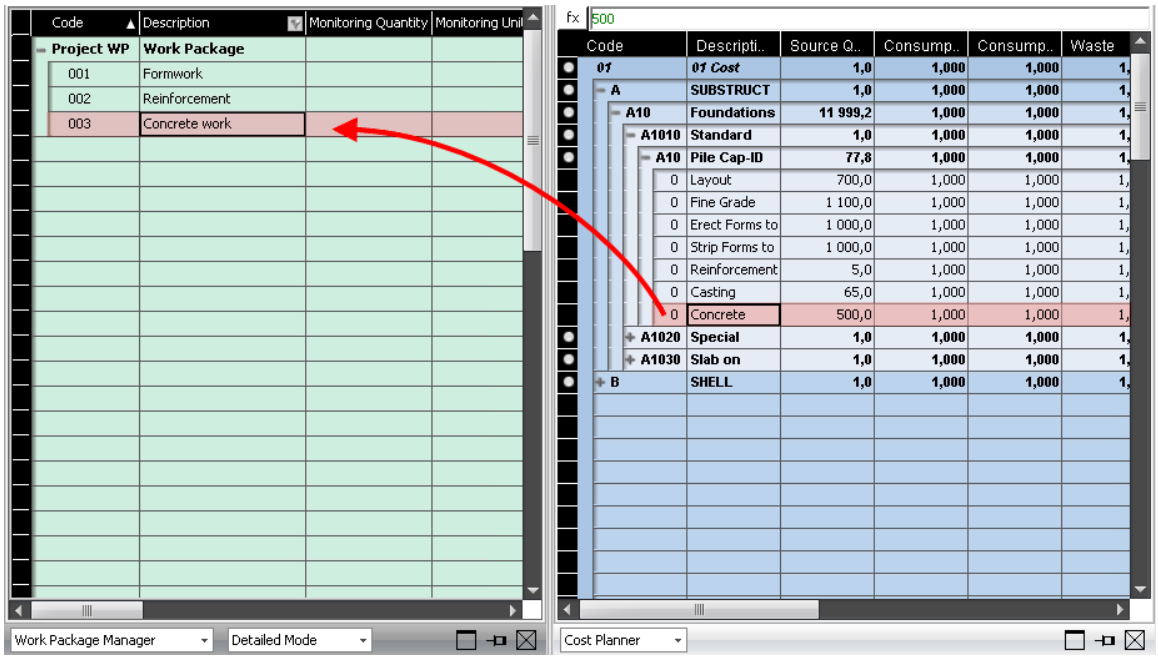
Important: A component or assembly can only belong to one work package.

To assign buyout items in the Work Package Manager view

1. Open the Define Work Packages task.
2. Click the **Work Package Manager & Cost Plan** viewset tab.
3. Use the arrows in the toolbar to expand each cost component to find the needed item (assembly or component).

   Note: To select multiple items, press **Ctrl** while clicking the items.
4. Drag the selected buyout items into a work package.

   Cost line items can be dragged and dropped (reassigned) between work packages as well.

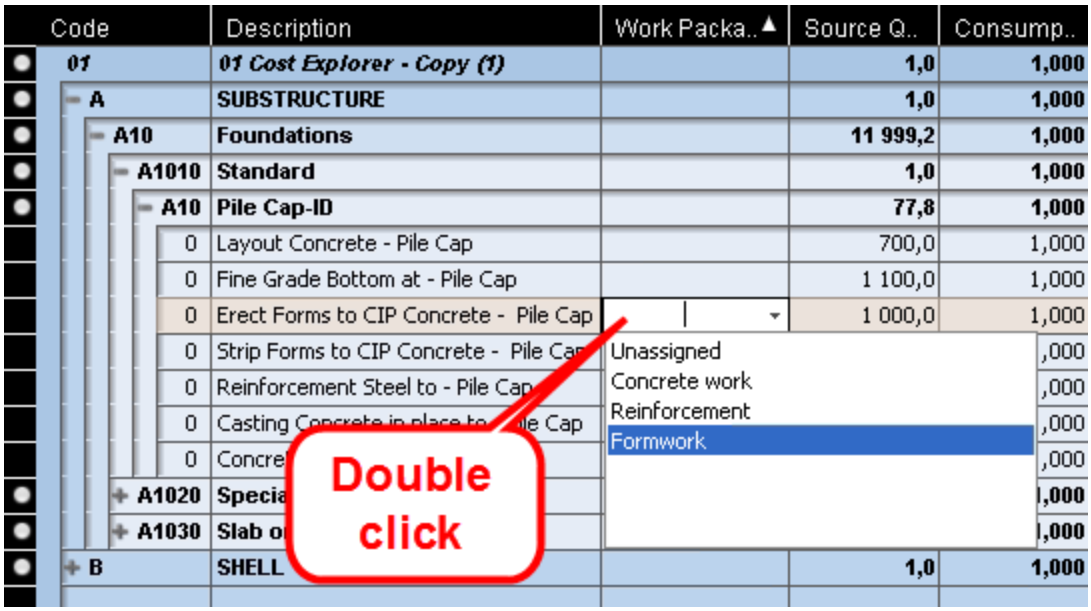


The **Work Package** column in the **Cost Planner** view is populated with the name of the work package that it belongs to.

When a higher level assembly is assigned to another work package, then all of its components are assigned to the same work package as the higher level assembly.

To assign a buyout item in the Cost Planner view

1. Open the Define Work Packages task.
2. Click the **Work Package Manager & Cost Plan** viewset tab.
3. Double-click the **Work Package** cell.



A list of the work package names appears in the list.

4. Select the target work package.

   The line item is automatically mapped to the related work package.

Any line item that includes calculated unit costs has the calculator icon shown on that line when entered in the cost plan from the bid award.

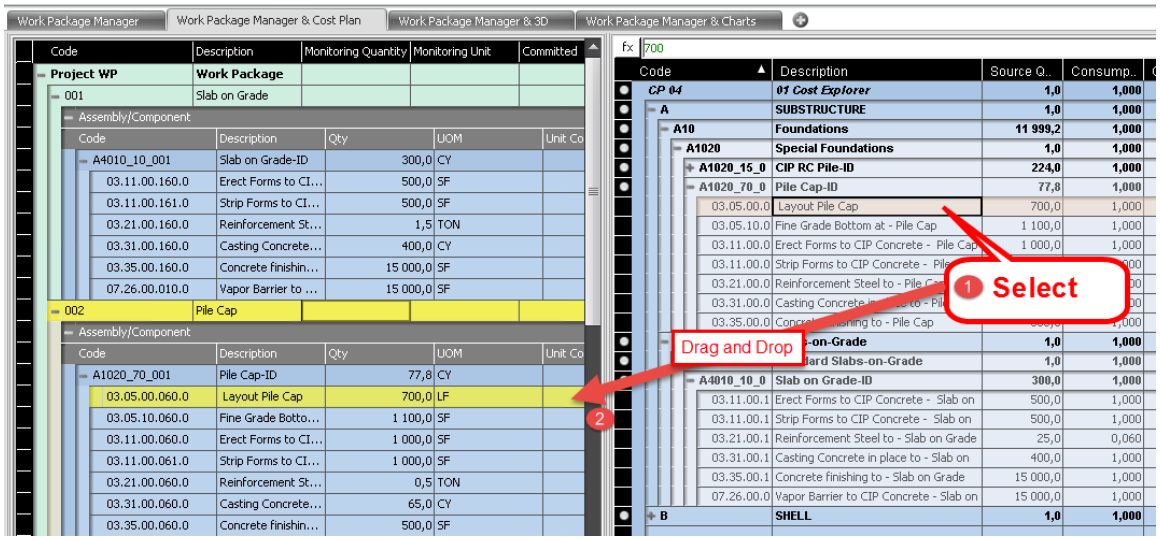
Note: Components can only belong to one work package. Therefore, the value of a work package decreases if its components are moved to another work package.

When you select a component in the cost plan, Vico Office highlights the work package that the current work item, or any work items from the levels below the selected one, was assigned to.

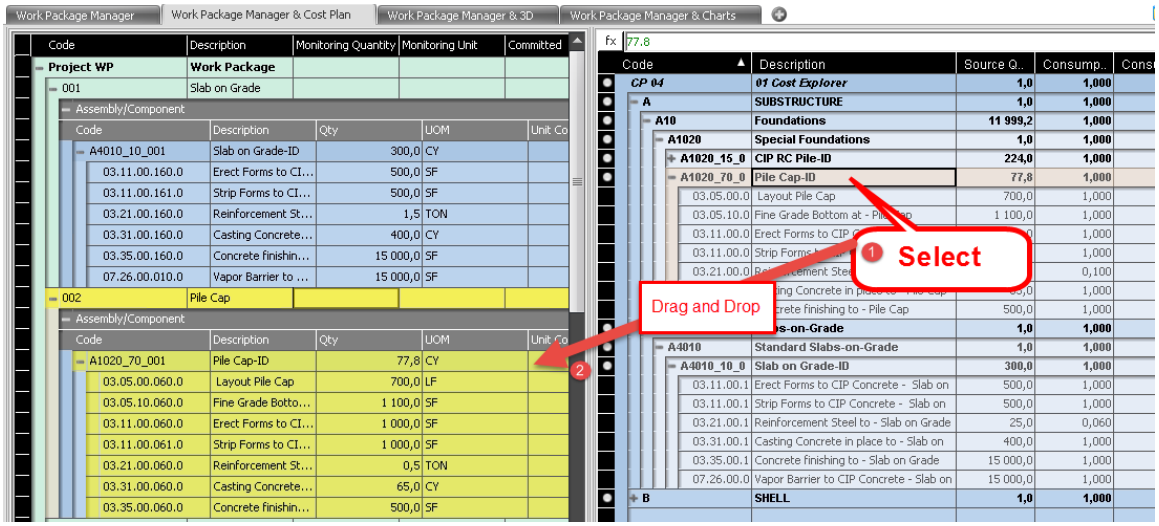
When you select a work package, Vico Office highlights every assigned work items in the **Cost Planner** view.

Example

In the images below, *A4010_10_001 Slab on Grade* was assigned to the Slab on Grade Work Package, and the *A1020_70_001 Pile Cap-ID* was assigned to the Pile Cap Work Package.



- Selecting A1020_70_001 Pile Cap



Node Visibility Settings

When you create a work package and assign buyout items, you can set the number of nodes each work package should display. Use the **Node Visibility Settings** to determine the cost plan hierarchy levels to be displayed in each package (or for the project work package that applies the settings for every work package).

To set the nodes to display for each work package

1. Open the Define Work Packages task.
2. Click the **Work Package Manager & Cost Plan** viewset tab.
3. In the **Work Package Manager** view, click the work package whose node you wish to set.
4. On the **Work Package Manager** ribbon tab, ensure that **Show Mapped** is enabled.

   This allows you to view the full parent/child nodes of the mapped component in the **Cost Planner** view.

5. To enable the settings, click **On/Off** on the **Work Package Manager** ribbon tab.

   When the setting is off, all the mapped component's child node levels are displayed.

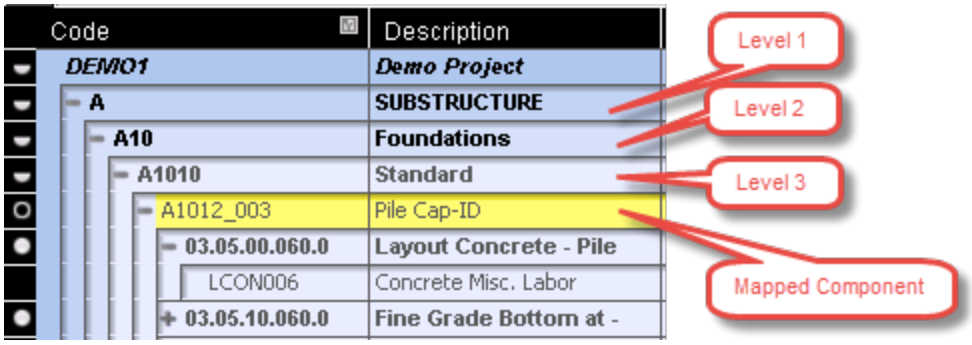
   

6. Set the following values:
   - **Always Shown:** Display the parent heading levels for the mapped component.
   - **Upper:** Set the number of nodes to display directly above the mapped component.
   - **Lower:** Determine the number of nodes to display below the upper node. This setting is relative to the Upper node.

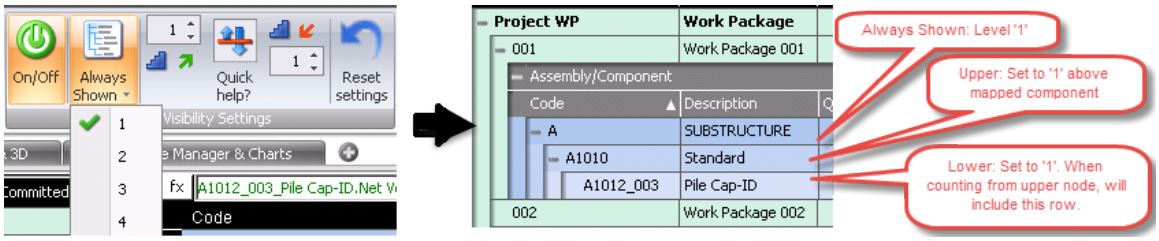
     Setting it to "0" hides the mapped component from the work package.
   - **Reset Settings:** Undo the setting changes that you made.

Examples

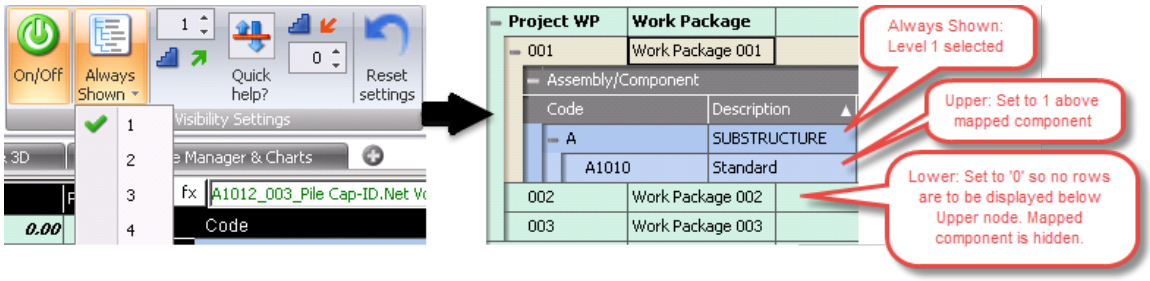
Mapped component: A1012_003 - Pile Cap-ID



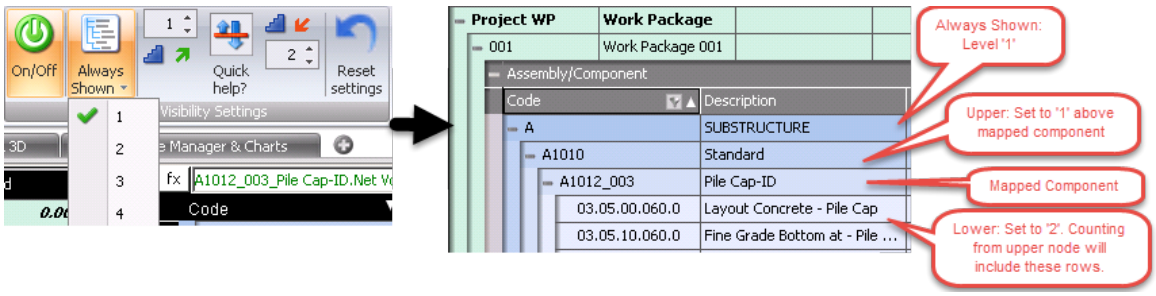
To show parent level of the mapped component



To hide the mapped component from the work package



To show levels below mapped component



Unassigning a Buyout Item

After you assign buyout items to work packages, you can unassign them and make them available in the cost plan again. Also, if you want to assign them to another work package, you can use the drag and drop functionality. Components can be unassigned and included in other work package that are separate from the parent assembly.

To remove a buyout item

1. Open the Define Work Packages task.
2. Click the **Work Package Manager & Cost Plan** viewset tab.
3. Select the buyout item that you want to remove from the buyout list.
4. On the **Work Package Manager** ribbon tab, click **Unassign Component**.

   –Or–

   Right-click the buyout item, and then click **Unassign Component**.

   The selected component is removed and available in the cost plan.

To remove a buyout item in the Cost Planner view

1. Open the Define Work Packages task.
2. Click the **Work Package Manager & Cost Plan** viewset tab.
3. On the **Work Package Manager** ribbon tab, click **Show Mapped**.

   Mapped components in the **Cost Planner** view are gray.
4. Select the work package that you want to unassign the component from.

   The components that belong to the selected work package are highlighted in the **Cost Planner** view.
5. In the highlighted fields, scroll to the right to find the **Work Package** column.
6. Double-click the **Work Package** cell, and then click **Unassigned**.

Because unassigned components no longer contribute to the work package values, the value of the work package is automatically updated.

Reviewing the Bid Scope

Elements that are already assigned to work packages are displayed in the **3D View** when selecting a work package.

To customize how your elements are displayed in the **3D View**, you can use Running Mode. If Running Mode is enabled, elements are highlighted as per the pre-defined Running Mode settings. If Running Mode is disabled, you can set the color for the current work package.

Note: If an element is part of multiple work packages (that are defined with different colors), when you select these work packages, the element is highlighted in white in the **3D View**.

Setting the Work Package Color

You can select the work package color in the work package spreadsheet, or you can create a list of colors that are applied automatically when you create a new work package.

To select the color in the work package spreadsheet

1. Open the Define Work Packages task.
2. Click the **Work Package Manager & 3D** viewset tab.
3. On the **Running Mode** ribbon tab, ensure that the **On/Off** button is set to off.
4. In the work package spreadsheet, click the **Color** cell for the work package, and then select a color.

   Tip: If the list does not contain any colors, click **New** to add a color.

   Elements that are associated to the current work package are highlighted with the selected color.

To create a list of colors for the Work Package Manager

1. Open the Edit Tags task.
2. Expand the **System** category, and then select **Color**.
3. Create a new tag value and define the color for it.
   a. On the ribbon, click **Value**.
   b. In the **Name** cell, type the value name.
   c. Click the **Color** cell, and then select a color.

   The defined color is added to the color list in the **Work Package Manager** view. When you create a new work package, Vico Office automatically applies a color for it from the defined list.

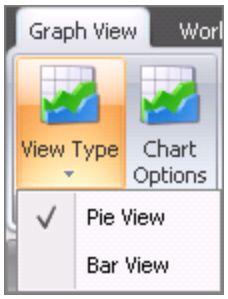
Note: If an element is associated with a different workflow item and both of them are selected, the element is highlighted in white.

Viewing a Pie Chart

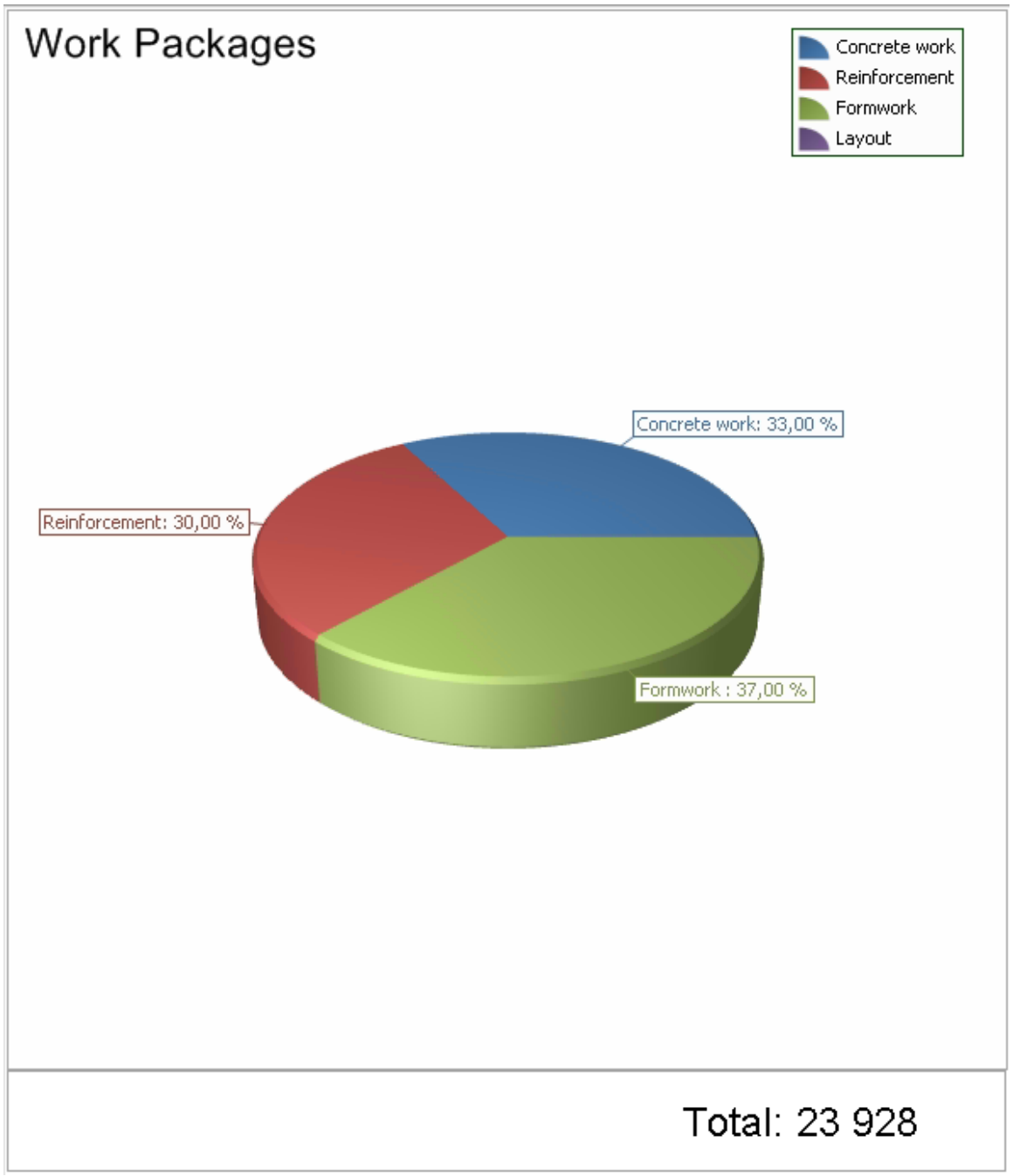
The pie chart displays the work packages and its subdivisions. Each slice of the pie consists of a subdivision, and the total project cost includes all the subdivisions.

To view your work packages in a pie chart

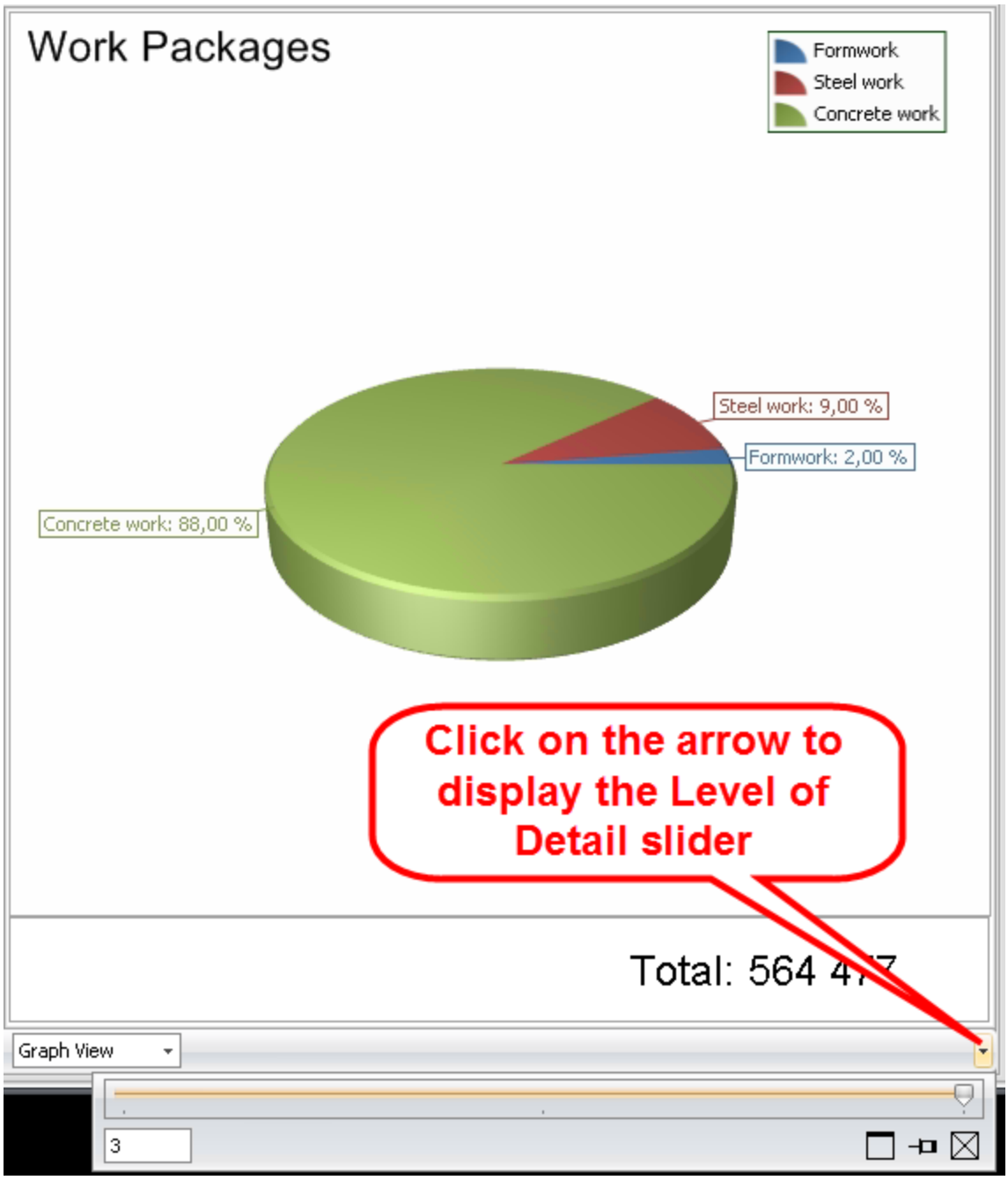
1. Open the Define Work Packages task.
2. Click the **Work Package Manager & Charts** viewset tab.
3. On the **Graph View** ribbon tab, click **View Type** > **Pie View**.



4. Press the **Ctrl** key as you click each work package that you wish to include in the graph.



5. To set the number of work packages to be displayed as unique slices in the graph, drag the **Level of Detail** slider, which is located on the bottom-right corner of the chart view.



