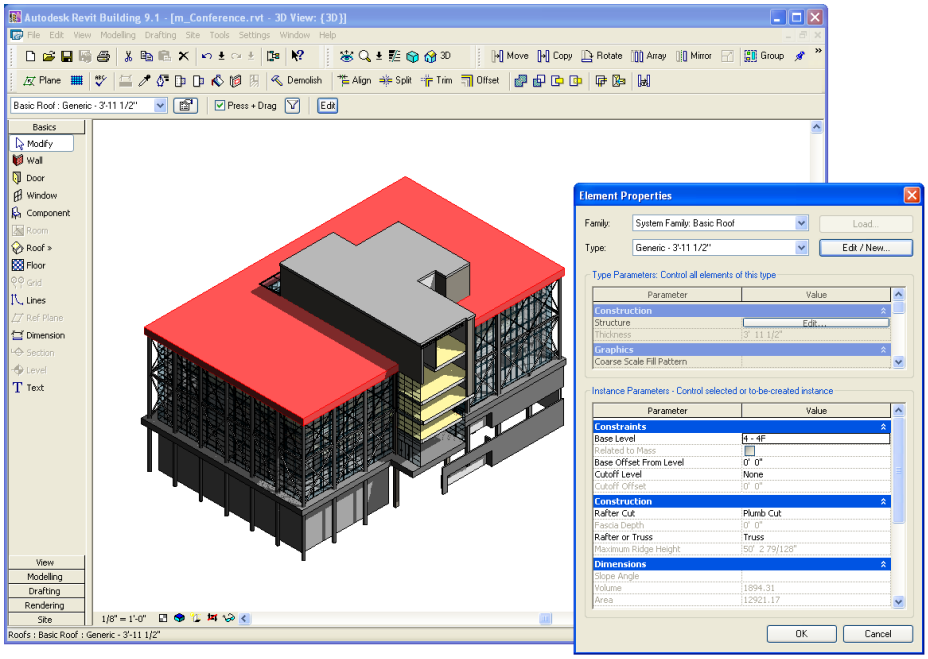