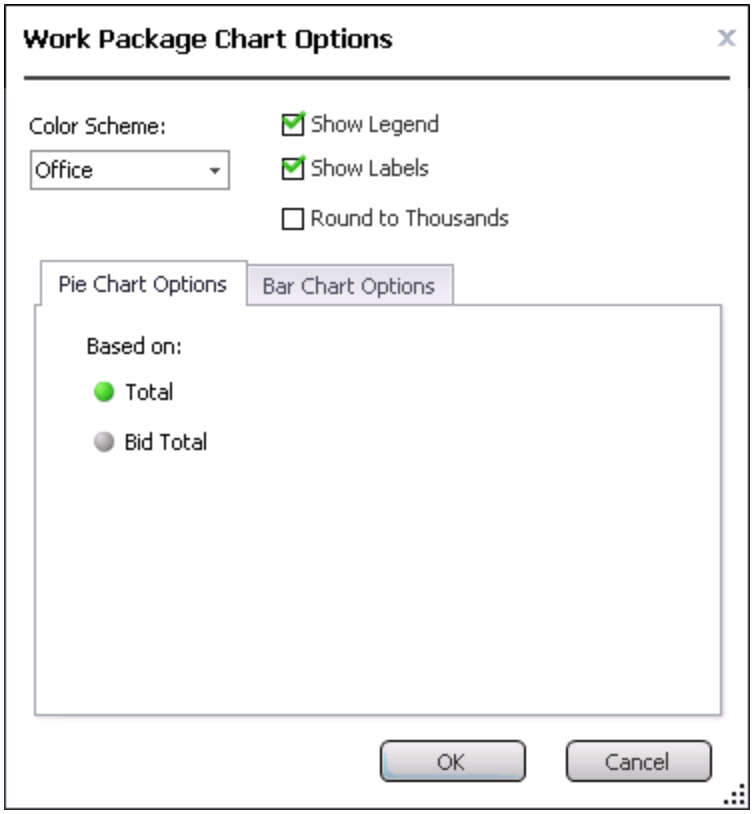
6. *Optional:* To modify the appearance of the chart, click the **Graph View** ribbon tab, and then click **Chart Options**.

   Chart options include:

   - Applying a filter for the states recognized in the project
   - Customizing your numbers

- Showing or hiding the **Legend** pane and labels
- Applying a color scheme to override the default colors

  By default, the chart view uses the colors that are defined in the **Work Package Manager** view.

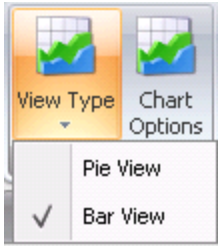


Viewing a Bar Chart

The bar chart helps you visualize how the value of a work package may have developed throughout the various project phases and work package states. In this view, the Y-axis represents the cost data, and the X-axis represents the selected work packages. When you select a work package, each phase is displayed as a bar.

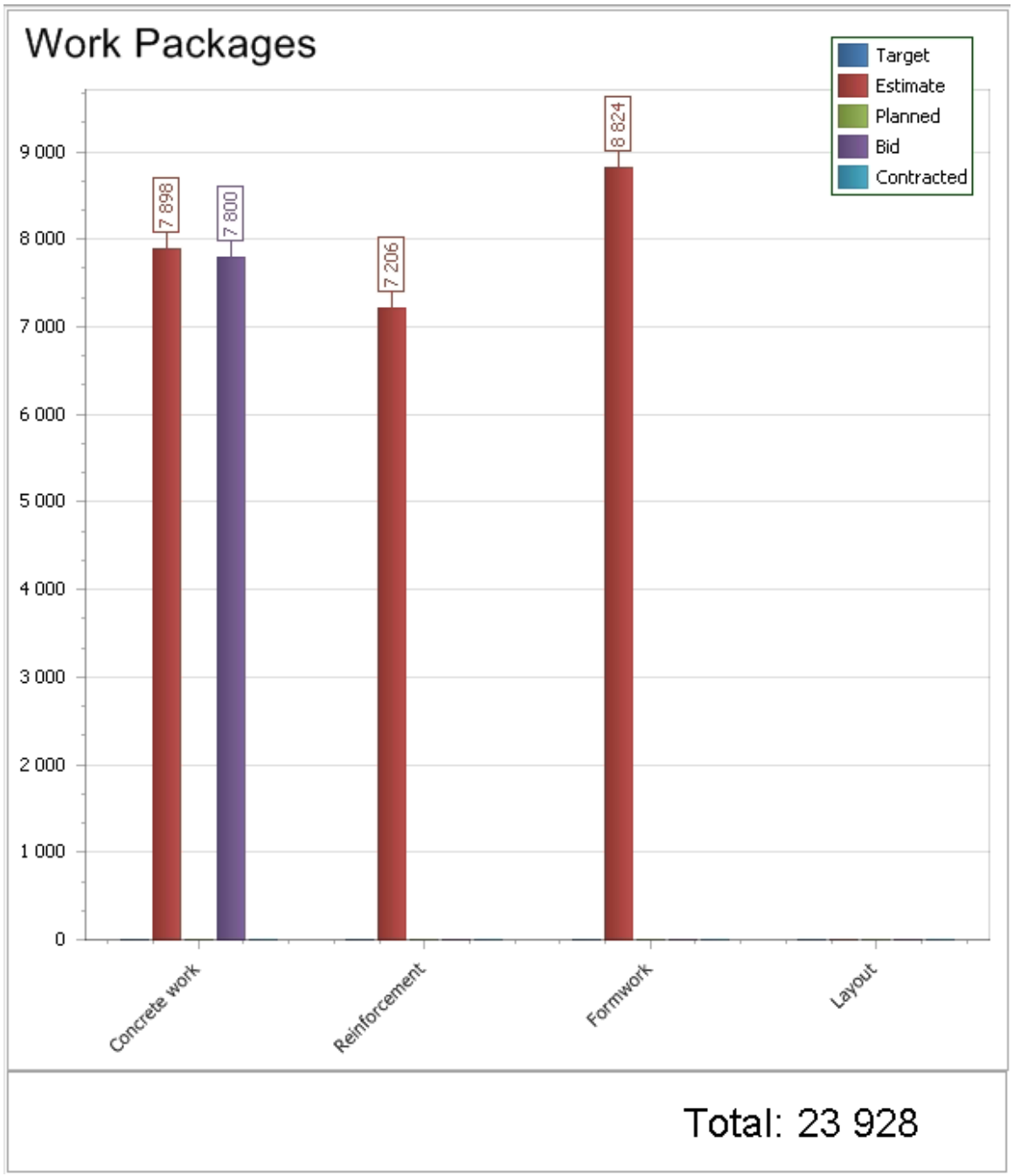
To view your work packages in a bar chart

1. Open the Define Work Packages task.
2. Click the **Work Package Manager & Charts** viewset tab.
3. On the **Graph View** ribbon tab, click **View Type** > **Bar View**.



4. Press the **Ctrl** key as you click each work package that you wish to include in the graph.

   The total project cost consists of all the subdivisions of the selected work packages. The active statuses and the project total are displayed in the graph area.



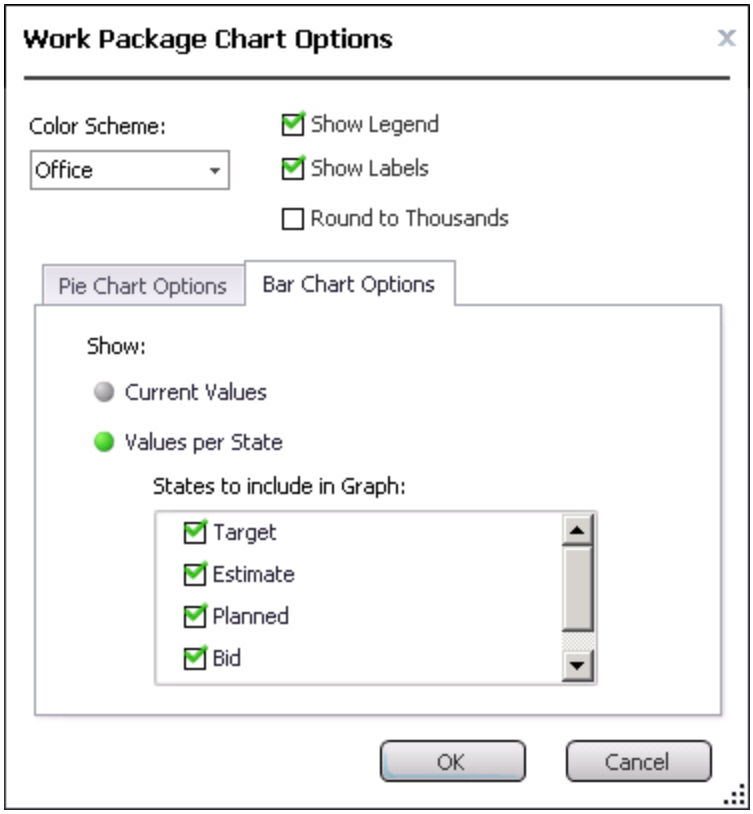
5. *Optional:* To modify the appearance of the chart, click the **Graph View** ribbon tab, and then click **Chart Options**.

   Chart options include:

   - Applying a filter for the states recognized in the project
   - Customizing your numbers

- Showing or hiding the **Legend** pane and labels
- Applying a color scheme to override the default colors

  By default, the chart view uses the colors that are defined in the **Work Package Manager** view.



Adding Requirements

After creating a work package, you can enter any extra information and requirements for it in the **Properties** palette.

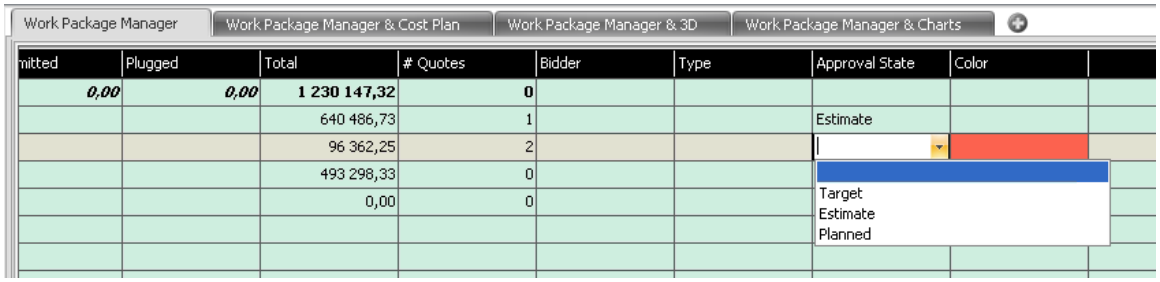
To add requirements

1. Open the Manage Bids task.
2. Select the work package.
3. Open and pin the Properties palette.
4. Enter your notes and requirements in the corresponding sections.

The information that you enter is visible when you open the **Properties** palette in the work package.

Pre-Award Stages

When you create a work package, you can define the pre-awarded stage for it. The bids that you enter in the **Manage Bids** task are compared with the selected stage of the work package. The **Work Package Manager** view displays the values based on the selected awarded stage. You can also compare these stages to each other in the Summary Mode.



Defined pre-awarded stages are useful during the bid examination, where you can compare your bid data with the defined stages. For more information, see "Awarding a Bid" on page 571.

To define pre-award stages

1. Open the Define Work Packages task.
2. Select the **Work Package** for which you want to set the pre-award stage.
3. Double-click the cell in the **Approval State** column, and then select the state from the list.
   - **Target:** Values are calculated based on the target costs that were defined in the **Define Target** view.
   - **Estimate:** Values are calculated based on the current state of the cost plan whether it is your own estimate or the allocated bids.
   - **Planned:** Values are calculated based on the included cost plan items that belong to the current work package. The Planned value appears when the state is changed to 'Planned'. When you change the state to Estimate, the presented values for the Planned state will be the latest values from the time the status was 'Planned'.

   The current values appear in the Summary Mode, in the line of the related pre-award stage.

Example

1. Change the stage to **Estimate**.

2. Open the cost plan, and change the Unit Cost of the Reinforcement Steel Pile Cap to 1400.

002	Pile Cap					18 407,50	2			Planned
Assembly/Component										
Code	Description	Qty	UOM	Unit Cost	Base Cost	Code Path	Description Path			
A1...	Pile Cap-ID	77,8	CY	236,60	18 407,50	A>A10>A1020>...	SUBSTRUCTURE...			
...	Layout Pile Cap	700,0	LF	1,00	700,00	A>A10>A1020>...	SUBSTRUCTURE...			
...	Fine Grade Botto...	1 100,0	SF	0,25	275,00	A>A10>A1020>...	SUBSTRUCTURE...			
...	Erect Forms to CI...	1 000,0	SF	7,72	7 720,00	A>A10>A1020>...	SUBSTRUCTURE...			
...	Strip Forms to CI...	1 000,0	SF	1,10	1 100,00	A>A10>A1020>...	SUBSTRUCTURE...			
...	Reinforcement St...	0,5	TON	1 200,00	600,00	A>A10>A1020>...	SUBSTRUCTURE...			
...	Casting Concrete...	65,0	CY	121,50	7 897,50	A>A10>A1020>...	SUBSTRUCTURE...			
...	Concrete finishin...	500,0	SF	0,23	115,00	A>A10>A1020>...	SUBSTRUCTURE...			

3. Go back to the **Work Package Manager** view and change the view mode to the **Summary Mode** to see the values for each of the stages.

   Note that the value of the Planned stage is the same it was in the time when the stage was changed to Estimate.

002	Pile Cap					18 507,50	2			Estimate
Assembly/Component										
Code	Description	Qty	UOM	Unit Cost	Base Cost	Code Path	Description Path			
A1...	Pile Cap-ID	77,8	CY	237,89	18 507,50	A>A10>A1020>...	SUBSTRUCTURE...			
...	Layout Pile Cap	700,0	LF	1,00	700,00	A>A10>A1020>...	SUBSTRUCTURE...			
...	Fine Grade Botto...	1 100,0	SF	0,25	275,00	A>A10>A1020>...	SUBSTRUCTURE...			
...	Erect Forms to CI...	1 000,0	SF	7,72	7 720,00	A>A10>A1020>...	SUBSTRUCTURE...			
...	Strip Forms to CI...	1 000,0	SF	1,10	1 100,00	A>A10>A1020>...	SUBSTRUCTURE...			
...	Reinforcement St...	0,5	TON	1 400,00	700,00	A>A10>A1020>...	SUBSTRUCTURE...			
...	Casting Concrete...	65,0	CY	121,50	7 897,50	A>A10>A1020>...	SUBSTRUCTURE...			
...	Concrete finishin...	500,0	SF	0,23	115,00	A>A10>A1020>...	SUBSTRUCTURE...			

Note: The current stage of the Work Package (Estimate) is in bold type.

002	Pile Cap			
Summary				
Descri...	Monitoring Quantity	Hours	Cost	Unclassified
Target	0,0	0,0	0,00	0,00
Estim...	0,0	0,0	18 507,50	18 507,50
Planned	0,0	0,0	18 407,50	18 407,50
Bid	0,0	0,0	0,00	0,00
Contr...	0,0	0,0	0,00	0,00
Differ...	0,0	0,0	18 407,50	18 407,50
Adjus...	0,0	0,0	0,00	0,00
Total	0,0	0,0	18 507,50	18 507,50

Updating the Data

If you make changes to the selected pre-awarded stage, and the data does not automatically synchronize, the data can be recalculated in the **Manage Bids** task.

To update the data in the Approval stage

1. Open the Manage Bids task.
2. To select the work package that you want to work on, on the ribbon, click **Select a Work Package**, and then select the work package from the list.
3. In the **Approval State** column, select the pre-awarded stage that you changed.
4. Right click the work package, and then click **Update Approval State**.

   The selected stage is updated.

Manage Bids

In the **Manage Bids** task, you can find the optimum bidder for defined work packages that are mapped to content from the **Cost Planner** view. You can add bids to the bidder columns either manually or from Excel and then compare them to each other. If required, you can change the previously created work packages.

To open the Manage Bids task

1. Right-click the Workflow Panel header, and then click **Work Package Manager**.
2. In the **Work Packages** workflow group, click **Manage Bids**.

   The default viewset includes the Bid Manager view.

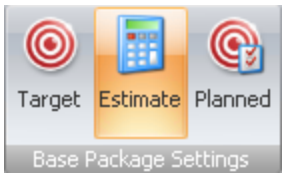
Entering Bid Data Manually

You can manually add bid information for each item. You can also enter a lump sum and then automatically allocate an amount to each item.

Note that:

- Manually entered data is bold.
- Blue and red triangles ▼ ▲ indicate differences between the pre-award stage and the bid.

  To select a stage for comparing the bids, click **Target**, **Estimate**, or **Planned** on the ribbon.



- A notification icon indicates that a lump sum is not provided and that only partial data is available.

After you award a bid, the price information in the **Cost Planner** view is updated.

To enter bid data manually

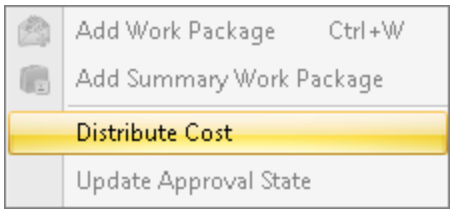
1. Open the Manage Bids task.
2. On the **Review Quotes** ribbon tab, click **Select a Work Package**, and then select the work package.

   Columns for the bidder's quote appear to the right of the spreadsheet.
3. To add extra bidder columns on the right, click **Add Quote** on the **Review Quotes** ribbon.

   The new bidders are automatically numbered (Bidder1, Bidder2, etc.).
4. Type the bid data into the relevant cells.

Bidder1			
		9 333,34	-116,67
Quantity	Unit Cost	Net Total	Difference
77,78	120,00	9 333,34	-116,67
	40,00	0,00	-2 100,00
		0,00	-7 350,00
Bidder1			

5. *Optional:* Enter a lump sum for an assembly parent unit cost.
   a. In the **Net Total** cell at the parent assembly level, enter the sum.
   b. Right-click the **Net Total** value, and then click **Distribute Cost**.



The cost information is allocated by ratio to all the individual line items. For information about plug values, see "Using Plug Values" on page 576.

Note: If you change the value in a cell, update the total by right-clicking the cell and then clicking **Recalculate Package Total**.

Tip: To make comparisons easier, you can change the order of the bidders by dragging and dropping the bidder column sets.

Exporting to/Importing from Microsoft Excel

Exporting to Excel

After you create a work package and assign the buyout items with all the model based quantities, you can export it to Excel. Then you send the Excel file to the subcontractors, so they can enter their own costs and/or alternatives.

To export a work package to Excel

1. Open the Manage Bids task.
2. On the **Review Quotes** ribbon tab, click **Select a Work Package**, and then select the work package that you want to export.

   Vico Office displays the work package with the mapped buyout items in the blue spreadsheet.
3. On the ribbon, click **Export to Excel**, and then click **Export with quantities** or **Export without quantities**.
4. Browse to the folder where you want to save the Excel file, enter the file name, and then click **Save**.

The Excel file contains the buyout items and related quantities (if that option was selected) from the spreadsheet. You can edit the file before you send it to the subcontractors.

Importing from Excel

You can take advantage of existing project information by reusing it in Vico Office. Excel files sent back from the subcontractors can also be entered into the Bid Manager this way. Items such as alternatives are included in the import process.

Tip: Ensure that the project name entered in the Excel file matches the Vico Office project name to which you are importing the file.

To import bid data from Excel

1. Open the Manage Bids task.
2. On the **Review Quotes** ribbon tab, click **Select a Work Package**, and then select the work package for which you want to add a bid.
3. On the ribbon, click **Import from Excel**, and then select the file that you want to import.

   The bid data with the related unit costs, net total, and/or alternatives is added to the spreadsheet. It also automatically calculates the Net Total from the imported values and presents the calculated values in italics.

Deleting a Bid

Unused bidders can be deleted from the **Bid Manager** view at anytime during the workflow.

To delete a locked item, you must first unlock it.

To unlock a work package

1. Open the Manage Bids task.
2. Select the work package you want to unlock.
3. Right-click the work package, and then click **Unlock Selected**.

   To indicate that the item was previously locked, the locked icon changes to an open lock .

   Now that the bidder is no longer locked, you can delete or modify it.

To delete a bid

1. Open the Manage Bids task.
2. Right-click the bidder that you wish to delete, and then click **Delete**.

   The bidder is deleted from the spreadsheet. This action cannot be undone.

Awarding a Bid

If you add a quote and provide values to all included components, you can assign an award level.

The following award levels are available:

- **Bid:** The bidder who is identified as the best candidate for the contract. When this level is assigned, the values are calculated based on the selected bidder. An icon indicates that this level is

assigned to the bidder, but you can still select a different bidder later.

- **Contracted:** The bidder who is awarded the contract. When this level is assigned, the values are calculated based on the included cost plan items. The lock icon indicates that the work packages are locked. To unlock the selected bid, first clear the Hard Lock 'Contracted' Work Package check box in the Project Settings.

You can also create new award levels.

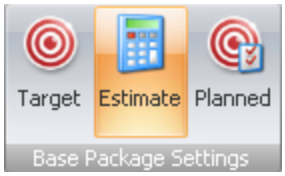
After awarding a bid, Vico Office locks the buyout items included in the work package. The buyout items can no longer be modified in the cost plan and appear with a gray background color and an icon (or) in the **Cost Planner** view.

Note: The pre-awarded state in the **Approval State** column is changed to the selected awarded stage. Vico Office uses the bidder defined values in the **Work Package Manager** view.

To award a bid

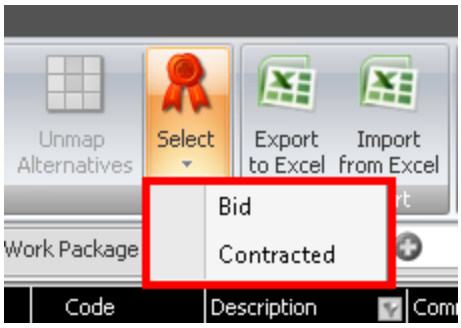
1. Open the Manage Bids task.
2. On the **Review Quotes** ribbon tab, click **Select a Work Package**, and then select the work package you want to work on.

   Note: Only one work package can be selected at a time.
3. To select a stage for comparing the bids, click **Target**, **Estimate**, or **Planned** on the ribbon.



4. Select the bidder quote that you are ready to award.

   Note that all bidder information is required before you can award it a level. For more information about defining quote, see "Entering Bid Data Manually" on page 568.
5. On the **Review Quotes** ribbon tab, click **Select**, and then select the award level.



–Or–

Right-click the bidder, point to **Select**, and then select the award level.

An award icon appears on the selected quote.

Modifying Awarded and Contracted Bids

After awarding a bid or a contract to a bidder, the bid is locked and can no longer be modified. However, if you wish to edit these bids after they have been awarded, follow the steps below:

To modify an awarded bid

1. Open the Define Work Packages task.

   –Or–

   Open the Manage Bids task.

2. Right-click the work package heading, and then click **Unlock Selected**.

   An unlocked icon indicates that the bid is no longer awarded. The work package is no longer locked, so it can now be modified.

To modify a contracted bid

1. Open the Define Settings task.
2. At the bottom-left corner, clear the **Hard Lock 'Contracted' Work Packages** check box.

   Now you can unlock the work package.

3. Open the Manage Bids task.
4. On the **Review Quotes** ribbon tab, click **Select a Work Package**, and then select the work package that you want to modify.
5. Right-click the work package, and then click **Unlock Selected**.

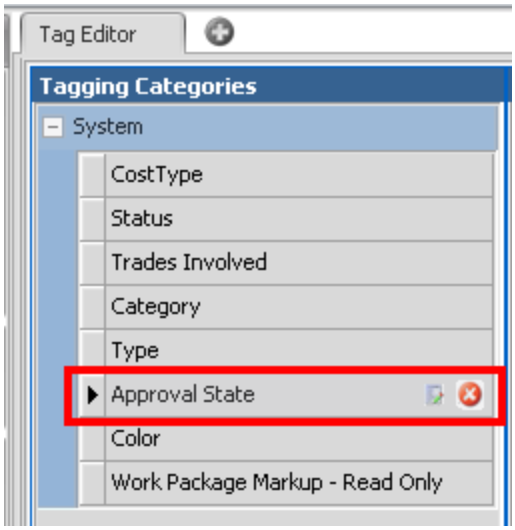
   The work package is unlocked and editable.

Creating an Awarded Stage

You can create additional awarded states in the **Tag Editor** view. The new tags can then be selected in the **Bid Manager** view.

To create an awarded stage

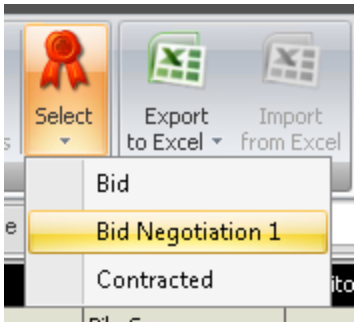
1. Open the Edit Tags task.
2. Expand the **System** category, and then select **Approval State**.



3. On the ribbon, click **Value**.
4. Name the new awarded state as desired.

   Note: The new state can be moved up and down in the list, but it cannot be moved inside the pre-awarded stages (Target, Estimate, Planned).

   The new awarded state can now be used when awarding a bidder.



Entering and Mapping an Alternative

If a bidder enters a different offer for a bid item, you can add a cost item as an alternative and make it as a replacement for the original cost item. Alternatives can be either manually entered into the bid or imported from Excel. For more information on importing from Excel, see "Exporting to/Importing from Microsoft Excel" on page 570.

After entering the alternatives, you can map them to the buyout item that you wish to replace.

To map an alternative

1. Open the Manage Bids task.
2. On the **Review Quotes** ribbon tab, click **Select a Work Package**, and then select the work package for which you are entering an alternative.
3. *Optional:* On the ribbon, click **Add Quote** to add additional bidders.
4. In the **Alternatives** section of the spreadsheet, enter the alternatives and the related unit costs.
5. Select the alternative, and click **Map Alternatives** on the ribbon.
6. Select the buyout item that you want to replace with the alternative, and then click **Map Alternatives** again.

   The name of the alternative is entered in the **Net Total** column.

   After you enter an alternative, the related cost line item appears in the **Cost Planner** view.

To see an alternative in the Cost Planner view

1. Open the Plan Cost task.

   –Or–

   Open the Define Work Packages task, and click the **Work Package Manager & Cost Plan** tab.
2. In the **Cost Planner** view, click **Show Alternatives** on the **Cost Planner** ribbon tab.

   –Or–

   On the **Work Package Manager & Cost Plan** tab, click in the **Cost Planner** view to enable the **Alternatives** group on the ribbon, and then click **Show Alternatives**.

   Vico Office displays each alternative as a separate line item with a green background.

Code	Description	Source Q..	Consump..	Consump..
DEMO1	*Demo Project*	**1.00**	**1.000**	**1.000**
#1000	Alternatives	1.00	1.000	1.000
[1]	Alternative 002	1.00	1.000	1.000
[0]	Alternative 001	1.00	1.000	1.000
A	**SUBSTRUCTURE**	**1.00**	**1.000**	**1.000**
B	**SHELL**	**1.00**	**1.000**	**1.000**

Alternatives can be moved under other line items, but they are not part of the cost plan base cost.

Using Plug Values

In the **Bid Manager** view, plug values are used to either determine the cost of line items in a work package or to exclude them from the work package's scope upon award. If a bidder does not provide required unit costs for all the line items included in the work package, you can 'plug' the costs with values from other sources to enable comparison based on the Target Cost, the Cost Plan, the Planned Values, the Lowest Bid Prices, the Average Bid Prices, or the Highest Bid Prices.

Plugged numbers use the cost type from their original estimate to contribute to the totals. Plug values also contribute to the Plug Values Summary.

Tip: Plug values shown in *italics* are calculated numbers.

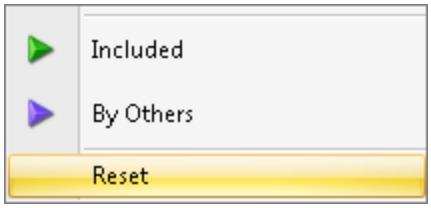
Types of plug values:

- Based on Target Cost
- Based on Cost Plan
- Based on Planned Value
- Based on Lowest Bid Prices
- Based on Average Bid Price
- Based on Highest Bid Price
- Manually: Indicates that this plugged value was entered manually and is not based on any of the existing values or prices.
- Included: Indicates that the price of the selected line item is already included in all the other costs, so that the unit cost of the included line item shows a zero value.
- By Others: Indicates that the selected line item is definitely not included in the scope of work defined by the work package and awarded bidder; thus, allowing it to be reallocated to another package.

Important: When you want to reset a unit cost from the plug value, you should select the cell in the Net Total column and delete it. Then manually enter the values to include in the calculation.

To reset plug values

1. Open the Manage Bids task.
2. Right-click the work item that you applied the plug value to, and then click **Reset**.



The previously entered values appear in the relevant cells.

Included Items

When a bidder marks items as 'Included', the price of the buyout item is already included in all other costs. In this situation, you can navigate to the **Bid Manager** bid and set the current buyout item as 'Included'.

To set a buyout item as Included

1. Open the Manage Bids task.
2. Right-click the **Unit Cost** or **Net Total** cell for the line item that has been marked as 'Included' by the bidder, point to **Plug Values**, and then click **Included**.

   Note: After all components have a value or plug value, you can award a work package as **Bid** or **Contracted**.

By Others Item

Items marked as 'By Others' indicate that the selected line item is definitely not included in the scope of work defined by the work package and awarded bidder; therefore, it can be reallocated to another package.

To enter a 'By Others' Item

1. Open the Manage Bids task.

   While reviewing the content of the selected work package, you can see one or more items within the scope of the work package are marked by the bidder as to be performed by others.

2. Right-click the **Unit Cost** or **Net Total** for the item that you wish to mark, point to **Plug Values**, and then select **By Others**.

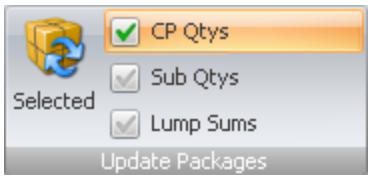
   A colored icon and relevant value is displayed in the line item's row.

   Note: After all components have a value or plug value, you can award a work package, except as **Contracted**.

Updating Quantities

Values of work packages are not updated automatically when cost plan items change. To update the value, the following options are available on the ribbon:

- **Cost Plan Quantities**: Update quantities and recalculates package totals. It only applies to the quantities that originated from the **Cost Planner** view.
- **Sub Quantities**: Update quantities and recalculates package totals. It only applies to quantities.
- **Lump Sum**: Recalculate lump sums from the updated quantities.



Quantities from the cost plan

To update quantities from the cost plan

1. Click the **Work Package Manager & Cost Plan** viewset tab.
2. Select the work package you want to update.
3. On the **Work Package Manager** ribbon tab, select the **CP Qtys** check box.
4. On the ribbon, click **Selected**.
5. When prompted to confirm, click **Yes**.

   Vico Office updates the quantities in the selected work package for every cost item that is used for Cost Planner quantities. This excludes items whose quantities were provided by the sub. After updating quantities, Vico Office automatically recalculates the package total using the new quantities.

Quantities from the subs

After you create a work package with the allocated buyout items and enter the bid that is priced by the

sub's own quantities, the actual quantities should be updated from the cost plan.

To replace subcontractor quantities with cost plan quantities

1. Click the **Work Package Manager & Cost Plan** viewset tab.
2. Select the work package you want to update.
3. On the **Work Package Manager** ribbon tab, select the **Sub Qtys** check box.
4. On the ribbon, click **Selected**.
5. When prompted to confirm, click **Yes**.

   Vico Office updates all the quantities in the selected work package. After updating the quantities, Vico Office automatically recalculates the package totals using the new quantities by multiplying the unit costs with the value entered by the sub. The lump sums that were defined by the subcontractor are not affected.

Lump sums from changed quantities

After updating the quantities in the work packages and the bids, you can update the lump sum to calculate the final total price for the bids.

If a subcontractor has provided a lump sum and the package quantities subsequently change this functionality is to allow you to recalculate the lump sum based on distributed values to provide an ‘educated guess’ as to what the revised lump sum may be as a temporary measure until the subcontractor can confirm updated pricing.

To update lump sums

1. Click the **Work Package Manager & Cost Plan** viewset tab.
2. Select the work package you want to update.
3. On the **Work Package Manager** ribbon tab, select the **Lump Sums** check box.
4. On the ribbon, click **Selected**.

   Vico Office updates the lump sums for every bid by using the cost plan quantities and multiplying them to the calculated unit cost created when the subs' bids were originally entered.

Managing Markup Adjustments

Quite often, you may need to make adjustments to a work package while comparing bids. For example, you may wish to award a 2.5% discount to main contractors for payments made within 30 days, or perhaps you wish to add the cost of an additional crane. Using the Markup Adjustments feature available in

Work Package Manager, you can create positive or negative markups depending on your changes. Markup adjustments will enable you to create an audit trail of your adjustments.

To add a markup adjustment

1. Open the Define Work Packages task.
2. Click the **Work Package Manager & Cost Plan** viewset tab.
3. On the ribbon of the **Work Package Manager** tab, click **Manage Markup Adjustments**

   Note: By default, the 'UNC - Unclassified' markup adjustment is created. Please see "Unclassified Markup Adjustments" on page 582 on the recommended use of this markup adjustment type.

4. Click . A new row is added to the table.
5. Enter a Code and Description for the new markup.
6. Repeat steps 5 - 6 to create additional markup adjustments.
7. Click **OK** to save your changes.
8. You can now assign these markup adjustments to work packages. For more information, see "Assigning Markup Adjustments" below

To delete a markup adjustment

1. On the Manage Markup Adjustments dialog box, select the markup to delete.
2. Click . The selected markup is deleted.

Assigning Markup Adjustments

To make changes to a work package before awarding it, assign it markup adjustments.

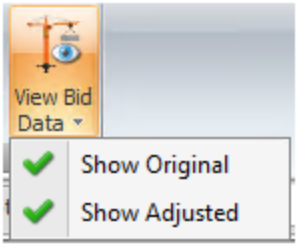
1. While viewing a work package on the Work Package Manager view, right-click on the work package and select **Open Bid Manager in New Tab**.

   The work package appears on the **Work Packages & Quotes** tab.
2. Click on the work package header to enable the markup buttons on the ribbon.
3. Click **Assign Markup Adjustments**.

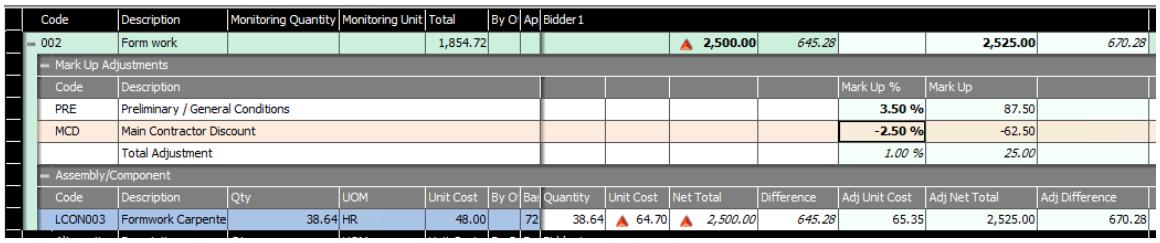
4. On the Assign Markup Adjustments dialog box, select the markups you wish to assign to this work package and click **OK**.

   The markups are added to the work package.

5. Use the **View Bid Data** button on the ribbon to show the customer's original prices and/or the adjusted cost.



   The Mark Up % and Mark Up columns are added to the view. When you enter a Markup %, the Markup value is automatically calculated based on the Markup percentage and the original cost. Similarly, if you enter a value in the Mark Up column, the Markup % is calculated based on that value and the original cost.



Code	Description	Monitoring Quantity	Monitoring Unit	Total	By O	Ap	Bidder 1						
002	Form work			1,854.72				2,500.00	645.28		2,525.00	670.28

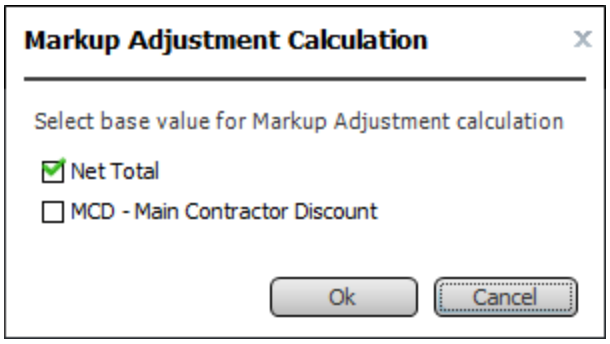
Mark Up Adjustments

Code	Description					Mark Up %	Mark Up	
PRE	Preliminary / General Conditions					3.50 %	87.50	
MCD	Main Contractor Discount					-2.50 %	-62.50	
	Total Adjustment					1.00 %	25.00	

Assembly/Component

Code	Description	Qty	UOM	Unit Cost	By O	Ba	Quantity	Unit Cost	Net Total	Difference	Adj Unit Cost	Adj Net Total	Adj Difference
LCON003	Formwork Carpente	38.64	HR	48.00		72	38.64	64.70	2,500.00	645.28	65.35	2,525.00	670.28

6. To change the base value that each markup adjustment is based on, right-click on the markup adjustment and select **Change Markup Adjustment Calculation**.



7. Select the values on which to base the calculation and click **OK**. The markup adjustment is re-calculated based on your selection. The work package is now ready to be awarded.

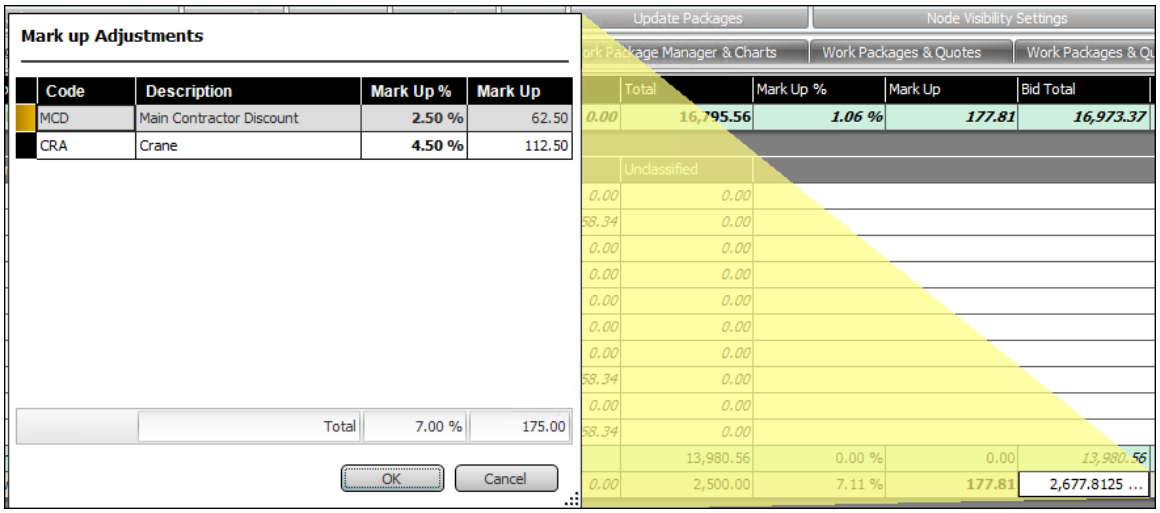
   Tip: You can also switch to the Work Package Manager tab in Summary Mode to view the Markup % and Markup values for the work package.

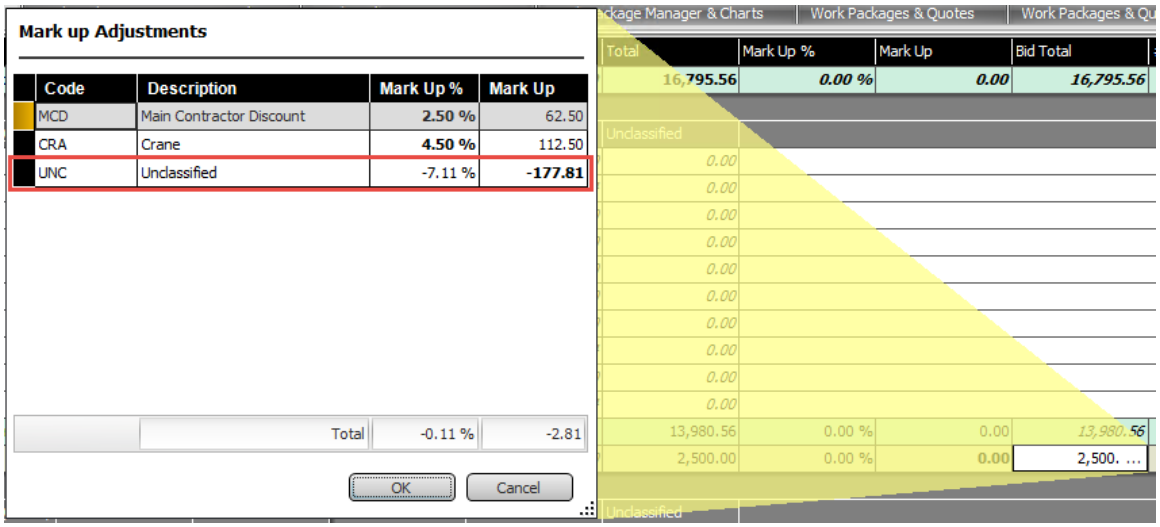
Unclassified Markup Adjustments

In a typical workflow scenario, you would create Markup Adjustments that can be applied to a work package quote. This ensures a clean audit trail for all your work package changes. However, if you need to make a last minute adjustment to an awarded bid in order to expedite a process, and a suitable markup type is not available, simply change either the bid total, the mark up total or percentage to the preferred amount in the Work Package Manager Summary mode.

Example

The original Bid Total of $2,677.81 was changed to $2,500.00.





Tip: To view the Markup Adjustments window, double-click on the cell and click on the ellipsis (...).

The 'Unclassified' markup adjustment is automatically used to track the change. After the bid has been awarded, the Unclassified markup value can be re-allocated to a valid markup adjustment type.

To re-allocate an Unclassified markup adjustment

1. On the Work Packages & Quotes tab, create a markup adjustment.
2. Assign the markup adjustment to the work package.
3. Copy the Markup % or Markup value from the Unclassified markup to the newly created one.
4. Click **Assign Markup Adjustments** on the ribbon and remove Unclassified from your work package.
5. When prompted to confirm, click **Yes**.

Create Reports

Vico Office contains the built-in Report Designer that you can use to generate location-based quantity reports for your project. All information, including project properties, that you defined for your project can be used in your report. The templates that you create can be used with all projects in the current database.

To open the Create Reports task from the Master Workflow module

1. Right-click the Workflow Panel header, and then click **Master Workflow**.
2. In the **Reporting & Data Mining** workflow group, click **Create & Run Reports**.

To open the Create Reports task from the other modules

- In the **Reports** workflow group, click **Create Report**.

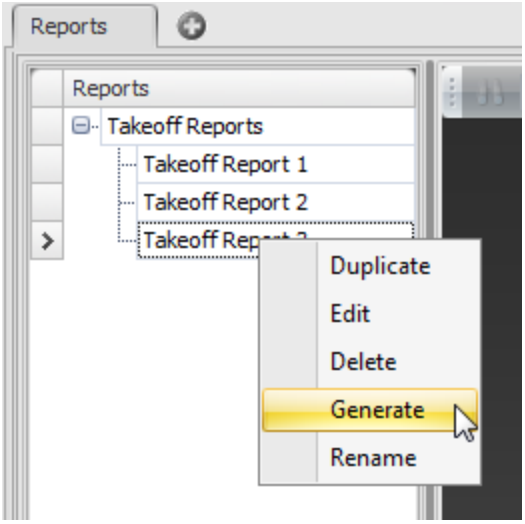
The default viewset includes the Reports view.

Viewing a report

Built-in report templates are available in the **Reports** view. You can use any of these templates to generate a quantity report for the active project.

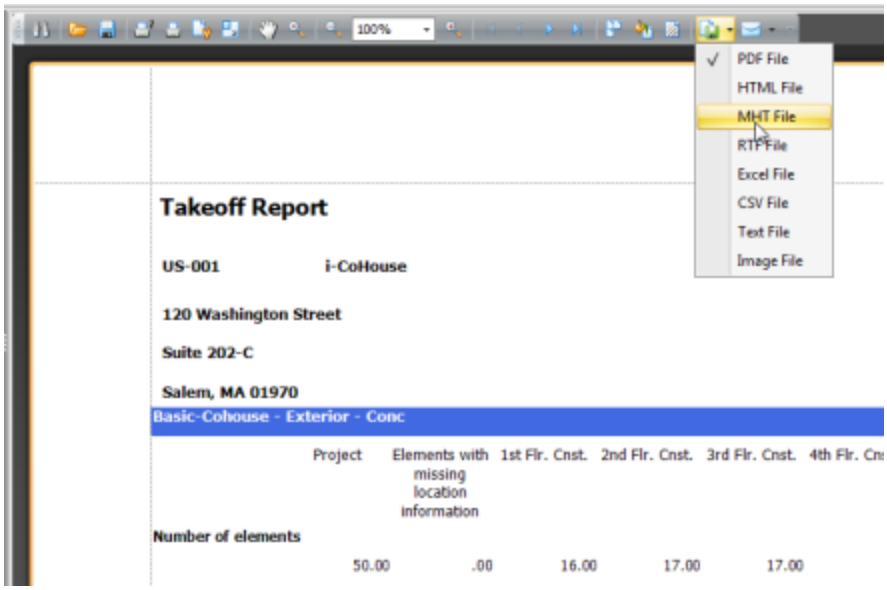
To view a report

1. Open the Create Reports task.
2. In the **Categories and Reports** tree, right-click a template, and then click **Generate Report**.



Vico Office reads your project information and displays the selected report in the **Report Preview Area**.

3. To save your report in any of the supported file formats, including RTF, XLS, and PDF, click the **Export Document** button.



Working with Report Templates

With the Report Designer included in Vico Office, you can create your own reports, or modify existing templates by adding your company's logo or contact information.

Report templates are defined using bands, which are report sections that contain the information sources that are available for your project. You can add bands for the report header, footer, and title.

The main content of the report is included through detail bands. Takeoff Manager has two standard detail bands, Project Properties and Takeoff Items, that contain the functionality to combine your project information correctly.

Note: A template must always be included in a category. If your project does not contain any categories yet, click **New Category**, and create a category.

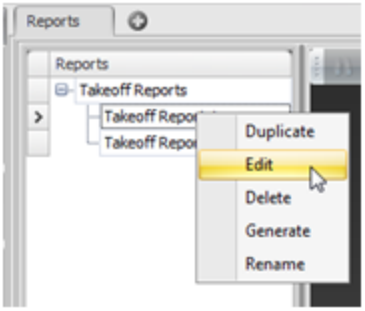
To create a report template

1. Open the Create Reports task.
2. Click on the template category where you want your template to be added.

   Tip: A template category groups your templates.
3. On the **Reports** ribbon tab, click **New Template** and enter a descriptive name for the template.

To open the Report Designer

- In the **Reports** tree, right-click on the new template and select **Edit**.

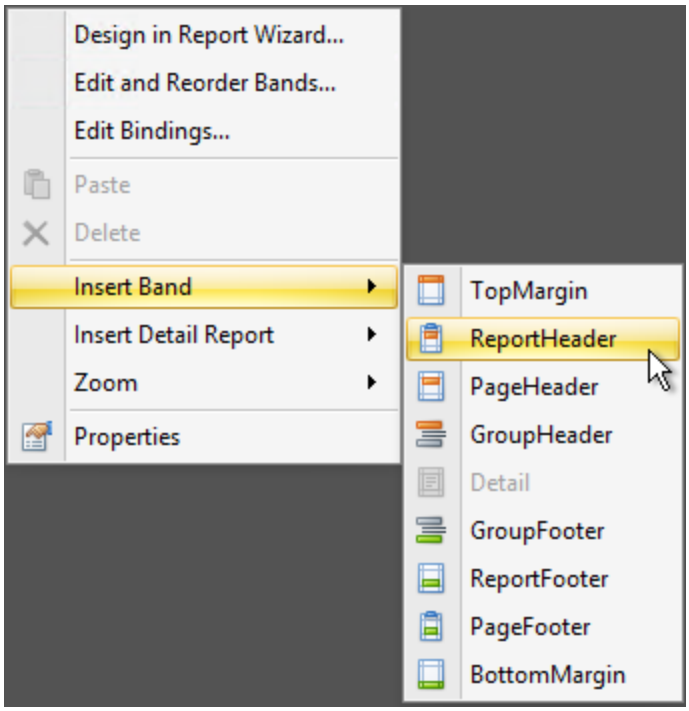


The Report Designer opens.

To add a report header

1. In the **Report Designer**, right-click in the report area, and select **Insert Band > Report Header**.

   The report header can contain information such as the report title (for example, 'Takeoff Report') for the first page of the report.



2. To insert text in the new area, use the **Rich Text** tool from the **Tool Box** to the left of the Report Editor.

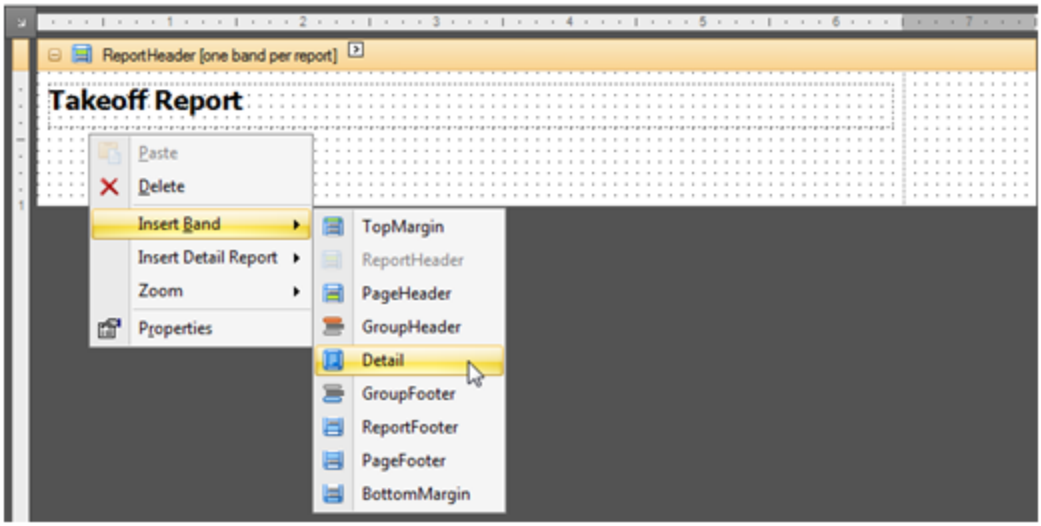
To add the date or project name on each page of the report

- Right-click in the report area, and then click Insert Band > PageHeader.

To insert a detail band

(Must be inserted before adding detailed project information. For new templates, a detail band is automatically inserted.)

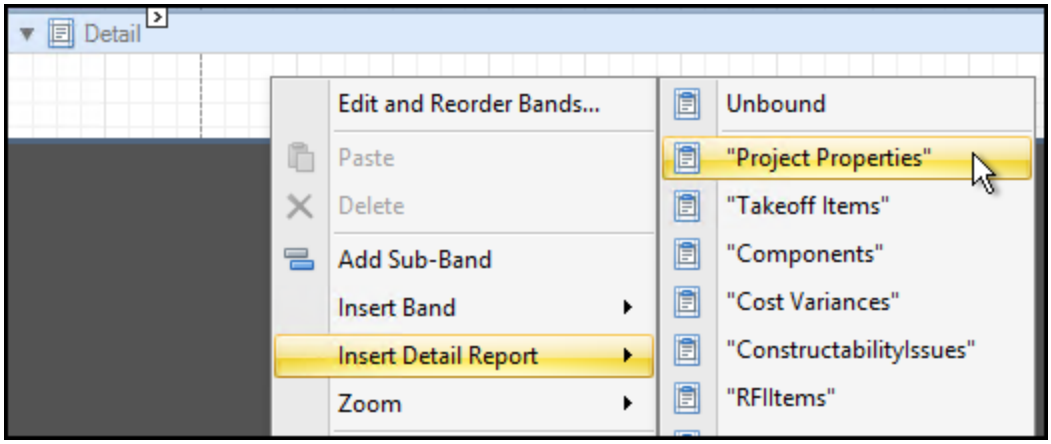
- Right-click in the report area, and then click **Insert Band > Detail**.



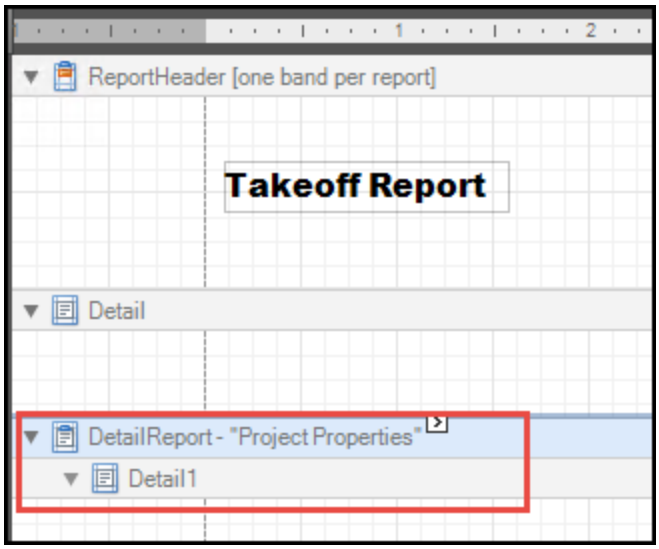
To add project properties

1. On the Detail band area of the report, right-click and select **Insert Detail Report > Project Properties**.

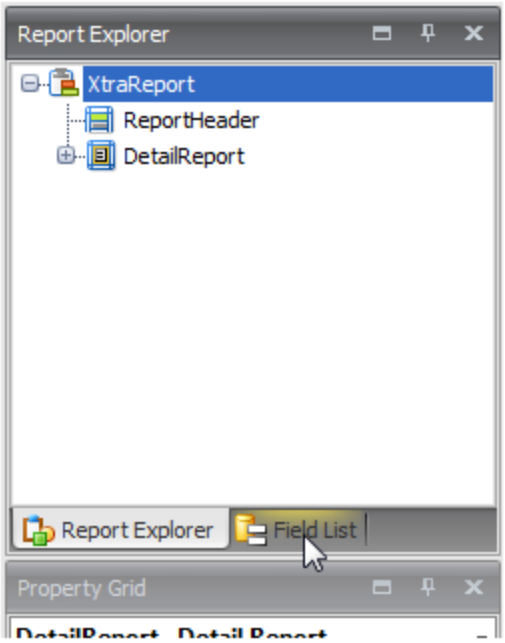
   Project properties information is read from the values entered in the Project Settings view.



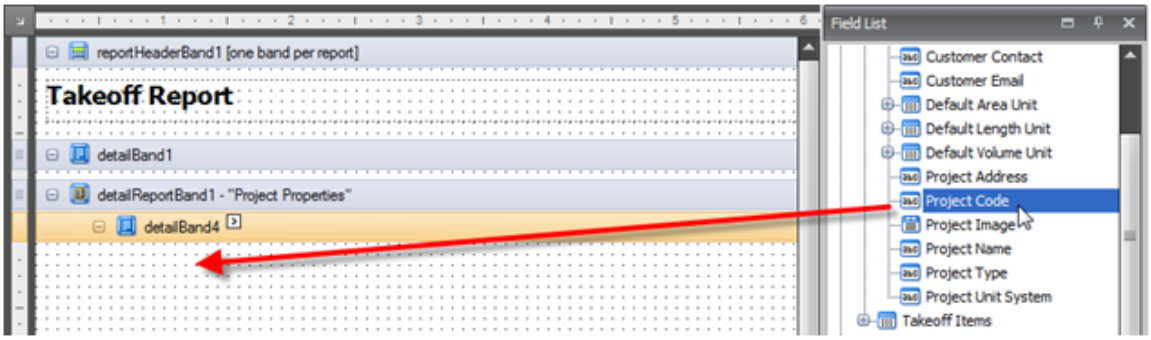
   The 'DetailReport - "Project Properties"' and 'Detail' bands are added to the report.



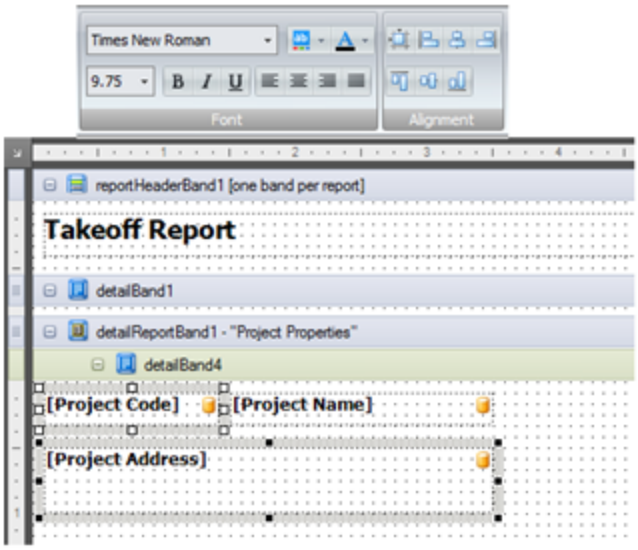
2. In the **Report Explorer** window to the right, click the **Field List** tab.



3. From the **Field List** tab, drag the desired properties into the detail band.

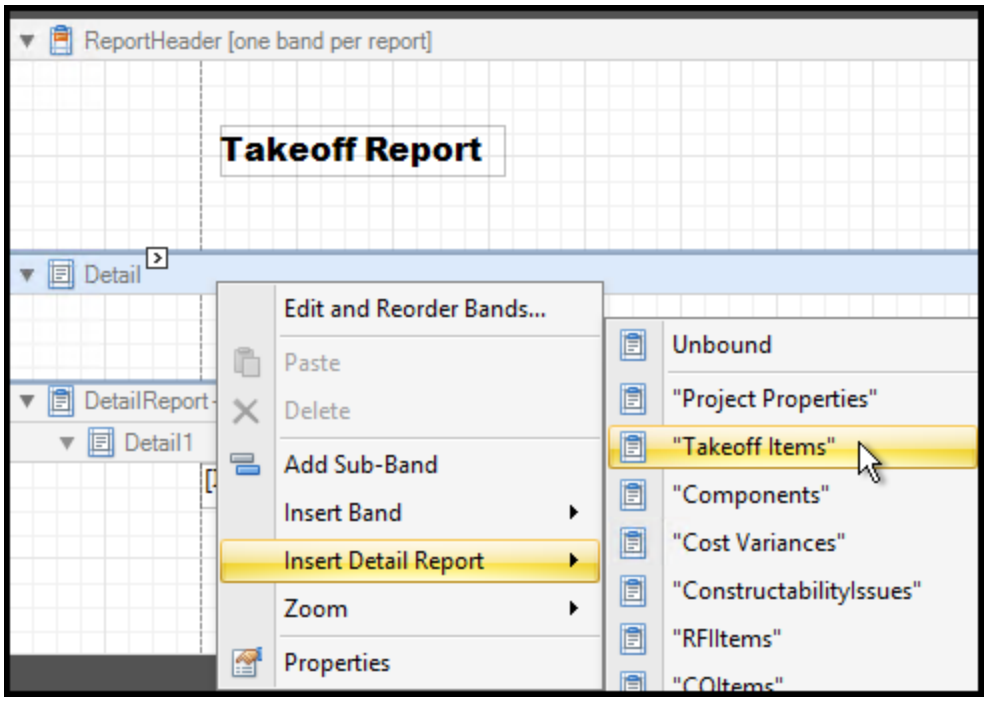


4. Modify the layout and formatting of the detail band.
   - To move and align the property placeholders, use the **Alignment** tools on the ribbon.
   - To modify the formatting of the data, select a placeholder, and then change the font size and type.



To add takeoff items

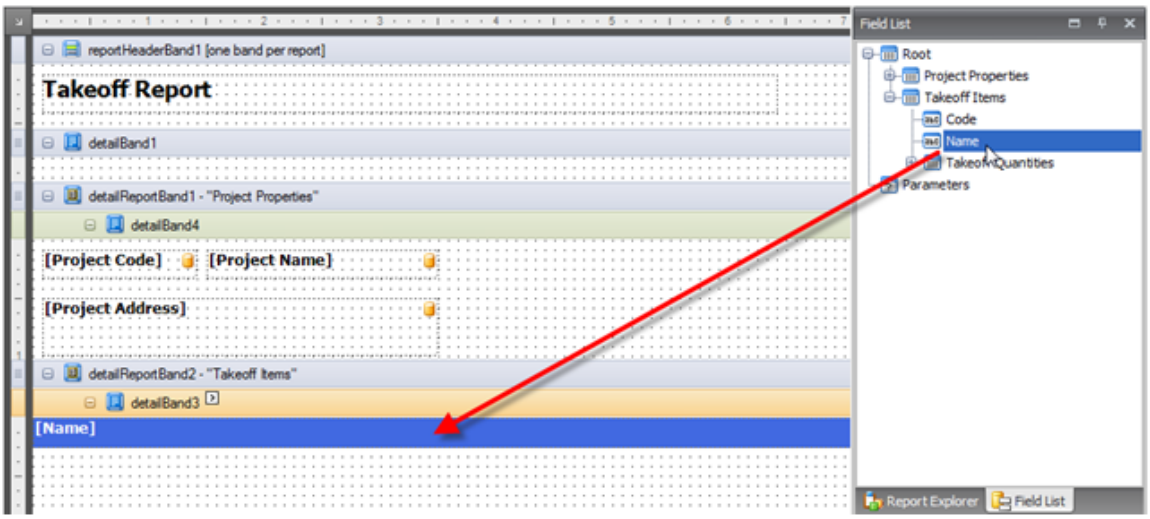
1. Right-click in the report area under the Detail band and select **Insert Detail Report > Takeoff Items**.



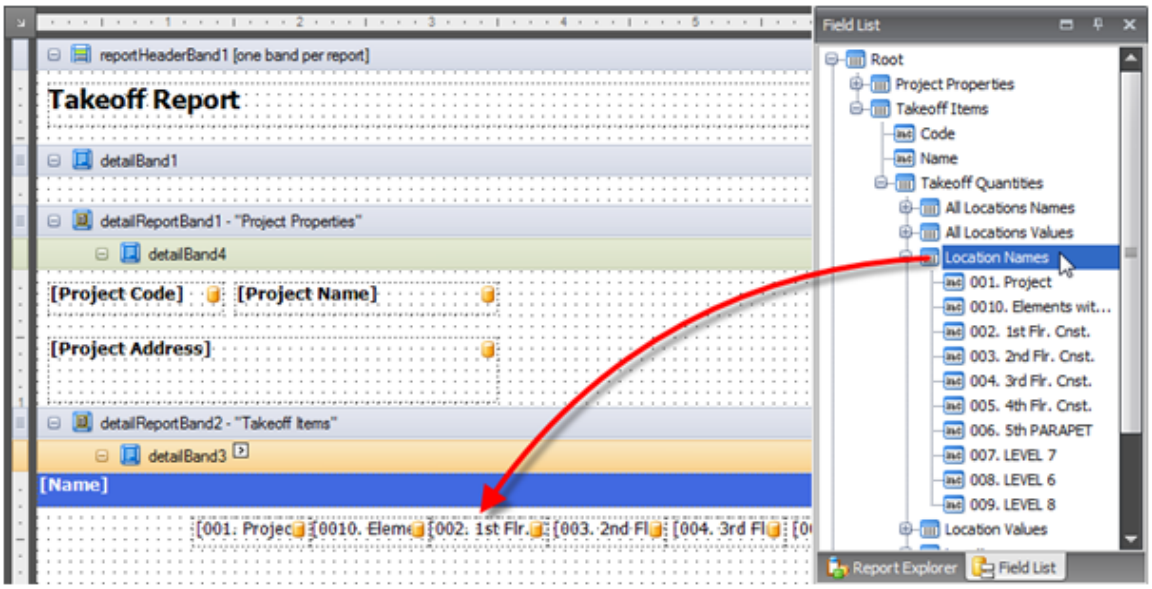
The 'DetailReport - "Takeoff Items"' and 'Detail' bands are added to the report.

2. On the **Field List** tab, expand **Takeoff Items**, and then drag the **Name** field under the new 'Detail' band.

   This will include all the names of the takeoff items that you created in the report. You can format the **Name** field as desired. In the example below, a blue fill and a white font are applied.

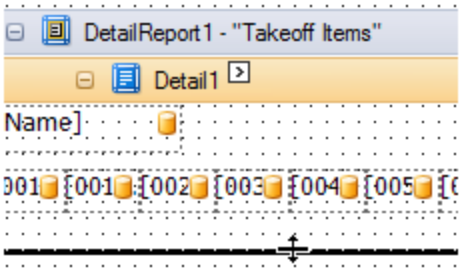


3. On the **Field List** tab, expand **Takeoff Items > Takeoff Quantities**, and then drag the **Location Names** field under the **Name** field.

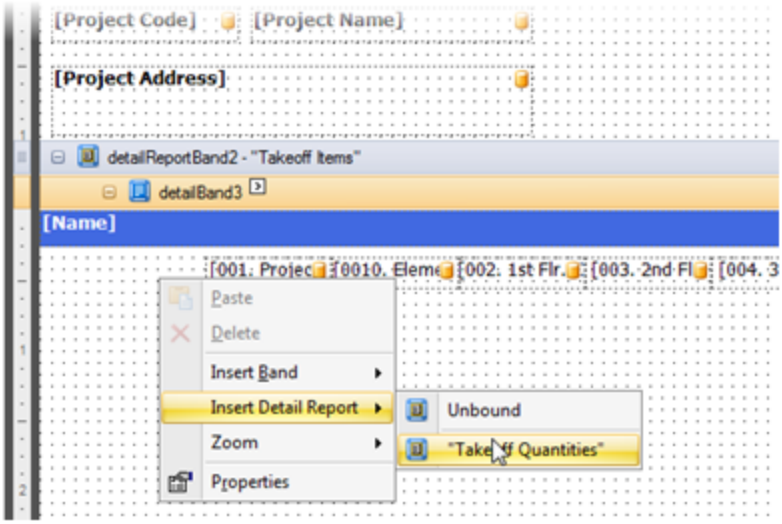


This will include all the locations from your project in the report. You can also include a subset of locations by dragging them individually into the Detail band.

Tip: To enlarge the report area, drag the bottom edge downwards.



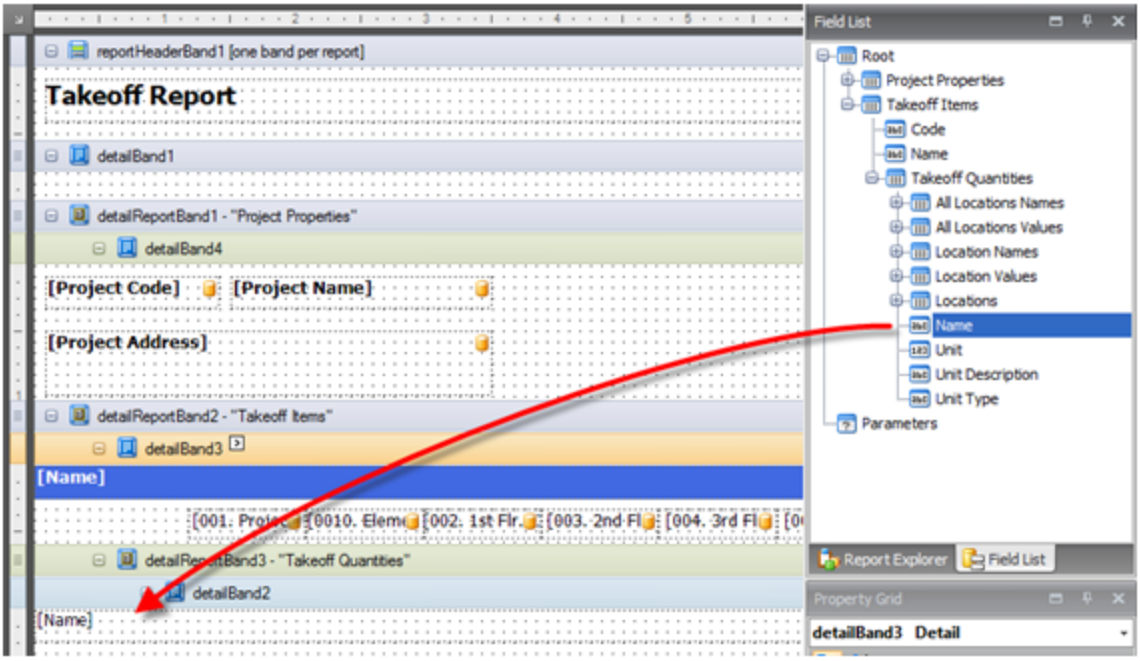
4. To include the Takeoff Quantities band inside the 'DetailReport - "Takeoff Items"' band, right-click on that header and select **Insert Detail Report > Takeoff Quantities**.



The 'DetailReport - "Takeoff Items.Takeoff Quantities" and "Detail" bands are added to the report.

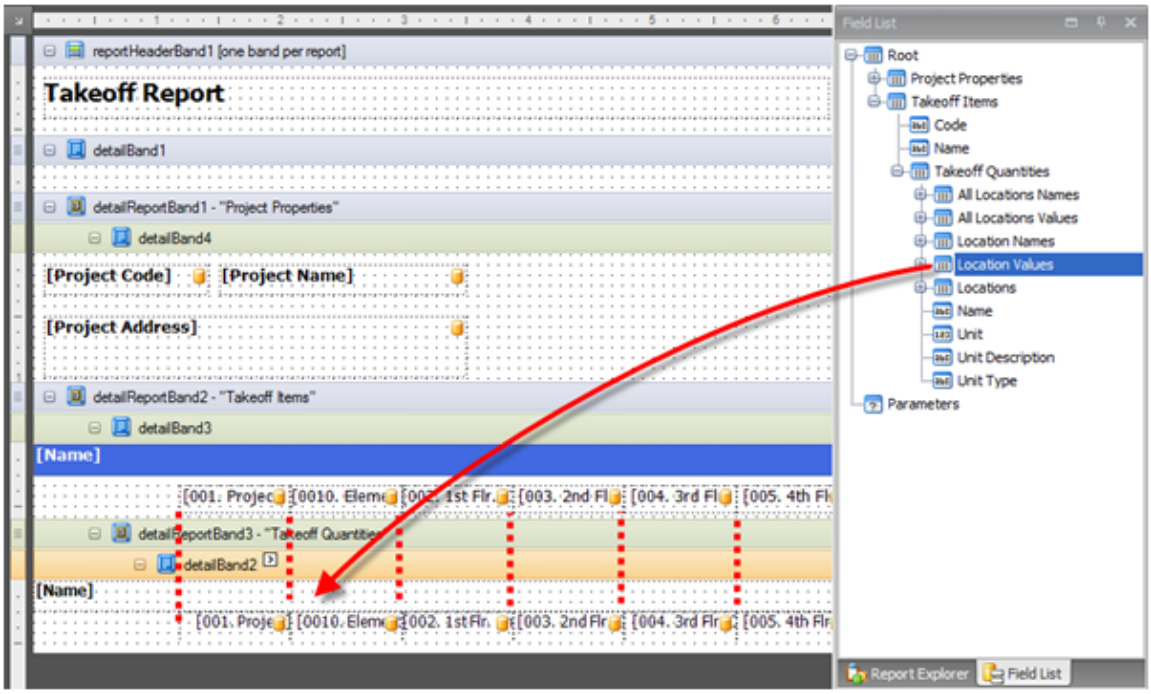
5. On the **Field List** tab, expand **Takeoff Items > Takeoff Quantities**, and then drag the **Name** field into the detailReport Band - "Takeoff Quantities".

   All takeoff quantities are automatically included.

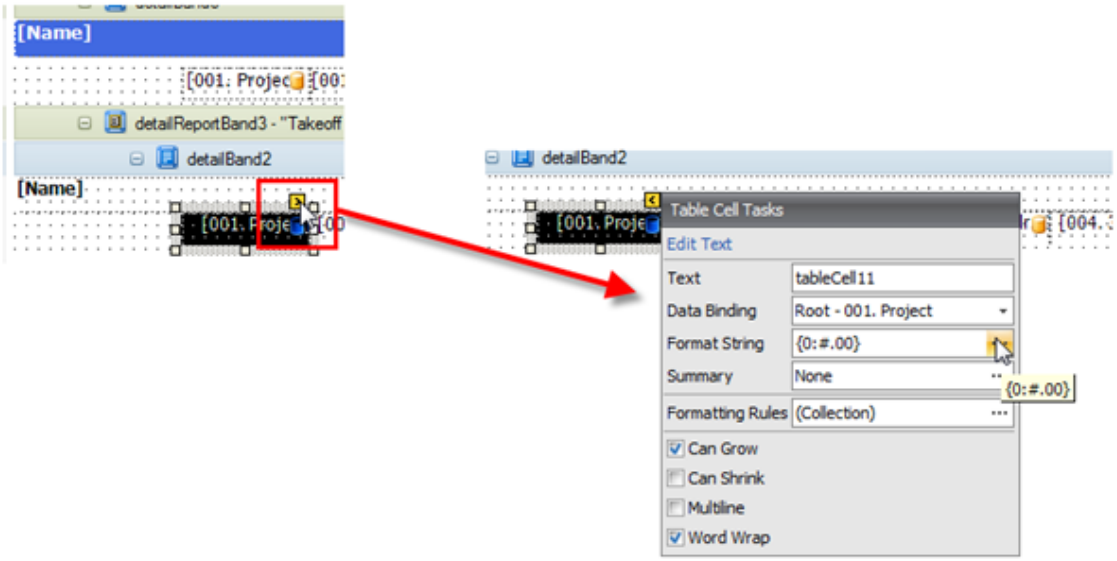


6. From the **Field List** tab, drag **Location Values**, the quantity values for all locations and takeoff quantities, to underneath the **Locations** field in the detailBand.

Tip: Ensure that the locations and location values are properly aligned to guarantee that they are presented correctly in the report.



7. *Optional:* To adjust the formatting of the quantities per location, select a cell, and then change the number format.



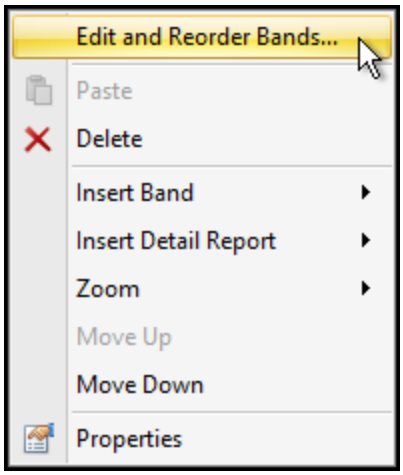
8. Optional fields that you can add to your report:
   - **Extended_Nr** (Takeoff Items > TakeOffQuantities > AllLocationsValues) - This field displays numeric format values for TOQ units. (Exception: the 'feet and inches' unit is displayed in inches.) You can also apply the standard report field formatting to this numeric field. If you do not need this to appear as a numeric field, use the '**Extended**' field.
   - **WarningType** (Takeoff Items > WarningType) - Displays a value that represents the warning message that appears next to each Takeoff Item on the Takeoff Manager view (Info column).

     Value Definition:

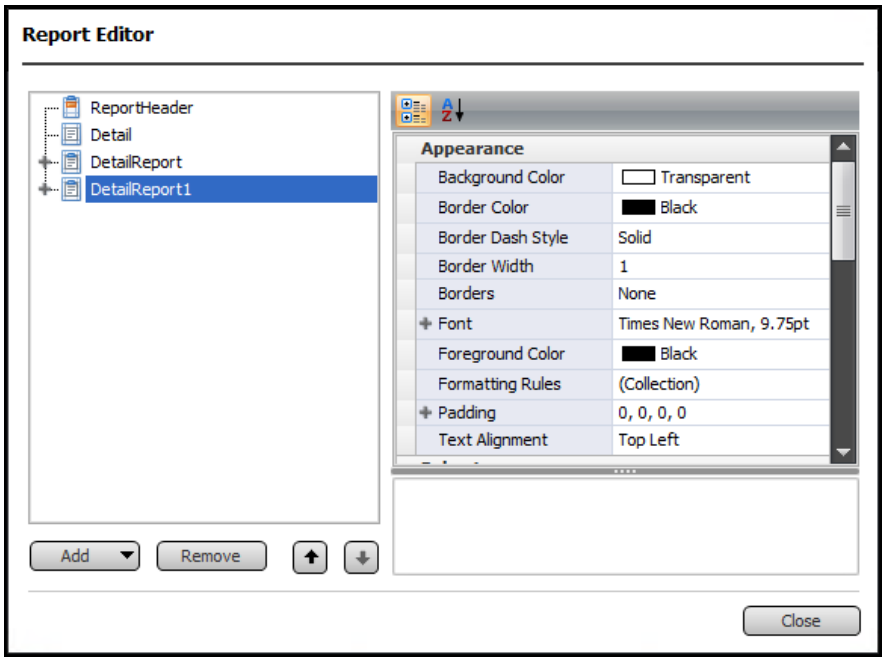
     - 0 - no warning is displayed next to this Takeoff item in Takeoff Manager.
     - 1 - Information - Indicates that the Takeoff item has elements with manual quantities. Corresponds to the blue circle icon 'Information' in Takeoff Manager.
     - 2 - Other - Indicates that the Takeoff item has takeoff quantities that could not be calculated correctly or if a quantity is missing. Corresponds to the yellow triangle icon 'Missing Quantity' in Takeoff Manager.
     - 3 - Reactivate model - Indicates that the model needs to be reactivated. Corresponds to the blue triangle icon in Takeoff Manager.
     - 4 - Re-quantification of the Takeoff item is required. Corresponds to the orange triangle icon 'Requantify Takeoff item' in Takeoff Manager.

To edit and reorder report bands

1. Right-click on a report band and select **Edit and Reorder Bands**.



2. On the Report Editor, you can click on each section and move it up or down, remove or rename it, change its appearance, determine its behavior, and more.

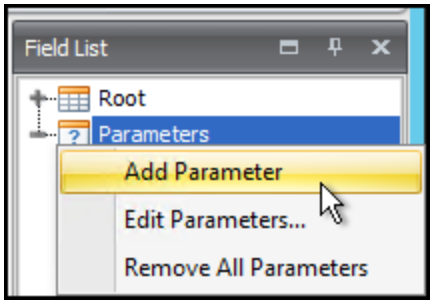


To add parameters

You can use report parameters to pass data to a report before it is published. To create a report

parameter at design time, follow the steps below:

1. On the Report Editor, click on the **Field List** tab.
2. Right-click on Parameters and select **Add Parameter**.

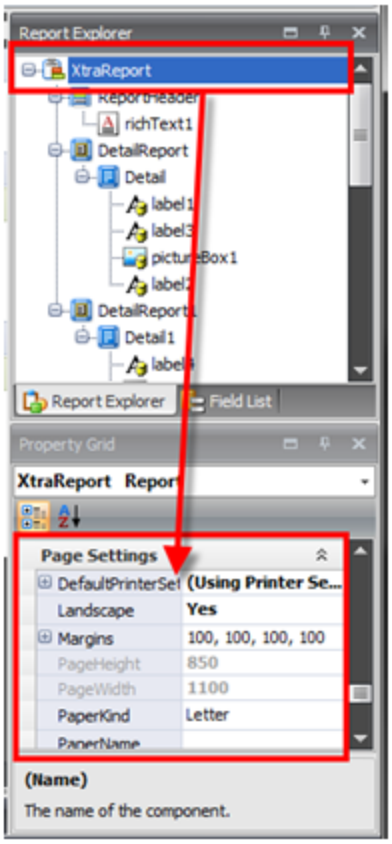


3. On the **Add New Parameter** dialog box, choose the following options:
   - **Name**: Enter a unique name for the parameter.
   - **Description**: Enter the text that will be displayed in a Print Preview along with the corresponding value.
   - **Type**: Specify the parameter's value type. This property can be set to any standard data type matching the expected data type of the parameter value.
   - **Default value**: Specify the default parameter value.
     - Show in the parameters panel: Enable this option to show the parameter value in a Print Preview.
     - Supports the collection of standard values: Enable this option if the parameter is visible (i.e., its value will be shown during Print Preview). The user will be prompted to choose a value from a predefined list. You can manually populate this list with possible values.
     - Allow multiple values: Enable this option if a parameter can be assigned a collection of values.
   - **Dynamic values**: Although it is on the Report Designer, the Dynamic values tab is currently not supported.
   - **Static values:** Click on this tab to specify a static list of possible values. Each value should have a description that is displayed in the Print Preview.

Changing the Report Page Settings

To change the page settings of a report template

1. Open the Create Reports task.
2. Create a report template in the Report Designer.
3. In the **Report Explorer** panel to the right of the Report Designer, click the name of the report template.
4. In the **Property Grid**, scroll to the **Page Settings** section.



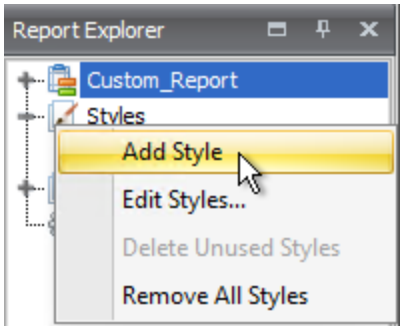
5. In this section, change the page orientation and page size as needed.

Report UI Styles and Formatting Rules

Report Designer offers you the ability to customize report style sheets and share them with other users.

To customize your report style

1. On the **Report Explorer** tab, right-click on **Styles** and select **Add Style**.



2. Right-click on the newly added style and select **Edit Styles**.
3. On the Styles Editor, assign the appearance of the style.
4. Assign a unique name for your design.
5. Click to save your style.

To make a copy of the existing style

- Click .

To check where the selected formatting rules are applied

- Right-click on a formatting rule and click **Select Controls With Formatting Rule**.

  Those controls are selected in the report template.

  Tip: Controls: All components added to your report in the report editor (includes cells, labels, charts, lines, etc.).

VICO OFFICE

R6.5 USER GUIDE

June 2017

TRANSFORMING THE WAY THE WORLD WORKS

Trimble.

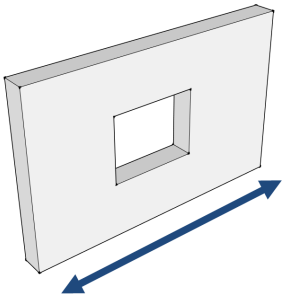
Quantities and Units

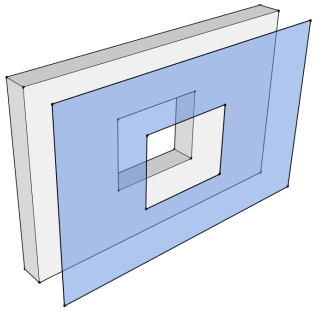
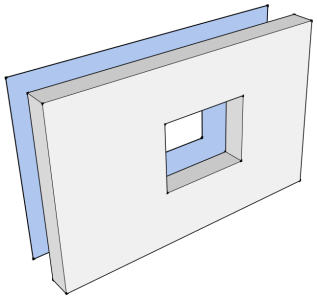
The following units and abbreviations are available in Vico Office:

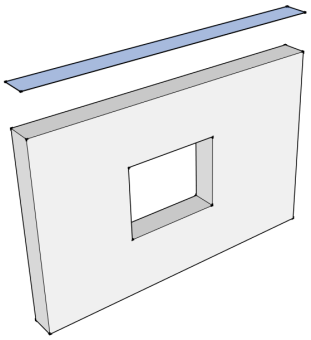
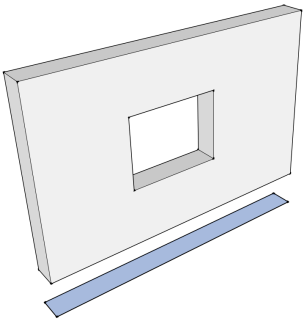
Dimension	Units (Imperial)	Units Abbr (Imperial)	Units (Metric)	Units Abbr (Metric)
Length	Inch	IN	Millimeter	MM
	Feet and Inches	FT-IN	Centimeter	CM
	Foot	FT	Decimeter	DM
	Yard	YD	Meter	M
	Mile	MI	Kilometer	KM
Area	Square Inch	SQ IN	Square Millimeter	MM2
	Square Foot	SQ FT	Square Centimeter	CM2
	Square Yard	SQ YD	Square Decimeter	DM2
			Square Meter	M2
Volume & Capacity	Cubic Inch	CU IN	Cubic Centimeter	CM3
	Cubic Foot	CU FT	Cubic Decimeter	DM3
	Cubic Yard	CU YD	Cubic Meter	M3
	Pint	PT	Centiliter	CL
	Quart	QT	Deciliter	DL
	Gallon	GAL	Litre	L
Weight	Ounce	OZ	Gram	G
	Pound	LB	Kilogram	KG
	TON (Short)	T (S)	TON (Metric)	T (M)
			TON (Long)	T (L)
Count / General	Each	EA	Each	EA

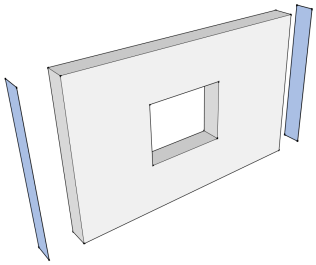
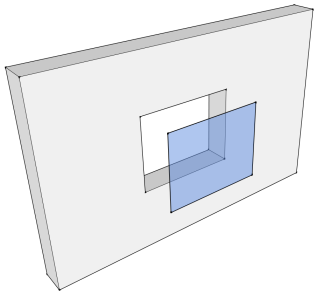
Dimension	Units (Imperial)	Units Abbr (Imperial)	Units (Metric)	Units Abbr (Metric)
	Lump Sum	LS	Lump Sum	LS
	Hour	HR	Hour	HR
	Day	D	Day	D

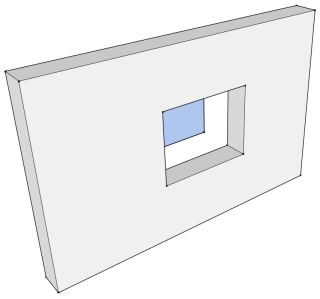
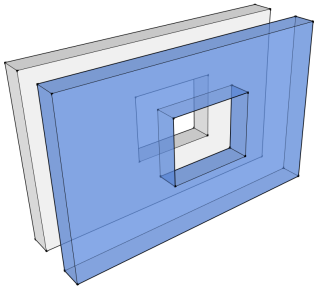
Wall Quantities

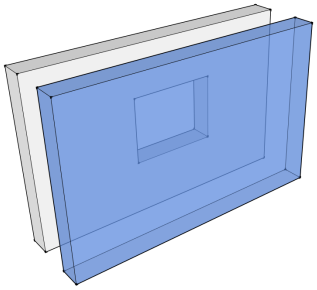
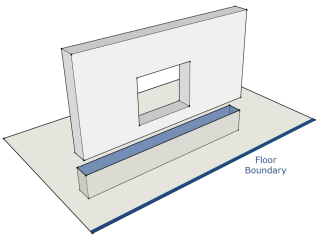
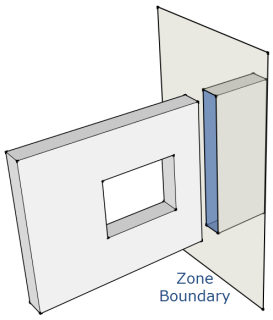
Name	Units - Imperial	Units - Metric	Description
Count	**EA**	**EA**	Number of Wall elements in the Takeoff Item.
Length	**FT-IN**	**M**	Length of the Wall element along the Reference Line. In case the Wall element is split, the Length value will be assigned to the Location in which the largest part of the Wall element is located. When equal parts are located in multiple zones, the Length is assigned to the Location with the lowest X,Y,Z coordinates.  The sum of the length of all reference lines, included in the element's meta information.

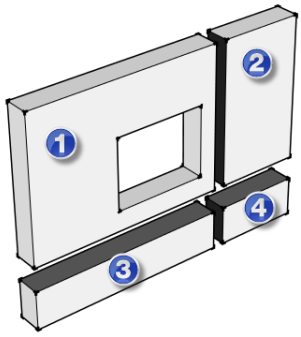
Name	Units - Imperial	Units - Metric	Description
Net Reference Side Surface Area	**SQ FT**	**M2**	Net surface area on reference side of the Wall element.  Calculated as the net surface area of the **Reference Side Polygon**.
Net Opposite Reference Side Surface Area	**SQ FT**	**M2**	Net surface area on opposite of reference side of the Wall element.  Calculated as the net surface area of the **Opposite Reference Side Polygon** on the side opposite the reference side of the Wall element.

Name	Units - Imperial	Units - Metric	Description
Top Surface Area	**SQ FT**	**M2**	Net surface area at the top of the Wall element.  Calculated as the surface area of the **Top Surface Polygon(s)**.
Bottom Surface Area	**SQ FT**	**M2**	Net surface area at the bottom of the Wall.  Calculated as the surface area of the **Bottom Surface Polygon(s)**.

Name	Units - Imperial	Units - Metric	Description
Ends Surface Area	**SQ FT**	**M2**	Surface area of both Wall ends.  Calculated as the sum area of the polygons at the ends of the Wall.
Reference Side Opening Surface Area	**SQ FT**	**M2**	Total surface area of openings on the reference side of the Wall element.  Calculated as the sum area of all polygon loops inside the Wall element's boundary polygon on the reference side.

Name	Units - Imperial	Units - Metric	Description
Opposite Reference Side Opening Surface Area	**SQ FT**	**M2**	Total surface area of openings on the opposite of the reference side of the Wall element.  Calculated as the sum area of all polygon loops inside the Wall element's boundary polygon on the opposite of the Wall element's reference side.
Net Volume	**CU YD**	**M3**	Net volume of the Wall element, which excludes the volume of all openings.  Extracted from the 3D body, taking in account the volume subtractions in the element.

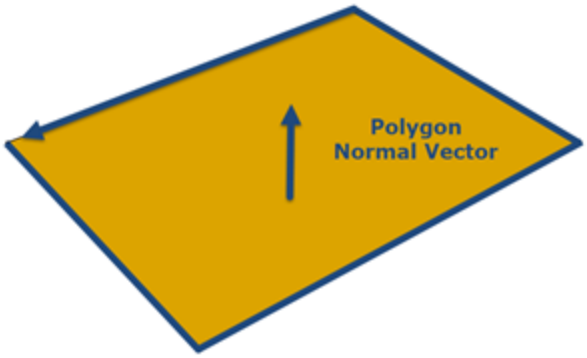
Name	Units - Imperial	Units - Metric	Description
Gross Volume	**CU YD**	**M3**	Gross volume of the Wall element, which includes the volume of all openings.  Volume is extracted from the 3D body. On places where the 3D body is modified, all polygon holes are removed and all polygons connecting to holes are also removed to get the 'gross' value.
Joint Horizontal Surface Area	**SQ FT**	**M2**	The surface area that is created by splitting an element along the boundary of a 'Floor' Location. 
Joint Vertical Surface Area	**SQ FT**	**M2**	The surface area that is created by splitting an element along the boundary of a 'Zone' Location. 

Name	Units - Imperial	Units - Metric	Description
Piece Count	**EA**	**EA**	Number of separate pieces, created from the original element as a result of splitting operations. Before defining Locations, Piece Count equals <1> for each Wall element.  Piece Count equals <4> for a Wall element that is split by a Zone and a Floor boundary.
Piece Length	**FT-IN**	**M**	Length of an individual Wall piece. Returns the length of the Wall that is contained in a Location.
CAD_Count	**EA**	**EA**	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.
CAD_Length	**FT-IN**	**M**	Length of the element along the Reference Line. This quantity comes from the CAD application after it was published.
CAD_Volume	**CU YD**	**M3**	Net volume of the element, which excludes the volume of any opening. This quantity comes from the CAD application after it was published.

Wall Polygon Classification

The Wall Polygon Classification process automatically labels geometry in the imported model, which then enables Takeoff Manager to calculate the quantities described above. The process uses Vico's geometry analysis algorithms, which are accurate for standard Wall elements but may result in wrong assumptions in specific cases. Any wrong assumptions can be corrected by using the Takeoff Quantity Painting process.

The Takeoff Manager polygon classification compares the model's vertical and the polygon's Normal Vector to determine its angle:



- For 'Vertical polygons' (angle >= 45 degrees and angle <= 135 degrees), Office calculates the smallest distance between the polygon's horizontal edges and the first reference line. When this is done for all 'vertical' polygons which are parallel to the reference line, then the polygon which is the closest to the reference line will be considered '**Reference Side Surface**', the first parallel polygons which is not the closest one (theoretically there can be only one) will be considered '**Opposite reference side surface**'.

  The rest of the 'vertical polygons' are considered '**End surface**'. If there is more than one '**Opposite reference side surface polygon**' only the first will be marked as such, the others will be classified as '**Unknown**.
- Polygons are classified as '**Top polygons**' if: angle >= -45 degrees and angle <= 45 degrees.
- Polygons are classified as '**Bottom polygons**' if: angle >= 135 degrees and angle <= 225 degrees
- If the Wall element is a curved wall (= exactly one reference line is provided and also a non-zero angle is provided), then all polygons are classified as 'Unknown'. 'Unknown' type polygons are not added to any surface quantity and will result in 'incomplete' Takeoff Quantities.

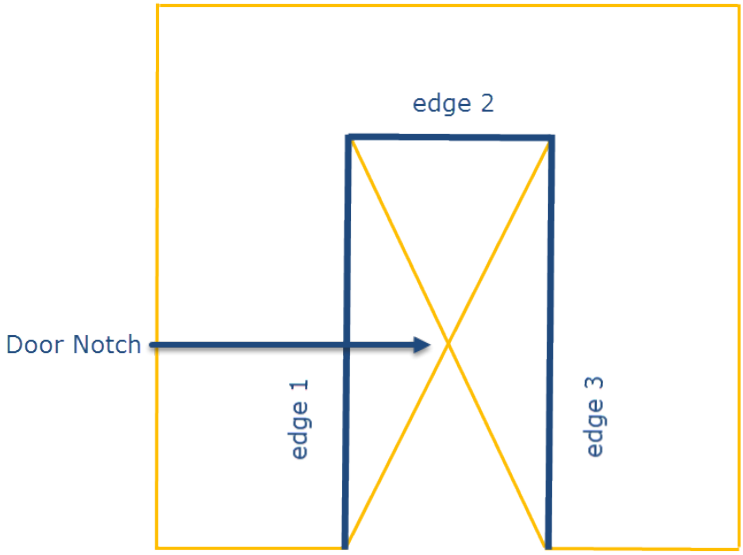
To correctly calculate the Gross Surface Area and Opening Surface Area of Walls that have a door inserted on the baseline of the Wall element, the 'door notch finder' algorithm is executed.

First, the automatic polygon classification runs, which determines the reference side and the opposite of the reference side polygon of the wall. The 'door notch finder' algorithm relies on this. It will only work correctly if the reference side and opposite of reference side polygons were classified correctly.

After this, the reference side total door notch area is calculated:

Going through the edges of the reference side polygon(s), the algorithm searches for 3 consecutive edges that have the following characteristics:

- The First edge is vertical and its first vertex is lower than its second vertex.
- The Second edge is horizontal and it's below the highest point of the wall (to avoid considering the outer contour of the wall to be a door notch).
- The third edge is vertical and its first vertex is higher than the second vertex.

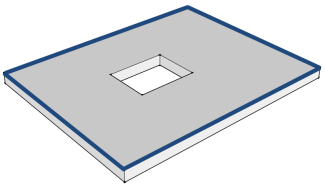
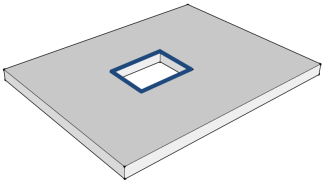


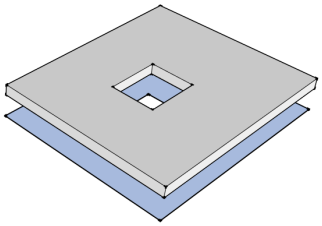
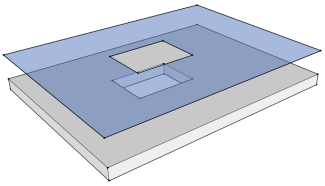
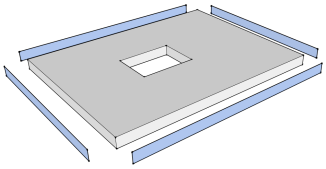
If all conditions are met for the 3 edges, the door notch area is added to the total door notch area of the reference side polygon. Door notch area is calculated as: length of the horizontal edge multiplied by the length of the longer vertical edge.

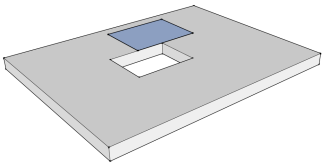
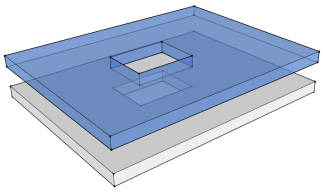
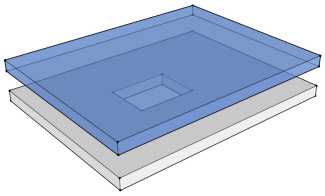
The opposite reference side total for door notches is then calculated exactly the same as the reference side total door notch area, however now the algorithm searches for polygons classified as opposite reference side polygons.

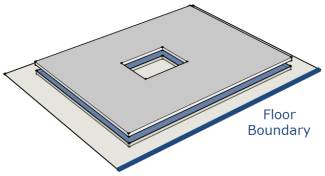
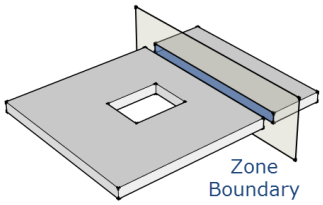
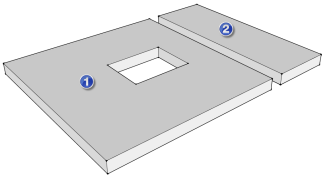
- The total reference side door notch area is added to the Reference Side Surface Area.
- The total opposite reference side door notch area is added to the Opposite Reference Side Surface Area.
- The total reference side door notch area, multiplied by the wall thickness, is added to the Gross Volume.

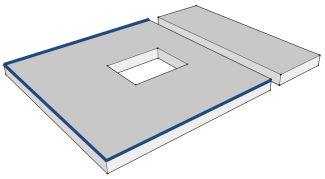
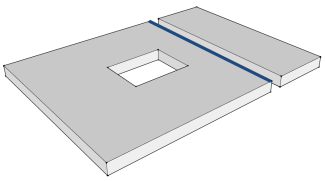
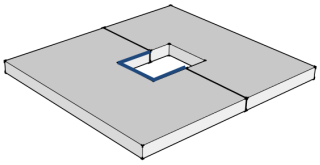
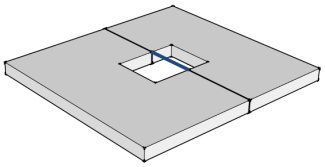
Slab and Roof Quantities

Name	Units - Imperial	Units - Metric	Description
Count	**EA**	**EA**	Number of elements in the Takeoff Item.
Edge Perimeter	**FT-IN**	**M**	Perimeter of the slab at the edges.  Calculated as the total length of edges of the 'Top surface' polygons; holes are excluded.
Hole Count	**EA**	**EA**	Number of Holes in the Slab element. Calculated as the number of polygons inside the "Top surface" polygon.
Hole Perimeter	**FT-IN**	**M**	Sum perimeter for all holes in the Slab element.  Calculated as the total length of polygons classified as holes in the “Top surface” polygon(s).

Name	Units - Imperial	Units - Metric	Description
Net Bottom Surface Area	**SQ FT**	**M2**	Net surface area at the bottom of the slab  Calculated as the surface area of the **Bottom Polygon**.
Net Top Surface Area	**SQ FT**	**M2**	Net surface area at the top of the slab.  Calculated as the surface area of the **Top Polygon**.
Edge Surface Area	**SQ FT**	**M2**	Gross surface area of the edges of the Slab element.  Calculated as the sum of all surface areas of polygons classified as **Side Polygon**.

Name	Units - Imperial	Units - Metric	Description
Hole Surface Area	**SQ FT**	**M2**	Surface area of the holes in the Slab element.  Calculated as surface area of **Polygons inside the boundary of the Top Polygon**.
Net Volume	**CU YD**	**M3**	Net volume  Calculated by the internal geometry analysis engine; any holes are subtracted.
Gross Volume	**CU YD**	**M3**	Gross volume of the Slab element.  Calculated by the internal geometry analysis engine.

Name	Units - Imperial	Units - Metric	Description
Joint Horizontal Surface Area	**SQ FT**	**M2**	The surface area that is created by splitting an element along the boundary of a 'Floor' Location. 
Joint Vertical Surface Area	**SQ FT**	**M2**	The surface area that is created by splitting an element along the boundary of a 'Zone' Location. 
Piece Count	**EA**	**EA**	Number of separate pieces, created from the original element as a result of splitting operations. Before defining Locations, Piece Count equals 1 for each Slab element. 

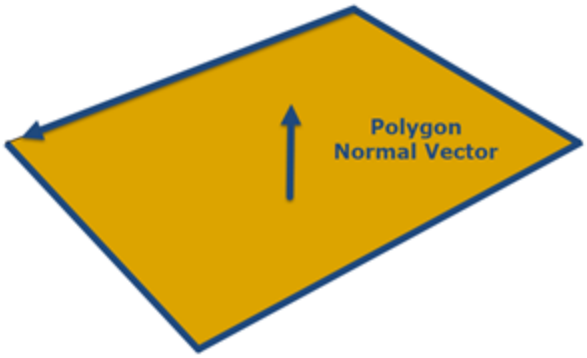
Name	Units - Imperial	Units - Metric	Description
Edge Length	**FT-IN**	**M**	Length of the Slab element's perimeter that belongs to a piece that was created by defining a 'Zone' Location.  Calculated as the length of all Perimeter edges for a piece.
Joint Length	**FT-IN**	**M**	Length of a Slab piece's edge along the split line, defined by a Zone Boundary. 
Hole Edge Length	**FT-IN**	**M**	The length of the slab hole's edge in a Location. The sum of all Hole Edge Lengths equals the Hole Perimeter. 
Hole Joint Length	**FT-IN**	**M**	The length of the split line over a hole in the slab. 

Name	Units - Imperial	Units - Metric	Description
CAD_Count	**EA**	**EA**	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.
CAD_Volume	**CU YD**	**M3**	Net volume of the element, which excludes the volume of any opening. This quantity comes from the CAD application after it was published.

Slab and Roof Polygon Classification

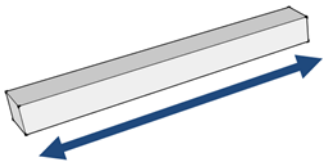
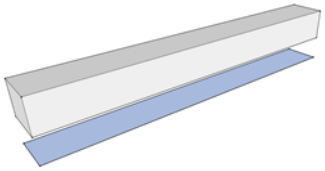
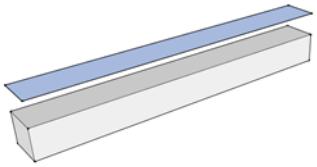
The Slab and Roof Polygon Classification process automatically labels geometry in the imported model, which then enables Takeoff Manager to calculate the quantities described above. The process uses Vico's geometry analysis algorithms, which are accurate for standard Slab elements but sometimes may result in wrong assumptions. Any wrong assumptions can be corrected by using the Takeoff Quantity Painting process.

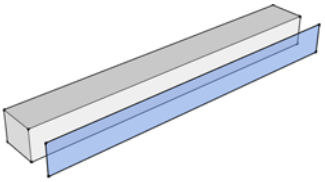
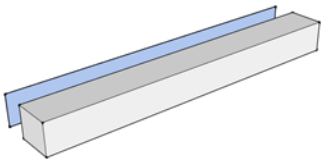
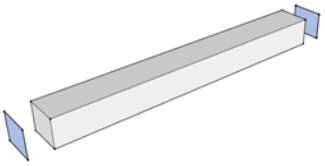
The Takeoff Manager polygon classification compares the model's vertical and the polygon's **Normal Vector** to determine its **angle**:

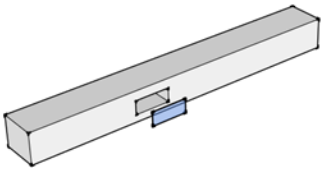
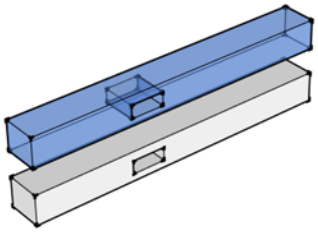
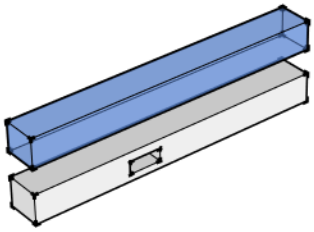


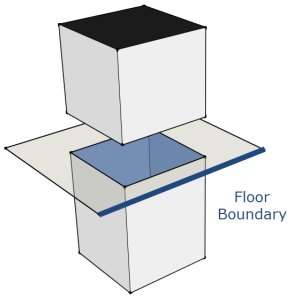
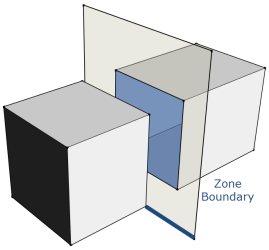
The angle of a polygon is calculated by the internal geometry analysis engine, the normal vector is calculated by Takeoff Manager.

Beam Rectangular Quantities

Name	Units - Imperial	Units - Metric	Description
Count	**EA**	**EA**	Number of elements in the Takeoff Item.
Length	**FT-IN**	**M**	Length of the Beam element along the Reference Line.  Calculated as the sum of the length of all reference lines, included in the element's meta information.
Bottom Surface Area	**SQ FT**	**M2**	Surface area at bottom  Calculated as the surface area of the **Bottom Side Polygon(s)**.
Top Surface Area	**SQ FT**	**M2**	Surface area at top  Calculated as the surface area of the **Top Side Polygon(s)**.

Name	Units - Imperial	Units - Metric	Description
Reference Side Surface Area	**SQ FT**	**M2**	Surface area on reference side  Calculated as the surface area of the **Reference Side Polygon**.
Opposite Reference Side Surface Area	**SQ FT**	**M2**	Surface area on opposite side of reference side.  Calculated as the surface area of the **Opposite of Reference Side Polygon**.
Ends Surface Area	**SQ FT**	**M2**	Surface area of ends of the beam**.**  Calculated as the sum of the surface areas of polygons classified as **Sides Polygon**.

Name	Units - Imperial	Units - Metric	Description
Hole Surface Area	**SQ FT**	**M2**	Surface area of holes in the beam.  Sum of the surface area of all polygon classified as **Hole Polygon**.
Net Volume	**CU YD**	**M3**	Net volume of the Beam element.  Calculated by the internal geometry analysis engine.
Gross Volume	**CU YD**	**M3**	Gross volume of the Beam element.  Calculated by the internal geometry analysis engine, ignoring any subtractions and holes.

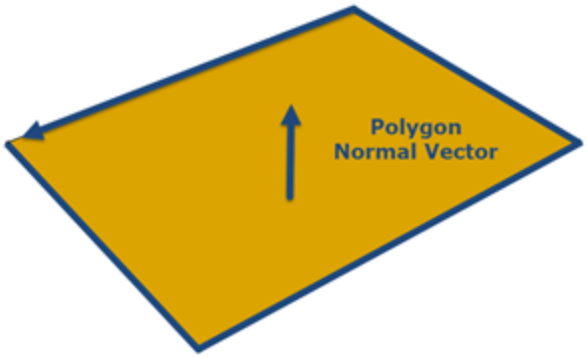
Name	Units - Imperial	Units - Metric	Description
Joint Horizontal Surface Area	**SQ FT**	**M2**	The surface area that is created by splitting an element along the boundary of a 'Floor' Location. 
Joint Vertical Surface Area	**SQ FT**	**M2**	The surface area that is created by splitting an element along the boundary of a 'Zone' Location. 
Piece Count	**EA**	**EA**	Number of separate pieces, created from the original element as a result of splitting operations. Before defining Locations, Piece Count equals 1 for each Beam element.
Piece Length	**FT-IN**	**M**	Length of an individual Wall piece. Returns the length of the Wall that is contained in a Location.
CAD_Count	**EA**	**EA**	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.

Name	Units - Imperial	Units - Metric	Description
CAD_Length	**FT-IN**	**M**	Length of the element along the Reference Line. This quantity comes from the CAD application after it was published.
CAD_Volume	**CU YD**	**M3**	Net volume of the element, which excludes the volume of any opening. This quantity comes from the CAD application after it was published.

Beam Polygon Classification

The Beam Polygon Classification process automatically labels geometry in the imported model, which then enables Takeoff Manager to calculate the quantities described above. The process uses Vico's geometry analysis algorithms, which are accurate for standard Beam elements but sometimes may result in wrong assumptions. Any wrong assumptions can be corrected by using the Takeoff Quantity Painting process.

The Takeoff Manager polygon classification compares the model's vertical and the polygon's **Normal Vector** to determine its **angle**:

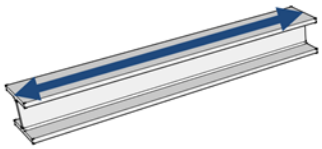


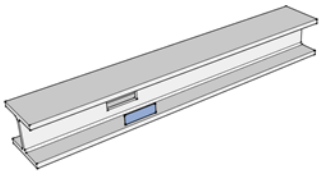
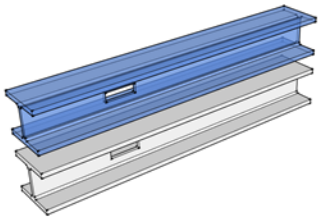
- For 'Vertical polygons' (angle >= 45 degrees and angle <= 135 degrees), Office calculates the smallest distance between the polygon's horizontal edges and the first reference line. When this is done for all 'vertical' polygons which are parallel to the reference line, then the polygon which is the closest to the reference line will be considered '**Reference Side Surface**', the first parallel polygons which is not the closest one (theoretically there can be only one) will be considered '**Opposite reference side surface**'.

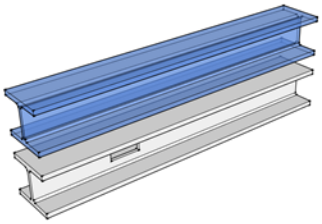
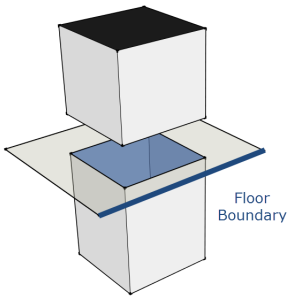
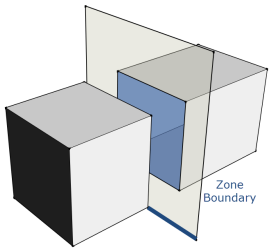
The rest of the 'vertical polygons' are considered '**Side Polygon**'. If there is more than one '**Opposite reference side surface polygon**' only the first will be marked as such, and the others will be classified as '**Unknown**'. If there is no reference line, all polygons will be classified as '**Side Polygon**'

- Polygons are classified as '**Top polygons**' if: angle >= -45 degrees and angle <= 45 degrees.
- Polygons are classified as '**Bottom polygons**' if: angle >= 135 degrees and angle <= 225 degrees.

Beam Profiled Quantities

Name	Units - Imperial	Units - Metric	Description
Count	**EA**	**EA**	Number of elements in the Takeoff Item.
Length	**FT-IN**	**M**	Length of the Beam element along the Reference Line.  Calculated as the sum of the length of all reference lines, included in the element's meta information.
Bottom Surface Area	**SQ FT**	**M2**	Surface area at bottom Calculated as the surface area of the **Bottom Side Polygon(s)**.
Top Surface Area	**SQ FT**	**M2**	Surface area at top Calculated as the surface area of the **Top Side Polygon(s)**.
Reference Side Surface Area	**SQ FT**	**M2**	Surface area on reference side Calculated as the surface area of the **Reference Side Polygon**.

Name	Units - Imperial	Units - Metric	Description
Opposite Reference Side Surface Area	**SQ FT**	**M2**	Surface area on opposite side of reference side. Calculated as the surface area of the **Opposite of Reference Side Polygon**.
Ends Surface Area	**SQ FT**	**M2**	Surface area of ends of the beam. Calculated as the sum of the surface areas of polygons classified as **Sides Polygon**.
Hole Surface Area	**SQ FT**	**M2**	Surface area of holes in the beam.  Sum of the surface area of all polygon classified as **Hole Polygon**.
Net Volume	**CU YD**	**M3**	Net volume of the Beam element.  Calculated by the internal geometry analysis engine.

Name	Units - Imperial	Units - Metric	Description
Gross Volume	**CU YD**	**M3**	Gross volume of the Beam element.  Calculated by the internal geometry analysis engine, ignoring any subtractions and holes.
Joint Horizontal Surface Area	**SQ FT**	**M2**	The surface area that is created by splitting an element along the boundary of a 'Floor' Location. 
Joint Vertical Surface Area	**SQ FT**	**M2**	The surface area that is created by splitting an element along the boundary of a 'Zone' Location. 

Name	Units - Imperial	Units - Metric	Description
Piece Count	**EA**	**EA**	Number of separate pieces, created from the original element as a result of splitting operations. Before defining Locations, Piece Count equals 1 for each Beam element.
Piece Length	**FT-IN**	**M**	Length of an individual Wall piece. Returns the length of the Wall that is contained in a Location.
CAD_Count	**EA**	**EA**	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.
CAD_Length	**FT-IN**	**M**	Length of the element along the Reference Line. This quantity comes from the CAD application after it was published.
CAD_Volume	**CU YD**	**M3**	Net volume of the element, which excludes the volume of any opening. This quantity comes from the CAD application after it was published.

Beam Polygon Classification

The Beam Polygon Classification process automatically labels geometry in the imported model, which then enables Takeoff Manager to calculate the quantities described above. The process uses Vico's geometry analysis algorithms, which are accurate for standard Beam elements but sometimes may result in wrong assumptions. Any wrong assumptions can be corrected by using the Takeoff Quantity Painting process.

Cable Tray Quantities

Name	Units - Imperial	Units - Metric	Description
Count	**EA**	**EA**	Number of cable tray elements in the Takeoff Item.

Name	Units - Imperial	Units - Metric	Description
Length	**FT-IN**	**M**	The length for each cable tray element
Piece Count	**EA**	**EA**	Number of pieces the cable tray was divided into as a result of defining Floors and Zones.
Piece Length	**FT-IN**	**M**	Length of an individual cable tray piece. Returns the length of the cable tray that is contained in a Location. If this element has a reference line published with its geometry, if you split this element, each derived element will get its own correct split length based on its piece of reference line. If a reference line is not present, a numeric value to detect length is used so it cannot be split correctly between locations. The element will get the full length as the Piece Length quantity.
CAD_Length	**SQ YD**	**M2**	Length of the element along the Reference Line. This quantity comes from the CAD application after it was published.
CAD_Count	**EA**	**EA**	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.

Cable Tray Fitting Quantities

Name	Units - Imperial	Units - Metric	Description
Count	**EA**	**EA**	Number of cable tray fitting elements in the Takeoff Item.

Name	Units - Imperial	Units - Metric	Description
CAD_Count	**EA**	**EA**	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.

Curtain Wall Quantities

Name	Units - Imperial	Units - Metric	Description
Count	**EA**	**EA**	Number of Curtain Wall elements in the Takeoff Item.
Piece Count	**EA**	**EA**	Number of pieces the Curtain Wall was divided into as a result of defining Floors and Zones.
CAD Net Surface Area	**SQ YD**	**M2**	Quantity that comes from the CAD system and is not calculated by Vico Office.
CAD_Count	**EA**	**EA**	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.

Curtain Wall Frame Quantities

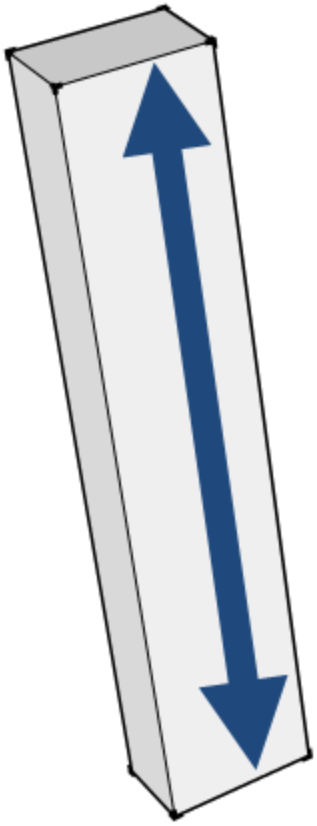
Name	Units - Imperial	Units - Metric	Description
Count	**EA**	**EA**	Number of Curtain Wall Frame elements in the Takeoff Item.
Length	**FT-IN**	**M**	Total length of the included Curtain Wall Frame elements.
Piece Count	**EA**	**EA**	Total number of Curtain Wall Frame elements, after defining Zones and Floors. Default value equals Count.

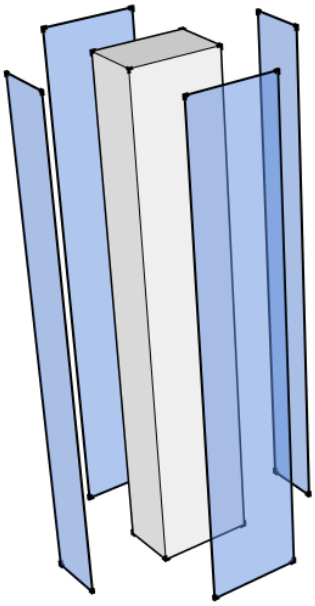
Name	Units - Imperial	Units - Metric	Description
Piece Length	**FT-IN**	**M**	Total length of all pieces of split Curtain Wall Frame segments. Returns Length of the segment contained in a Location.
Vertical Mullions	**FT-IN**	**M**	Total length of all the vertical mullion elements.
Horizontal Mullions	**FT-IN**	**M**	Total length of all the horizontal mullion elements.
CAD_Count	**EA**	**EA**	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.
CAD_Length	**FT-IN**	**M**	Length of the element along the Reference Line. This quantity comes from the CAD application after it was published.

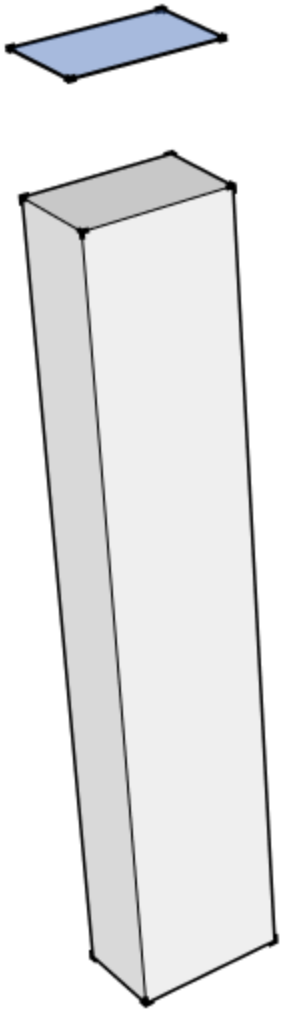
Curtain Wall Panel Quantities

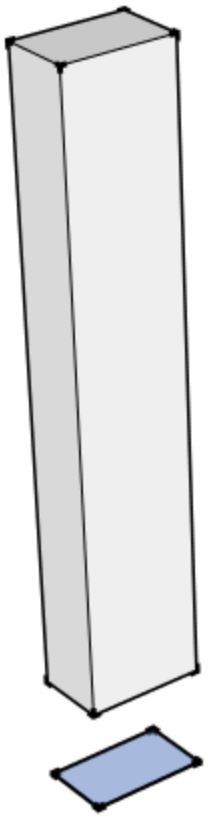
Name	Units - Imperial	Units - Metric	Description
Count	**EA**	**EA**	Number of Curtain Wall Panel elements in the Takeoff Item.
Surface Area	**SQ FT**	**M2**	Total surface area of the included Curtain Wall Panel elements.
Joint Surface Area	**SQ FT**	**M2**	The surface area that is created by splitting an element along the boundary of a 'Floor' Location.
CAD_Count	**EA**	**EA**	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.

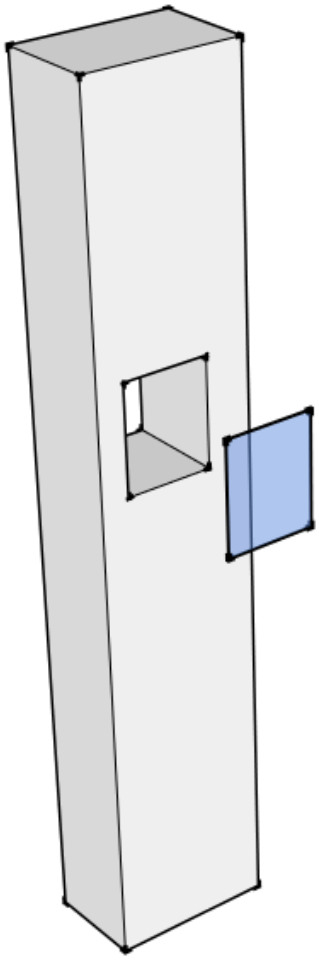
Column Rectangular Quantities

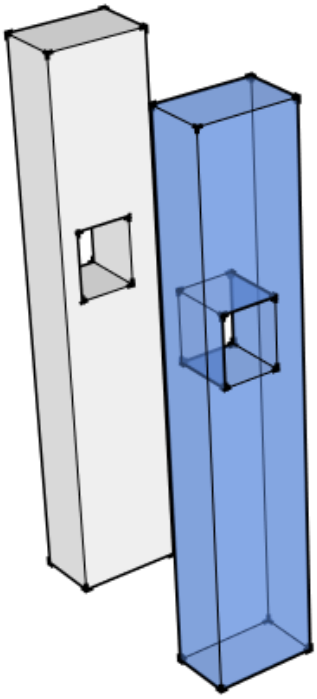
Name	Units - Imperial	Units - Metric	Description
Count	**EA**	**EA**	Number of elements in the Takeoff Item.
Height	**FT-IN**	**M**	Height of the Column element. Whole Height is always assigned to lowest Location of the Column.  Calculated as the difference between the highest point in the **Top Polygon** and the lowest point in the **Bottom Polygon**.

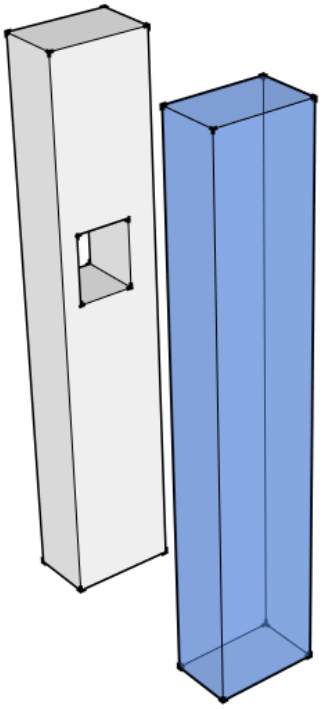
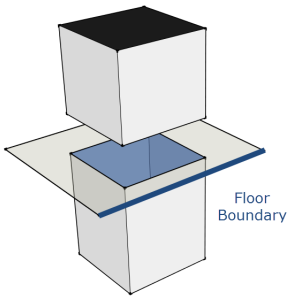
Name	Units - Imperial	Units - Metric	Description
Vertical Surface Area	**SQ FT**	**M2**	Vertical surface area of the Column element.  Calculated as the sum of the surface areas of all **Side Polygons**.

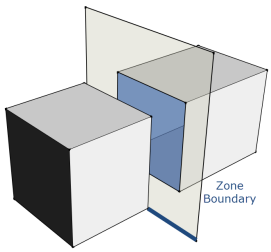
Name	Units - Imperial	Units - Metric	Description
Top Surface Area	**SQ FT**	**M2**	Surface area at the top of the column.  Calculated as the surface area of the polygon classified as **Top Surface Polygon**.

Name	Units - Imperial	Units - Metric	Description
Bottom Surface Area	**SQ FT**	**M2**	Surface area at the bottom of the column.  Calculated as the surface area of the polygon classified as the **Bottom Surface Polygon**.

Name	Units - Imperial	Units - Metric	Description
Hole Surface Area	**SQ FT**	**M2**	Surface area of penetrations in the Column element.  Calculated as the surface area of all polygons that are classified as **Hole Polygon**.

Name	Units - Imperial	Units - Metric	Description
Net Volume	**CU YD**	**M3**	Net volume of Column  Calculated by the internal geometry analysis engine.

Name	Units - Imperial	Units - Metric	Description
Gross Volume	**CU YD**	**M3**	Gross volume of Column  Calculated by the internal geometry analysis engine, ignoring any penetrations and subtractions.
Joint Horizontal Surface Area	**SQ FT**	**M2**	The surface area that is created by splitting an element along the boundary of a 'Floor' Location. 

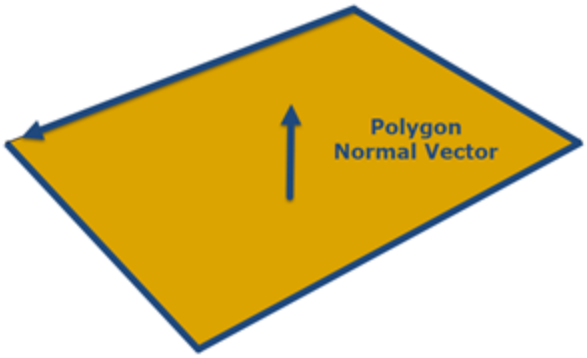
Name	Units - Imperial	Units - Metric	Description
Joint Vertical Surface Area	**SQ FT**	**M2**	The surface area that is created by splitting an element along the boundary of a 'Zone' Location. 
Piece Count	**EA**	**EA**	Number of separate pieces, created from the original element as a result of splitting operations. Before defining Locations, Piece Count equals 1 for each Column element.
Piece Height	**FT-IN**	**M**	Height of a single split piece. Returns the Height of the column piece that is contained in a Location.
CAD_Count	**EA**	**EA**	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.
CAD_Length	**FT-IN**	**M**	Length of the element along the Reference Line. This quantity comes from the CAD application after it was published.
CAD_Volume	**CU YD**	**M3**	Net volume of the element, which excludes the volume of any opening. This quantity comes from the CAD application after it was published.

Column Polygon Classification

The Column Polygon Classification process automatically labels geometry in the imported model, which then enables Takeoff Manager to calculate the quantities described above. The process uses Vico's

geometry analysis algorithms, which are accurate for standard Column elements but sometimes may result in wrong assumptions. Any wrong assumptions can be corrected by using the Takeoff Quantity Painting process.

The Takeoff Manager polygon classification compares the model's vertical and the polygon's **Normal Vector** to determine its **angle**:



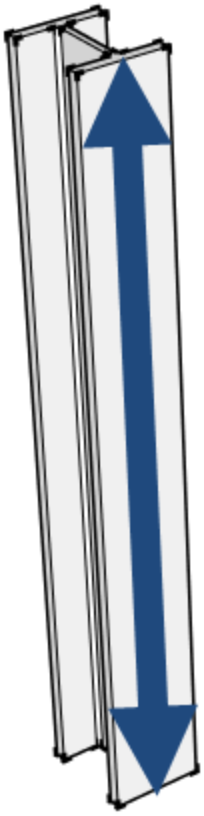
- Polygons that have at least one vertex classified as 'hole vertex' will be classified as 'Hole' type polygon

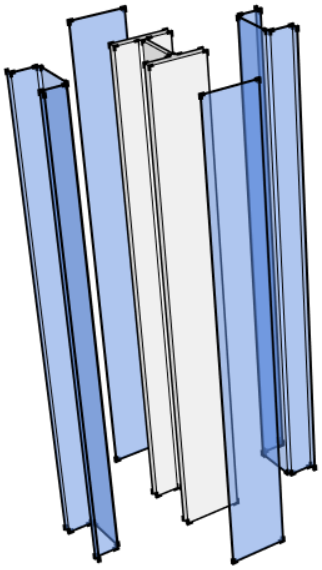
  The algorithm calculates the angle between the polygon's normal vector and the (0, 0, 1) vector (pointing upwards) and based on that assigns a classification.
- Polygons are classified as '**Side Polygons**' if: angle >= 45 degrees and angle <= 135 degrees and named '**Edge surface area**'
- Polygons are classified as '**Top polygons**' if: angle >= -45 degrees and angle <= 45 degrees
- Polygons are classified as '**Bottom polygons**' if: angle >= 135 degrees and angle <= 225 degrees

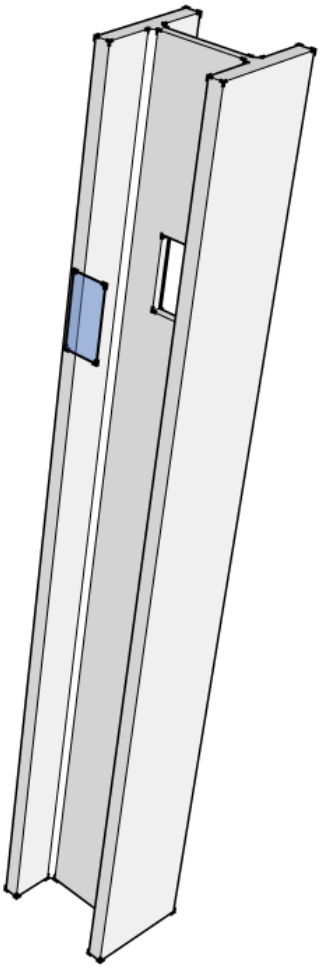
  The angle of a polygon is calculated by the internal geometry analysis engine, the normal vector is calculated by Takeoff Manager.

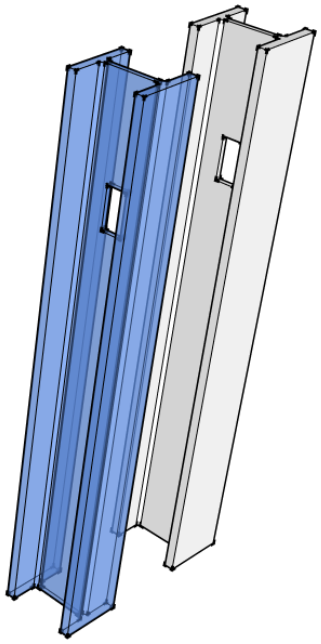
Column Profiled Quantities

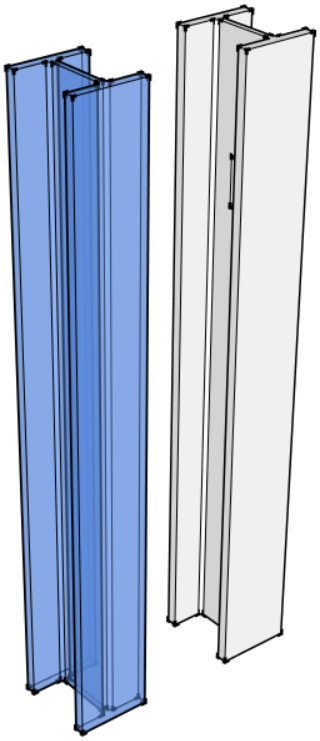
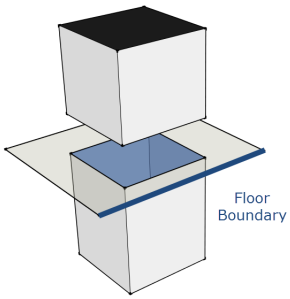
Name	Units - Imperial	Units - Metric	Description
Count	**EA**	**EA**	Number of elements in the Takeoff Item.

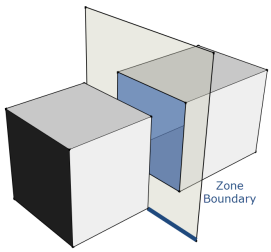
Name	Units - Imperial	Units - Metric	Description
Height	**FT-IN**	**M**	Height of the Column element. Whole Height is always assigned to lowest Location of the Column.  Calculated as the difference between the highest point in the **Top Polygon** and the lowest point in the **Bottom Polygon**.

Name	Units - Imperial	Units - Metric	Description
Vertical Surface Area	**SQ FT**	**M2**	Vertical surface area of the Column element.  Calculated as the sum of the surface areas of all **Side Polygons**.
Top Surface Area	**SQ FT**	**M2**	Surface area at the top of the column. Calculated as the surface area of the polygon classified as **Top Surface Polygon**.
Bottom Surface Area	**SQ FT**	**M2**	Surface area at the bottom of the column. Calculated as the surface area of the polygon classified as the **Bottom Surface Polygon**.

Name	Units - Imperial	Units - Metric	Description
Hole Surface Area	**SQ FT**	**M2**	Surface area of penetrations in the Column element.  Calculated as the surface area of all polygons that are classified as **Hole Polygon**.

Name	Units - Imperial	Units - Metric	Description
Net Volume	**CU YD**	**M3**	Net volume of Column  Calculated by the internal geometry analysis engine.

Name	Units - Imperial	Units - Metric	Description
Gross Volume	**CU YD**	**M3**	Gross volume of Column  Calculated by the internal geometry analysis engine, ignoring any penetrations and subtractions.
Joint Horizontal Surface Area	**SQ FT**	**M2**	The surface area that is created by splitting an element along the boundary of a 'Floor' Location. 

Name	Units - Imperial	Units - Metric	Description
Joint Vertical Surface Area	**SQ FT**	**M2**	The surface area that is created by splitting an element along the boundary of a 'Zone' Location. 
Piece Count	**EA**	**EA**	Number of separate pieces, created from the original element as a result of splitting operations. Before defining Locations, Piece Count equals 1 for each Column element.
Piece Height	**FT-IN**	**M**	Height of a single split piece. Returns the Height of the column piece that is contained in a Location.
CAD_Count	**EA**	**EA**	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.
CAD_Length	**FT-IN**	**M**	Length of the element along the Reference Line. This quantity comes from the CAD application after it was published.
CAD_Volume	**CU YD**	**M3**	Net volume of the element, which excludes the volume of any opening. This quantity comes from the CAD application after it was published.

Column Polygon Classification

The Column Polygon Classification process automatically labels geometry in the imported model, which then enables Takeoff Manager to calculate the quantities described above. The process uses Vico's

geometry analysis algorithms, which are accurate for standard Column elements but sometimes may result in wrong assumptions. Any wrong assumptions can be corrected by using the Takeoff Quantity Painting process.

Duct Quantities

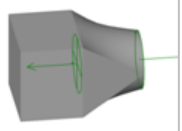
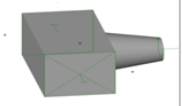
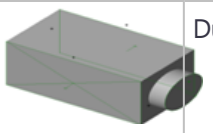
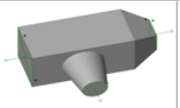
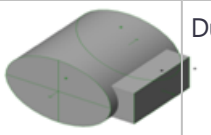
Name	Units - Imperial	Units - Metric	Description
Count	**EA**	**EA**	Number of Duct elements in the Takeoff Item.
Length	**FT-IN**	**M**	Length of the run
Piece Count	**EA**	**EA**	Number of separate pieces, created from the original element as a result of splitting operations. Before defining Locations, Piece Count equals 1 for each Duct element.
Piece Length	**FT-IN**	**M**	Length of an individual Duct piece. Returns the length of the Duct that is contained in a Location. If this element has a reference line published with its geometry, if you split this element, each derived element will get its own correct split length based on its piece of reference line. If a reference line is not present, a numeric value to detect length is used so it cannot be split correctly between locations. The element will get the full length as the Piece Length quantity.
CAD_Count	**EA**	**EA**	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.

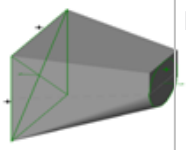
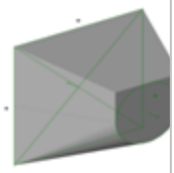
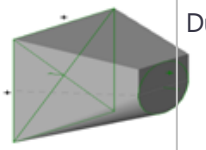
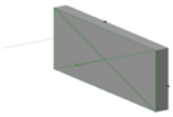
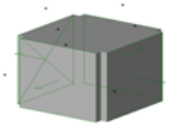
Name	Units - Imperial	Units - Metric	Description
CAD_Length	**FT-IN**	**M**	Length of the element along the Reference Line. This quantity comes from the CAD application after it was published.

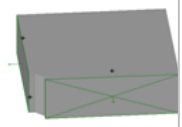
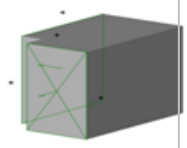
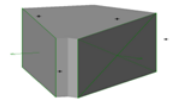
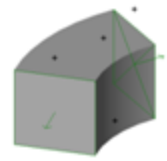
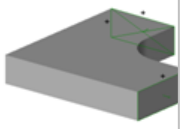
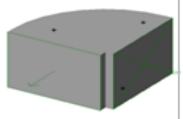
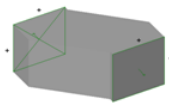
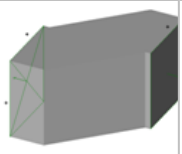
Length of Revit Duct Fittings is calculated using these elements' custom properties. See "Revit Duct Fitting Length Calculation" below for an overview of calculation rules.

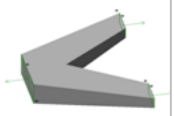
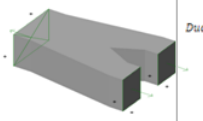
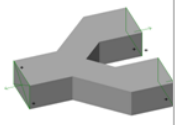
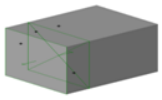
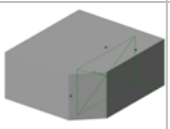
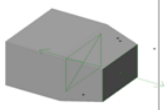
Revit Duct Fitting Length Calculation

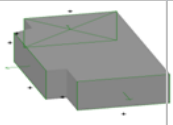
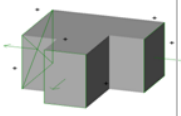
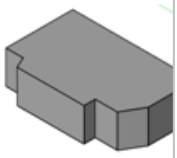
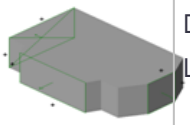
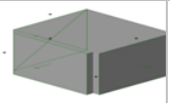
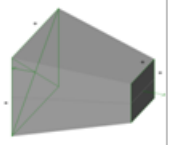
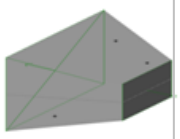
Calculation of 'Length' property of duct fittings in Autodesk Revit MEP library.

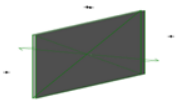
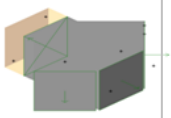
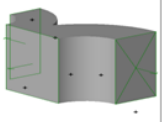
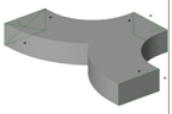
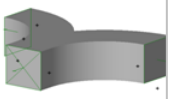
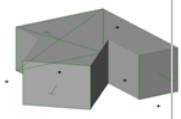
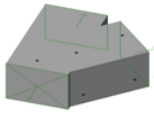
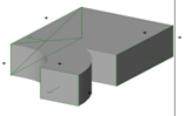
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Multi-Shape\Taps	Element Profile	Length Calculation
Rectangular to Round Duct Takeoff.rfa		Takeoff Length + Takeoff Length Projection
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Multi-Shape\Tees	Element Profile	Length Calculation
Rectangular to Round Duct Tee - Conical Tap.rfa		Duct Length 1 + Duct Length 2
Rectangular to Round Duct Tee - Transition.rfa		Duct Length 1 + Duct Width/2 + Length 3
Rectangular to Round Duct Tee with Transition - Conical Tap.rfa		Duct Length 1 + Duct Length 2 + Duct Length 3
Round to Rectangular Duct Tee - Transition.rfa		Duct Length 1
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Multi-Shape\Transitions	Element Profile	Length Calculation

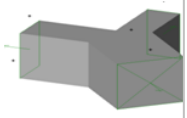
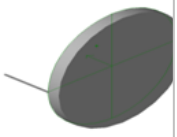
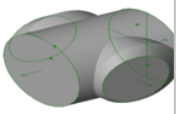
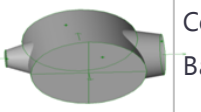
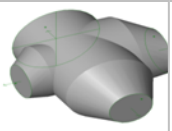
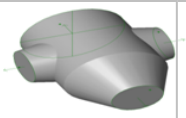
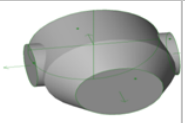
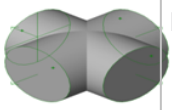
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Multi-Shape\Taps	**Element Profile**	**Length Calculation**
Rectangular to Round Duct Transition - Angle.rfa		Length 1
Round to Rectangular Duct Transition - Angle.rfa		Duct Length 1
Round to Rectangular Duct Transition - Length.rfa		Duct Length 1
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Profiles	Element Profile	Length Calculation
Duct - Rectangular.rfa		N/A (2D)
Duct - Round.rfa		N/A (2D)
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Rectangular\Caps	Element Profile	Length Calculation
Rectangular Duct Endcap.rfa		Length
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Rectangular\Crosses	Element Profile	Length Calculation
Rectangular Duct Cross.rfa		Length 3 *2 + Length 1 * 2
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Rectangular\Elbows	Element Profile	Length Calculation

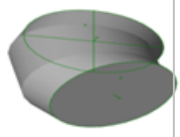
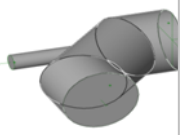
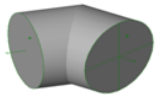
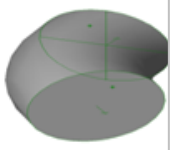
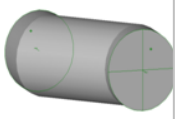
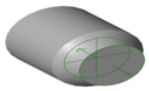
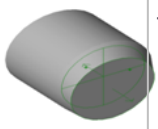
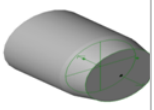
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Multi-Shape\Taps	**Element Profile**	**Length Calculation**
Rectangular Duct Elbow - Beveled Throat - Sharp Heel.rfa		W*2
Rectangular Duct Elbow - Mitered - Transition.rfa		W1 + W2 + Shoulder Length * 2
Rectangular Duct Elbow - Mitered.rfa		Length 1 *2
Rectangular Duct Elbow - Radius.rfa		Centre Radius * Angle(this quantity is needed in radial)
Rectangular Duct Elbow - Round Throat - Sharp Heel.rfa		W550 + Sholder Length*2 + Throat Radius*2
Rectangular Duct Elbow - Sharp Throat - Radius Heel.rfa		Radius * Angle(in radial) + Connector Extension*2
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Rectangular\Offsets	Element Profile	Length Calculation
Rectangular Duct Offset - Plain - Flanged.rfa		$L1 * 2 + 2 * \sqrt{CC\_Offset^2 + L0^2}$
Rectangular Duct Offset.rfa		$SC90 * 2 + 2 * \sqrt{Offset\ 300^2 + [\frac{(Length01 - 2 * SC90)}{2}]^2}$

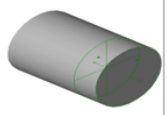
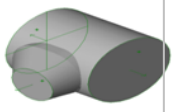
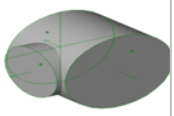
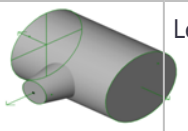
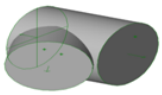
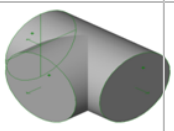
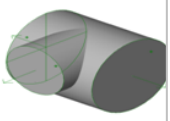
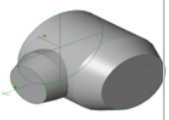
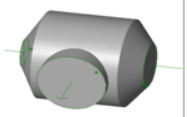
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Multi-Shape\Taps	**Element Profile**	**Length Calculation**
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Rectangular\Pants and Vees	Element Profile	Length Calculation
Rectangular Duct Pants - Reducing.rfa		Duct Length 1
Rectangular Duct Pants - Transition.rfa		$Duct\ length\ 1 + Duct\ length\ 3 + Duct\ length\ 7 + 2 * \sqrt{(Duct\ length 2 - Duct\ length\ 1)^2 + [\frac{Duct\ width}{2}]^2}$
Rectangular Duct Pants.rfa		$Duct\ length\ 1 + Duct\ length\ 3 + Duct\ length\ 7 + \sqrt{(Duct\ length\ 2 - Duct\ length\ 1)^2 + [\frac{Duct\ length\ 8 - Duct\ width\ 3}{2}]^2} + \sqrt{(Duct\ length 2 - Duct\ length 1)^2 + [\frac{Duct\ length 4 - Duct\ length 2}{2}]^2}$
Rectangular Duct Vee - Tapered.rfa		$Duct\ length 1 + Duct\ length 4 + Duct\ length 8 + \sqrt{Length^2 + Duct\ length 7^2} + \sqrt{Length^2 + Duct\ length 3^2}$
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Rectangular\Taps	Element Profile	Length Calculation
Rectangular Duct Takeoff.rfa		Takeoff Length + Takeoff Length Projection
Rectangular Duct Tap - Beveled.rfa		Takeoff Length + Takeoff Length Projection
Rectangular Duct Tap - Pyramidal.rfa		Takeoff Length + Takeoff Length Projection
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Rectangular\Tees	Element Profile	Length Calculation

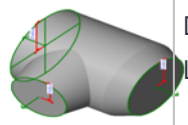
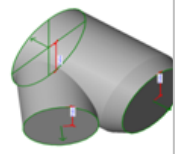
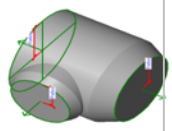
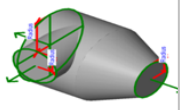
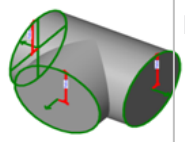
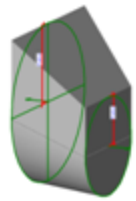
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Multi-Shape\Taps	**Element Profile**	**Length Calculation**
Rectangular Duct Tee - Beveled.rfa		Duct Length 1*2 + Duct Length3
Rectangular Duct Tee - Fillet.rfa		Duct Length 1*2 + Duct Length3
Rectangular Duct Tee-Reducing.rfa		Duct Length 1+Duct Length 2+Duct Length 3+(Offset 1-(Duct Width 2/2))
Rectangular Duct Tee with Transition - Beveled.rfa		Duct Length 1+Duct Length 2+Duct Length 3
Rectangular Duct Tee with Transition.rfa		Duct Length1+Duct Length2+Duct Length3
Rectangular Duct Tee.rfa		Duct Length1*2+Duct Length3
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Rectangular\Transitions	Element Profile	Length Calculation
Rectangular Duct Transition - Angle.rfa		Length 01
Rectangular Duct Transition - Length.rfa		Duct Length

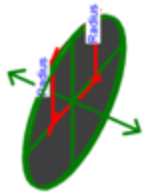
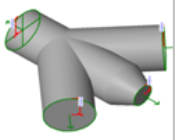
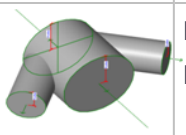
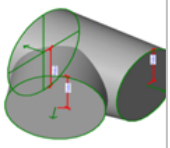
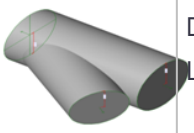
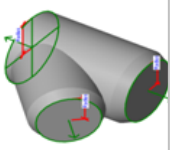
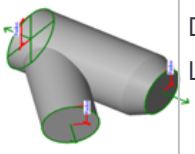
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Multi-Shape\Taps	**Element Profile**	**Length Calculation**
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Rectangular\Unions	Element Profile	Length Calculation
Rectangular Duct Union.rfa		Length01
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Rectangular\Wyes	Element Profile	Length Calculation
Rectangular Duct Double Wye.rfa		Length1+Length3+Length4
Rectangular Duct Wye - Curved - Transition.rfa		Radius 1* Angle(this quantity is needed in radial)+Radius 2* Angle(this quantity is needed in radial)+Shoulder
Rectangular Duct Wye - Curved.rfa		Radius * Angle(this quantity is needed in radial)+Radius * Angle(this quantity is needed in radial)+Required Length *3
Rectangular Duct Wye - Dovetail.rfa		Radius1 * Angle2(this quantity is needed in radial)+Radius2 * Angle3(this quantity is needed in radial)
Rectangular Duct Wye - Lateral - Transition.rfa		$\sqrt{(I0+I7+I6)^2+(CL\_Offset\ 2-CL\_Offset\ 1)^2}+L3$
Rectangular Duct Wye - Lateral.rfa		L1 + L3
Rectangular Duct Wye - Smooth Radius.rfa		$\sqrt{Shoulder\ Length^2+(CL\_Offset*2)^2}+\sqrt{\left[\left(\frac{W1}{2}+W3\right)-I1\right]^2+Shoulder\ Length^2}+I1*a+I1+I0$ a= value in radial

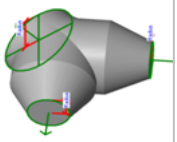
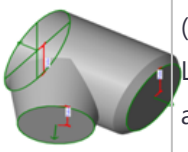
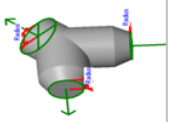
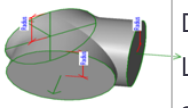
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Multi-Shape\Taps	Element Profile	Length Calculation
Rectangular Duct Wye.rfa		Duct Length 1+ Duct Length 2*2
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Round\Caps	Element Profile	Length Calculation
Round Duct Endcap.rfa		Length
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Round\Crosses	Element Profile	Length Calculation
Round Duct Cross - Beveled.rfa		Duct Length1+Duct Length2+Duct Length3+Duct Length4+Duct Radius1*2
Round Duct Cross - Conical.rfa		Cone Length*2+Stub Length*2+Cone Base Radius Insulation*2
Round Duct Cross with Transition - Beveled.rfa		Duct Length1+Duct Length2+Duct Length3+Duct Length4+Duct Length5+Duct Radius1*2
Round Duct Cross with Transition - Conical.rfa		Duct Length1+Duct Length2+Duct Radius1*2+102*2
Round Duct Cross with Transition - Straight.rfa		Duct Length1*2+Duct Length2+Duct Radius1*2+Length3+Length4
Round Duct Cross.rfa		Length1*2 + Length3*2
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Round\Elbows	Element Profile	Length Calculation

Autodesk\RME 2009\Imperial Library\Duct\Fittings\Multi-Shape\Taps	**Element Profile**	**Length Calculation**
Round Duct Elbow - Gore.rfa		Centreline Radius * Angle(this quantity is needed in radial)
Round Duct Elbow - Heel Tapped.rfa		Centreline Radius * Angle1(in radial)+Duct Length3
Round Duct Elbow - Mitered.rfa		Length1*2
Round Duct Elbow.rfa		Centre Radius * Angle(this quantity is needed in radial)
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Round\Offsets	Element Profile	Length Calculation
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Round\Offsets		$\sqrt{CC\ Offset^2 + (L0 * 2)^2} + (Length - L0 * 2)$
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Round\Taps	Element Profile	Length Calculation
Round Duct Takeoff - Bellmouth.rfa		Takeoff Length + Takeoff Length Projection
Round Duct Takeoff - Beveled.rfa		Takeoff Length + Takeoff Length Projection
Round Duct Takeoff - Conical.rfa		Takeoff Length + Takeoff Length Projection

Autodesk\RME 2009\Imperial Library\Duct\Fittings\Multi-Shape\Taps	**Element Profile**	**Length Calculation**
Round Duct Takeoff.rfa		Takeoff Length + Takeoff Length Projection
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Round\Tees	Element Profile	Length Calculation
Round Duct Tee - Beveled.rfa		Length A1 + Length A6
Round Duct Tee - Bullhead.rfa		Duct Length 1 *2 + Duct Length 3
Round Duct Tee - Conical.rfa		Length 1 *2 + Cone Length
Round Duct Tee - Lateral.rfa		Duct Length 2 + Duct Length 3
Round Duct Tee - Straight.rfa		Length 1 *3
Round Duct Tee - Tangential.rfa		Length 1 + Length 2 *2
Round Duct Tee with Transition - Beveled.rfa		Duct Length 2 + Duct Length 6 + Duct Length 7 + Duct Length 3 + Duct Length 4
Round Duct Tee with Transition - Bullhead.rfa		Length *2 + Duct Length 1 * 2 + Duct Length 3

Autodesk\RME 2009\Imperial Library\Duct\Fittings\Multi-Shape\Taps	**Element Profile**	**Length Calculation**
Round Duct Tee with Transition - Conical.rfa		Duct Length1*2+Duct Length2+Duct Length3+Duct Radius1
Round Duct Tee with Transition - Lateral.rfa		Duct Length10-Duct Length2+Duct Length11+Duct Length3+(Duct Length6*cosa) a=90°-Angle3
Round Duct Tee with Transition - Straight Conical.rfa		Duct Length1*2+Duct Length2+Duct Length3+Duct Length4
Round Duct Tee with Transition - Tangential.rfa		Duct Length1*2+Duct Length2+Duct Radius 1+Duct Length3
Round Duct Tee.rfa		L01+L2
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Round\Transitions	Element Profile	Length Calculation
Round Duct Transition - Angle.rfa		Computed Length
Round Duct Transition - Length.rfa		Duct Length1

Autodesk\RME 2009\Imperial Library\Duct\Fittings\Multi-Shape\Taps	Element Profile	Length Calculation
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Round\Unions	Element Profile	Length Calculation
Round Duct Union.rfa		Length01
Autodesk\RME 2009\Imperial Library\Duct\Fittings\Round\Wyes	Element Profile	Length Calculation
Round Duct Double Wye with Transition.rfa		Duct Length1+Duct Length2+Duct Length3+Duct Length4+Duct Length5
Round Duct Double Wye.rfa		Duct Length2+Duct Length3+Duct Length4
Round Duct Wye - Lateral - Tapered Body.rfa		(Duct Length1-Duct Length2)+Duct Length3+Duct Length6*cosa a=90°-Angle3
Round Duct Wye - Single Lateral.rfa		Duct Length1+Duct Length2+Duct Length5
Round Duct Wye with Transition - Lateral - Conical.rfa		L0+L1+L2+L3+L4
Round Duct Wye with Transition - Lateral.rfa		Duct Length1+Duct Length2+Duct Length3+Duct Length4

Autodesk\RME 2009\Imperial Library\Duct\Fittings\Multi-Shape\Taps	Element Profile	Length Calculation
Round Duct Wye with Transition - Symmetric.rfa		Duct Length1+Length2*a1+Duct Length5+Duct Length3+Length2*a2+Duct Length4+Duct Length2 a1=Angle3, a=Angle2
Round Duct Wye with Transition - Tapered Lateral.rfa		(Duct Length1-Duct Length12)+Duct Length3+Duct Length6*cosa a=90°-Angle3
Round Duct Wye with Transition.rfa		Duct Length1+Duct Length2+Duct Length3+Duct Length4+Duct Length5
Round Duct Wye.rfa		Duct Length1+Length2*a1+Duct Length5+Length2*a2+Duct Length4 a1=Angle3, a=Angle2

Equipment and Accessories Quantities

Name	Units - Imperial	Units - Metric	Description
Count	**EA**	**EA**	Number of Equipment and Accessory elements in the Takeoff Item.
Piece Count	**EA**	**EA**	Number of separate pieces, created from the original element as a result of splitting operations.
CAD_Count	**EA**	**EA**	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.

Light Fixture Quantities

Name	Units - Imperial	Units - Metric	Description
Count	**EA**	**EA**	Number of light fixture elements in the Takeoff Item.
CAD_Count	**EA**	**EA**	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.

Object Quantities

Name	Units - Imperial	Units - Metric	Description
Count	**EA**	**EA**	Number of object elements in the Takeoff Item.
CAD_Count	**EA**	**EA**	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.

Railing Quantities

Name	Units - Imperial	Units - Metric	Description
Count	**EA**	**EA**	Number of railing elements in the Takeoff Item.
Length	**FT-IN**	**M**	Length of the run.
Piece Count	**EA**	**EA**	Number of separate pieces, created from the original element as a result of splitting operations. Before defining Locations, Piece Count equals 1 for each railing element.

Name	Units - Imperial	Units - Metric	Description
Piece Length	**FT-IN**	**M**	Length of an individual railing piece. Returns the length of the railing that is contained in a Location. If this element has a reference line published with its geometry, if you split this element, each derived element will get its own correct split length based on its piece of reference line. If a reference line is not present, a numeric value to detect length is used so it cannot be split correctly between locations. The element will get the full length as the Piece Length quantity.
CAD_Count	**EA**	**EA**	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.
CAD_Length	**FT-IN**	**M**	Length of the element along the Reference Line. This quantity comes from the CAD application after it was published.

Rebar Quantities

Imperial

Name	Units	Description
Count	EA	Number of Rebar elements in the Takeoff Item.
Overall weight	TON	The overall weight for the rebar.
#2	TON	Total weight of #2 sized rebars.
#3	TON	Total weight of #3 sized rebars
#4	TON	Total weight of #4 sized rebars.

Name	Units	Description
#5	TON	Total weight of #5 sized rebars.
#6	TON	Total weight of #6 sized rebars.
#7	TON	Total weight of #7 sized rebars.
#8	TON	Total weight of #8 sized rebars.
#9	TON	Total weight of #9 sized rebars.
#10	TON	Total weight of #10 sized rebars.
#11	TON	Total weight of #11 sized rebars.
#14	TON	Total weight of #14 sized rebars.
#18	TON	Total weight of #18 sized rebars.
CAD_Count	EA	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.
CAD_Length	FT-IN	Length of the element along the Reference Line. This quantity comes from the CAD application after it was published.

Metric

Name	Units	Description
Count	EA	Number of Rebar elements in the Takeoff Item.
Piece Count	EA	Number of separate pieces, created from the original element as a result of splitting operations.
Overall weight	TON	The overall weight for the rebar.
M5	TON	Total weight of M5 sized rebars.
M6	TON	Total weight of M6 sized rebars.
M8	TON	Total weight of M8 sized rebars.
M10	TON	Total weight of M10 sized rebars.
M12	TON	Total weight of M10 sized rebars.
M14	TON	Total weight of M14 sized rebars.
M16	TON	Total weight of M16 sized rebars.
M18	TON	Total weight of M18 sized rebars.

Name	Units	Description
M20	TON	Total weight of M20 sized rebars.
M22	TON	Total weight of M22 sized rebars.
M24	TON	Total weight of M24 sized rebars.
M25	TON	Total weight of M25 sized rebars.
M26	TON	Total weight of M26 sized rebars.
M28	TON	Total weight of M28 sized rebars.
M30	TON	Total weight of M30 sized rebars.
M32	TON	Total weight of M32 sized rebars.
M34	TON	Total weight of M34 sized rebars.
M35	TON	Total weight of M35 sized rebars.
M36	TON	Total weight of M36 sized rebars.
M38	TON	Total weight of M38 sized rebars.
M40	TON	Total weight of M40 sized rebars.
M45	TON	Total weight of M45 sized rebars.
M50	TON	Total weight of M50 sized rebars.
M55	TON	Total weight of M55 sized rebars.
CAD_Count	EA	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.
CAD_Length	M	Length of the element along the Reference Line. This quantity comes from the CAD application after it was published.

Pipe Quantities

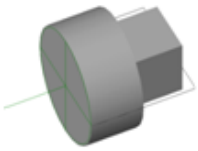
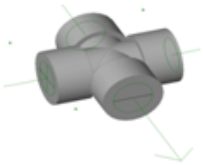
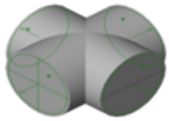
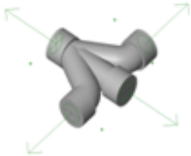
Name	Units - Imperial	Units - Metric	Description
Count	**EA**	**EA**	Number of Pipe elements in the Takeoff Item.
Length	**FT-IN**	**M**	Length of the run

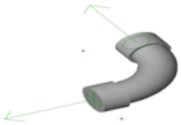
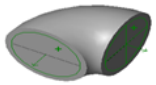
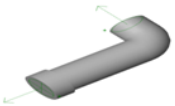
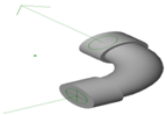
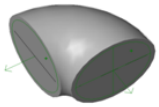
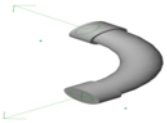
Name	Units - Imperial	Units - Metric	Description
Piece Count	**EA**	**EA**	Number of separate pieces, created from the original element as a result of splitting operations. Before defining Locations, Piece Count equals 1 for each Pipe element.
Piece Length	**FT-IN**	**M**	Length of an individual Pipe piece. Returns the length of the Pipe that is contained in a Location. If this element has a reference line published with its geometry, if you split this element, each derived element will get its own correct split length based on its piece of reference line. If a reference line is not present, a numeric value to detect length is used so it cannot be split correctly between locations. The element will get the full length as the Piece Length quantity.
CAD_Count	**EA**	**EA**	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.
CAD_Length	**FT-IN**	**M**	Length of the element along the Reference Line. This quantity comes from the CAD application after it was published.

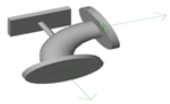
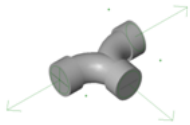
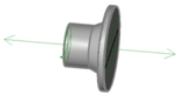
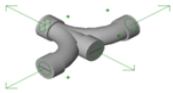
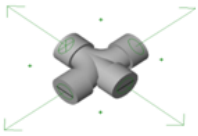
Length of Revit Pipe Fittings and Valves is calculated using these elements' custom properties. See "Revit Pipe Fitting and Valve Length Calculation" below for an overview of calculation rules.

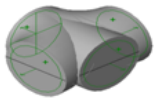
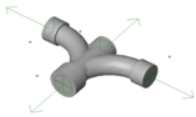
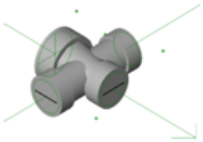
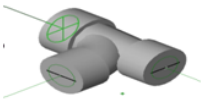
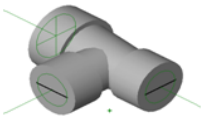
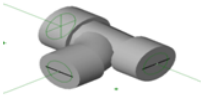
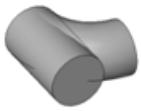
Revit Pipe Fitting and Valve Length Calculation

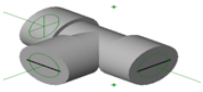
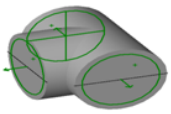
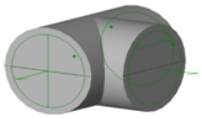
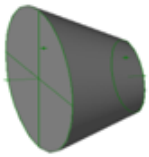
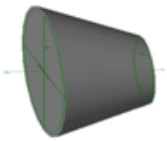
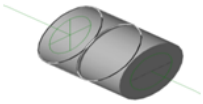
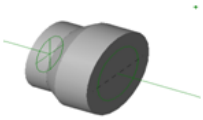
Calculation of 'Length' property of pipe fittings and valves in Autodesk Revit MEP library.`

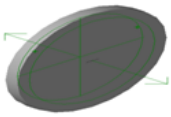
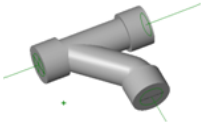
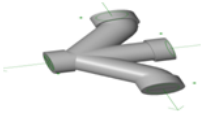
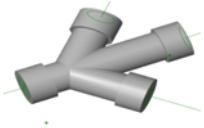
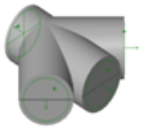
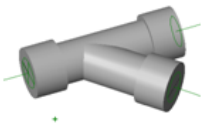
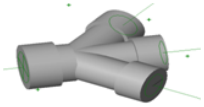
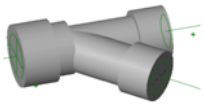
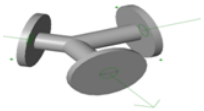
Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Caps	Element Profile	Length Calculation
Pipe Endcap.rfa		Insulation Thickness
Pipe Plug - PVC.rfa		Thickness + Stub Length
Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Crosses	Element Profile	Length Calculation
Pipe Cross - CPVC - Glued.rfa		Pipe Length *4 + Socket Length * 4
Pipe Cross - Flanged.rfa		Pipe Length *4 + Flange Length * 4
Pipe Cross - PVC - Glued.rfa		Pipe Length *4 + Socket Width * 4
Pipe Cross.rfa		H*4
Pipe Fixture Fittings - Glued.rfa		Pipe Length + Pipe Length 5 + {2 (?) (Center Radius 1)/4} + {2 (?) (Center Radius 2)/4} + Socket Width 1 + Socket Width 2 + Socket Width 3 + Socket Width 4

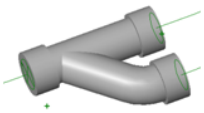
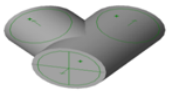
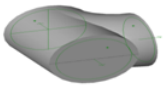
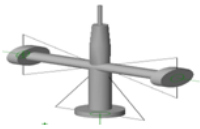
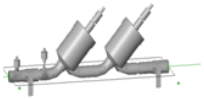
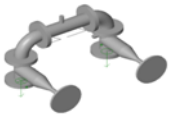
Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Caps	**Element Profile**	**Length Calculation**
Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Elbows	Element Profile	Length Calculation
Pipe Bend - DWV - Glued.rfa		2 (?) (Center Radius)/4 + Socket Widthn * 2
Pipe Bend - PVC.rfa		2 (?) (Center Radius)/4
Pipe Closet Bend - Glued.rfa		Socket Width + Length 4 + Length 5 + 2 (?) (Center Radius)/4
Pipe Elbow - Flanged.rfa		2 (?) (Center Radius)/4 + Flange Width * 2
Pipe Elbow - Vent - Glued.rfa		2 (?) (Center Radius)/4 + Socket Width * 2
Pipe Elbow.rfa		2 (?) (Center Radius)/4
Pipe Long Bend - DWV - Glued.rfa		2 (?) (Center Radius)/4
Pipe Long Radius Elbow - Flanged.rfa		2 (?) (Center Radius)/4 + Flange Width * 2
Pipe Round Base Elbow - Flanged.rfa		2 (?) (Center Radius)/4 + Flange Width * 3

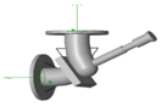
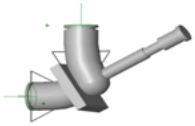
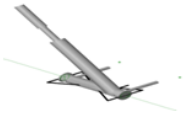
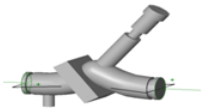
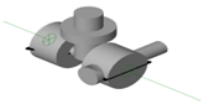
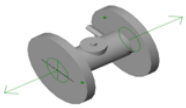
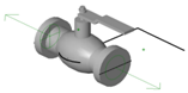
Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Caps	Element Profile	Length Calculation
Pipe Square Base Elbow - Flanged.rfa		2 (?) (Center Radius)/4 + Flange Width * 3
Pipe Three Way Ell - Glued.rfa		2 (?) (Center Radius)/4 + Socket Width * 3
Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Lateral Tees	Element Profile	Length Calculation
Pipe 45 Deg Lateral - Flanged.rfa		Pipe Length 1 + Pipe Length 2+ Pipe Length 3 + 3*Flange Width
Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Profiles	Element Profile	Length Calculation
Pipe - Round.rfa		N/A
Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Spuds	Element Profile	Length Calculation
Pipe Closet Flange - DWV - Glued.rfa		Socket Width + Transition Width + Flange Width
Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Tees	Element Profile	Length Calculation
Pipe Double Long Tee - Glued.rfa		Pipe Length 2 + {2 (?) (Center Radius)/4}*2 + Socket Width * 3
Pipe Double Short Tee - Sanitary - Glued.rfa		Socket Width *2+ Insulation Length *2+ Center Radius*Angle3+ Center Radius*Angle4 (Angle quantity is needed in radial)

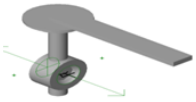
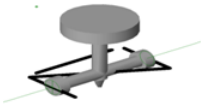
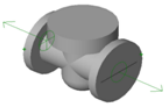
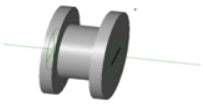
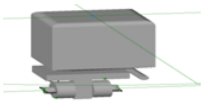
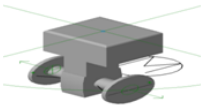
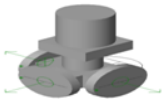
Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Caps	Element Profile	Length Calculation
Pipe Double Short Tee - Sanitary - PVC.rfa		Center Spacing + Length 2 + {2 (?) (Center Radius)/4}*2
Pipe Reducing Double Long Tee - Glued.rfa		Pipe Length 2 + {2 (?) (Center Radius)/4}*2 + Socket Width * 4
Pipe Reducing Double Short Tee - Sanitary - Glued.rfa		Socket Width 1+Socket Width 3*2+Center Radius*Angle3+Center Radius*Angle4 (Angle quantity is needed in radial)
Pipe Reducing Double Tee - Vent - Glued.rfa		Pipe Length 2 * 2 + Pipe Length 3 * 2 + Socket Length 1 + Socket Width 2 + Socket Width 3 *2
Pipe Reducing Short Tee - Sanitary - Glued.rfa		Pipe Length 1 + Pipe Length 3+ Pipe Length 6 + Socket Width 1 + Socket Width 2 + Socket Width 3
Pipe Reducing Tee - Vent - Glued.rfa		Pipe Length 1 + Pipe Length 2+ Pipe Length 3 + Socket Width 1 + Socket Width 2 + Socket Width 3
Pipe Short Tee - Sanitary - Glued.rfa		Pipe Length 1+Center Radius*Angle+Socket Width*3 (Angle quantity is needed in radial)
Pipe Short Tee - Sanitary - PVC.rfa		Center Radius*Angle+Center Spacing+Length 2(Angle quantity is needed in radial)

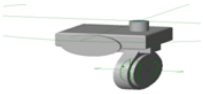
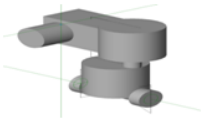
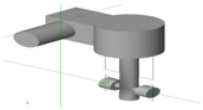
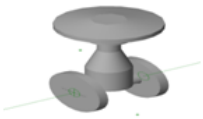
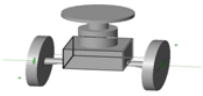
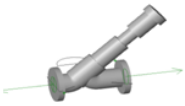
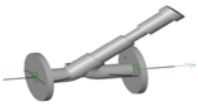
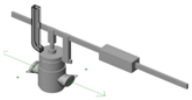
Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Caps	**Element Profile**	**Length Calculation**
Pipe Tee - Vent - Glued.rfa		Half Length * 3 + Socket Width * 3
Pipe Tee - Vent - PVC.rfa		Length 1 + Length 2 + Length 3
Pipe Tee.rfa		L1 * 4
Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Transitions	Element Profile	Length Calculation
Pipe Transition - PVC.rfa		Pipe Length 0
Pipe Transition.rfa		Pipe Length 0
Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Unions	Element Profile	Length Calculation
Pipe Coupling - Glued.rfa		Pipe Length 1 + Pipe Length 2 + Half Pipe Length * 2
Pipe Coupling - PVC.rfa		N
Pipe Increaser Coupling - Glued.rfa		Pipe Length 1 + Pipe Length 2 + Half Pipe Length 3 * 2

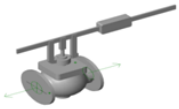
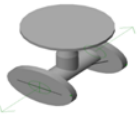
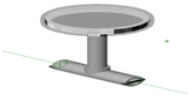
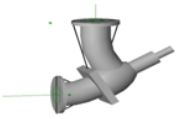
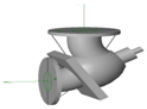
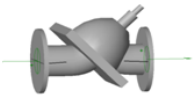
Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Caps	Element Profile	Length Calculation
Pipe Straight Coupling.rfa		N
Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Wyes	Element Profile	Length Calculation
Pipe Combination Wye with 8th Bend - Glued.rfa		Pipe Length 1 + Pipe Length 2 + Socket Width*3
Pipe Double Combination Wye with 8th Bend - Glued.rfa		Pipe Length 1 + Pipe Length 2 + Pipe Length 3*2 + Socket Width*3
Pipe Double Wye - DWV - Glued.rfa		Pipe Length 1 * 2+ Pipe Length 2 + Socket Width*4
Pipe Double Wye - DWV - PVC.rfa		Pipe Length 1 + Pipe Length 2 + Pipe Length 3 + Pipe Length 4
Pipe Plain Wye - DWV - Glued.rfa		Pipe Length 1 + Pipe Length 2 + Pipe Length 3 + Socket Width*3
Pipe Reducing Double Wye - Glued.rfa		Pipe Length 1 + Pipe Length 2 + Pipe Length 3*2 + Socket Width 1+ Socket Width 2 +Socket Width 3*2
Pipe Reducing Wye - DWV - Glued.rfa		Pipe Length 1 + Pipe Length 2 + Pipe Length 3 + Socket Width 1+ Socket Width 2 +Socket Width 3
Pipe True Wye - Flanged.rfa		Pipe Length 1+Pipe Length 2+Pipe Length 3+Flange Width*3

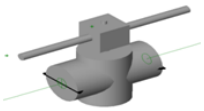
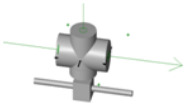
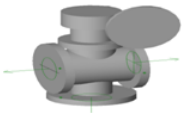
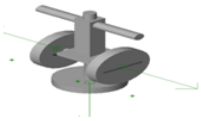
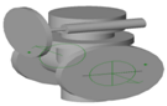
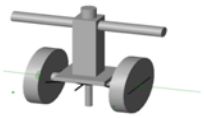
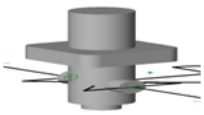
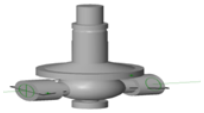
Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Caps	Element Profile	Length Calculation
Pipe Upright Wye - DWV - Glued.rfa		Pipe Length 1 + Pipe Length 2 + Pipe Length 3 + Socket Width 1 *3
Pipe Wye - DWV - PVC.rfa		Pipe Length 1 + Pipe Length 2 + Pipe Length 3
Pipe Wye and 8th Bend - PVC.rfa		Center Radius*Angle+L0+L1
Autodesk\RME 2009\Imperial Library\Pipe\Valves\3 Way Valves	Element Profile	Length Calculation
3 Way Valve - 0.75-4 Inch.rfa		Body Length
Autodesk\RME 2009\Imperial Library\Pipe\Valves\Backflow Preventers	Element Profile	Length Calculation
Backflow Preventer - 0.5-2 Inch.rfa		Valve Length
Double Check Valve - 2.5-10 Inch.rfa		Valve Length
Double Check Valve - N Pattern - 2.5-10 Inch.rfa		Valve Length
Vacuum Breaker Backflow Valve - 0.5-2 Inch.rfa		C2 Offset

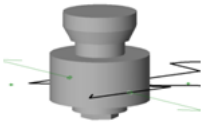
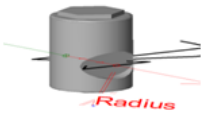
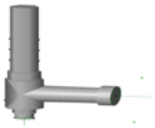
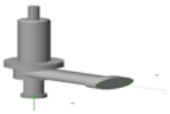
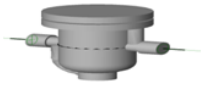
Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Caps	Element Profile	Length Calculation
Autodesk\RME 2009\Imperial Library\Pipe\Valves\Balancing Valves	Element Profile	Length Calculation
Balancing Valve - Angle - 2.5-12 Inch - Flanged.rfa		Open Length+C2 Offset1
Balancing Valve - Angle - 2.5-12 Inch - Grooved.rfa		Open Length+C2 Offset1
Balancing Valve - Straight - 0.5-2 Inch - Threaded.rfa		Valve Length
Balancing Valve - Straight - 2.5-12 Inch - Flanged.rfa		Valve Length
Balancing Valve - Straight - 2.5-12 Inch - Grooved.rfa		Valve Length
Circuit Setter - 0.5-2 Inch.rfa		Overall Length
Circuit Setter - 2.5-4 Inch.rfa		Overall Length
Autodesk\RME 2009\Imperial Library\Pipe\Valves\Ball Valves	Element Profile	Length Calculation
Ball Valve - 2-6 Inch.rfa		Body Length

Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Caps	Element Profile	Length Calculation
Autodesk\RME 2009\Imperial Library\Pipe\Valves\Butterfly Valves	Element Profile	Length Calculation
Butterfly Valve - 2-12 Inch.rfa		Width3 *2
Autodesk\RME 2009\Imperial Library\Pipe\Valves\Check Valves	Element Profile	Length Calculation
Check Valve - 0.375-4 Inch - Threaded.rfa		Body Length
Check Valve - 2-12 Inch - Flanged.rfa		Body Length
Check Valve - Wafer - 2-24 Inch.rfa		Body Length
Autodesk\RME 2009\Imperial Library\Pipe\Valves\Control Valves	Element Profile	Length Calculation
Motor Control Valve - 0.5-2 Inch.rfa		Valve Length
Motor Control Valve - 2.5-6 Inch.rfa		Half Valve Length * 2
Motor Control Valve - 3 Way - 2-16 Inch.rfa		Width2* 4

Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Caps	Element Profile	Length Calculation
Motor Control Valve - 8-12 Inch.rfa		Valve Thickness
Solenoid Valve - 0.5-3 Inch.rfa		Length2
Solenoid Valve - 0.25-0.375 Inch.rfa		N/A
Autodesk\RME 2009\Imperial Library\Pipe\Valves\Diaphragm Valves	Element Profile	Length Calculation
Diaphragm Valve - Straight - 0.5-2 Inch.rfa		Body Length + Flange Thickness *2
Diaphragm Valve - Straight - 2.5-14 Inch.rfa		Half Body Length + Flange Thickness *2
Diaphragm Valve - Weir Type - 0.5-12 Inch.rfa		Body Length + Flange Thickness *2
Diaphragm Valve - Y Pattern - 1.5-3 Inch - Threaded.rfa		Valve Length
Diaphragm Valve - Y Pattern - 1.5-20 Inch - Flanged.rfa		Valve Length
Autodesk\RME 2009\Imperial Library\Pipe\Valves\Float Valves	Element Profile	Length Calculation
Level Valve - 0.5-2 Inch - Threaded.rfa		Valve Length

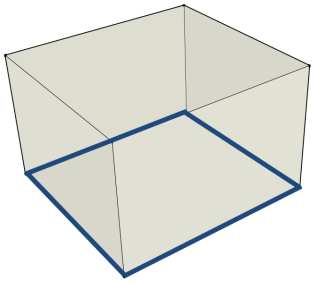
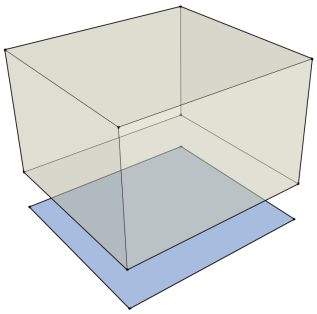
Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Caps	Element Profile	Length Calculation
Level Valve - 2.5-3 Inch - Flanged.rfa		Valve Length
Autodesk\RME 2009\Imperial Library\Pipe\Valves\Gate Valves	Element Profile	Length Calculation
Gate Valve - 2-12 Inch.rfa		Body Length + Flange Thickenss *2
Autodesk\RME 2009\Imperial Library\Pipe\Valves\Globe Valves	Element Profile	Length Calculation
Globe Valve - 0.375-2 Inch - Threaded.rfa		Half Pipe Length *2
Globe Valve - 2-18 Inch - Flanged.rfa		Half Pipe Length *2 + Flange thickness *2
Autodesk\RME 2009\Imperial Library\Pipe\Valves\Multi-Purpose Valves	Element Profile	Length Calculation
Multi-Purpose Valve - Angle - 1.5-2.5 Inch - Threaded.rfa		C2 Offset 1+Open Length
Multi-Purpose Valve - Angle - 3-12 Inch - Flanged.rfa		C2 Offset 1+Open Length
Multi-Purpose Valve - Straight - 1.5-2.5 Inch - Threaded.rfa		Valve Length
Multi-Purpose Valve - Straight - 3-12 Inch - Flanged.rfa		Valve Length

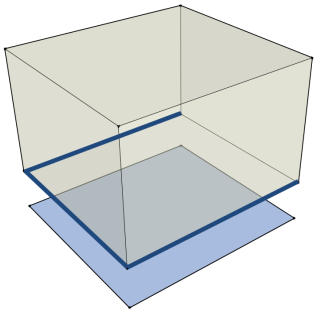
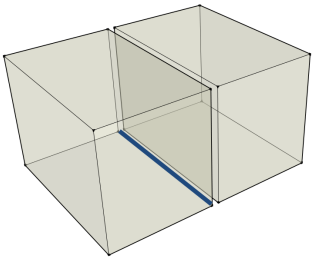
Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Caps	Element Profile	Length Calculation
Autodesk\RME 2009\Imperial Library\Pipe\Valves\Plug Valves	Element Profile	Length Calculation
Plug Valve - 0.5-2 Inch.rfa		Half Valve Length * 2
Plug Valve - 3 Way - 0.5-2 Inch.rfa		Valve Length
Plug Valve - 3 Way - Gear Operated - 4-16 Inch.rfa		Valve Length
Plug Valve - 3 Way - Lever Handle - 0.5-4 Inch.rfa		Valve Length
Plug Valve - Gear Operated - 4-16 Inch.rfa		Valve Length
Plug Valve - Lever Handle - 0.5-4 Inch.rfa		Valve Length
Autodesk\RME 2009\Imperial Library\Pipe\Valves\Pressure Regulating Valves	Element Profile	Length Calculation
Pressure Regulating Valve - 0.5-2 Inch - Threaded.rfa		Valve Length
Pressure Regulating Valve - 2-6 Inch - Flanged.rfa		Valve Length

Autodesk\RME 2009\Imperial Library\Pipe\Fittings\Caps	Element Profile	Length Calculation
Pressure Regulator - Hand Knob Operated - 0.25-1 Inch.rfa		C1 Offset + C2 Offset
Pressure Regulator - Wrench Operated - 0.25-1 Inch.rfa		C1 Offset + C2 Offset
Autodesk\RME 2009\Imperial Library\Pipe\Valves\Relief Valves	Element Profile	Length Calculation
Cap Relief Valve - 0.5-2 Inch - Threaded.rfa		C2 Offset
Pressure Relief Valve - 1-10 Inch.rfa		C2 Offset
Autodesk\RME 2009\Imperial Library\Pipe\Valves\Steam Traps	Element Profile	Length Calculation
Steam Trap - Inverted Bucket.rfa		Overall Length

Room Quantities

Name	Units - Imperial	Units - Metric	Description
Count	**EA**	**EA**	Number of Room elements in the Takeoff Item.
Height	**FT-IN**	**M**	Height of the Room

Name	Units - Imperial	Units - Metric	Description
Perimeter	**FT-IN**	**M**	Perimeter at the baseline of the Room  Calculated as the sum of polygon lengths at the baseline of the Room element.
Floor Surface Area	**SQ FT**	**M2**	Floor surface area  Calculated as the sum of the areas of polygons classified as 'Room Floor'.
Net Volume	**CU YD**	**M3**	Net volume
Gross Volume	**CU YD**	**M3**	Gross volume of the Room.
Piece Count	**EA**	**EA**	Number of pieces created from the original Room element as a result of defining Locations (Floors and Zones).
Piece Height	**FT-IN**	**M**	Height of an individual piece of the Room element, created as a result of defining Locations.

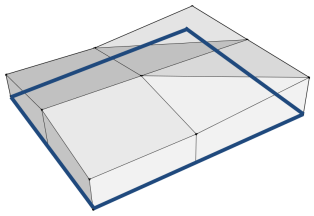
Name	Units - Imperial	Units - Metric	Description
Edge Length	**FT-IN**	**M**	Length of the Perimeter that belongs to a split piece. Returns the part of the perimeter that is contained in a Location. 
Joint Length	**FT-IN**	**M**	Length of a Room piece perimeter segment that was created by splitting the Room element after defining Locations. 
CAD_Count	**EA**	**EA**	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.

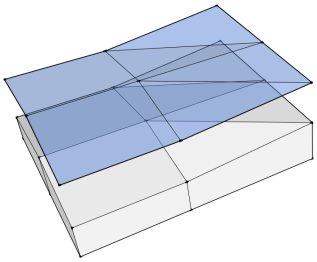
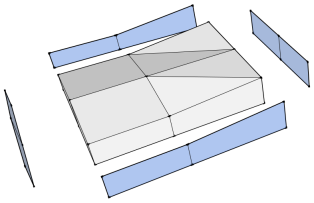
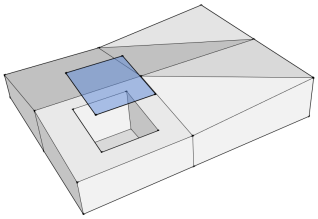
Stair Quantities

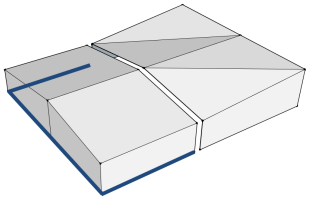
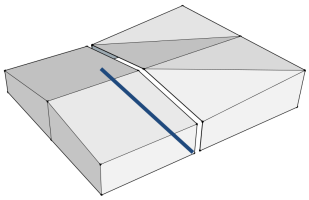
Name	Units - Imperial	Units - Metric	Description
Count	**EA**	**EA**	Number (Count)
Height	**FT-IN**	**M**	Height
Tread Surface Area	**SQ FT**	**M2**	Surface area of all stair treads

Name	Units - Imperial	Units - Metric	Description
Side Surface Area	**SQ FT**	**M2**	Surface area of the sides of the stair element
Net Volume	**CU YD**	**M3**	Net volume
Piece Count	**EA**	**EA**	Number of pieces created by splitting the Stair element after defining Locations.
CAD_Count	**EA**	**EA**	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.
CAD_Volume	**CU YD**	**M3**	Net volume of the element, which excludes the volume of any opening. This quantity comes from the CAD application after it was published.

Surface Quantities

Name	Units - Imperial	Units - Metric	Description
Count	**EA**	**EA**	Number of elements
Perimeter	**FT-IN**	**M**	Perimeter of the Surface element 

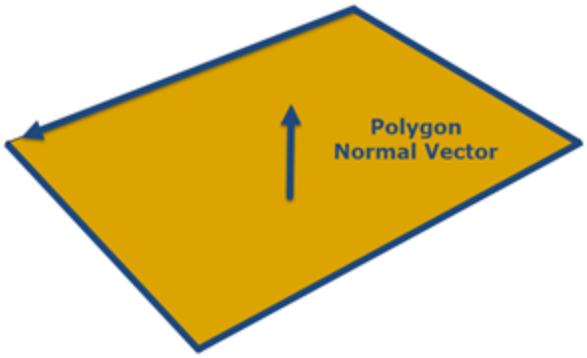
Name	Units - Imperial	Units - Metric	Description
Top Surface Area	**SQ FT**	**M2**	Surface area on the top side  Calculated as total area of polygons with 'Top' classification.
Edge Surface Area	**SQ FT**	**M2**	Surface area at the edges  Calculated as total area of polygons with 'Edge' classification.
Hole Surface Area	**SQ FT**	**M2**	Surface area of holes  Calculated as total area of polygons with 'Hole' classification.
Net Volume	**CU YD**	**M3**	Net volume
Bottom Surface Area	**SQ FT**	**M2**	Surface area at the bottom of the Surface element.

Name	Units - Imperial	Units - Metric	Description
Piece Count	**EA**	**EA**	Number of pieces created from the original Surface element after defining Locations.
Edge Length	**FT-IN**	**M**	Length of the Perimeter that belongs to a split piece. Returns the part of the perimeter that is contained in a Location. 
Joint Length	**FT-IN**	**M**	Length of a Room piece perimeter segment that was created by splitting the Room element after defining Locations. 
CAD_Count	**EA**	**EA**	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.

Surface Polygon Classification

The Surface Polygon Classification process automatically labels geometry in the imported model, which then enables Takeoff Manager to calculate the quantities described above. The process uses Vico's geometry analysis algorithms, which are accurate for standard elements but may result in wrong assumptions in specific cases. Any wrong assumptions can be corrected by using the Takeoff Quantity Painting process.

The Takeoff Manager polygon classification compares the model's vertical and the polygon's **Normal Vector** to determine its **angle**:



Based on orientation and direction of normal vector, Surface polygons are classified as follows:

- If a polygon is horizontal and its normal vector points downwards, it is classified as 'unknown', because 'Bottom Surface Area' is not a standard quantity type for the Surface element type.
- If a polygon's orientation is vertical, then it is classified as 'Edge'
- All other polygons are classified as 'Top'

Window, Door, and Opening Quantities

Name	Units - Imperial	Units - Metric	Description
Count	**EA**	**EA**	Number of elements
Width	**FT-IN**	**M**	Width
Height	**FT-IN**	**M**	Height
Perimeter	**FT-IN**	**M**	Perimeter
Element Surface Area*	**SQ FT**	**M2**	Area*
CAD_Count	**EA**	**EA**	Number of elements in the Takeoff Item. This quantity comes from the CAD application after it was published.

***Element Surface Area:** Applies to the face of the whole element so quantities should be used carefully depending on how the element was modeled.

For example, these are all modeled as single elements, and the quantities are provided for the red colored area: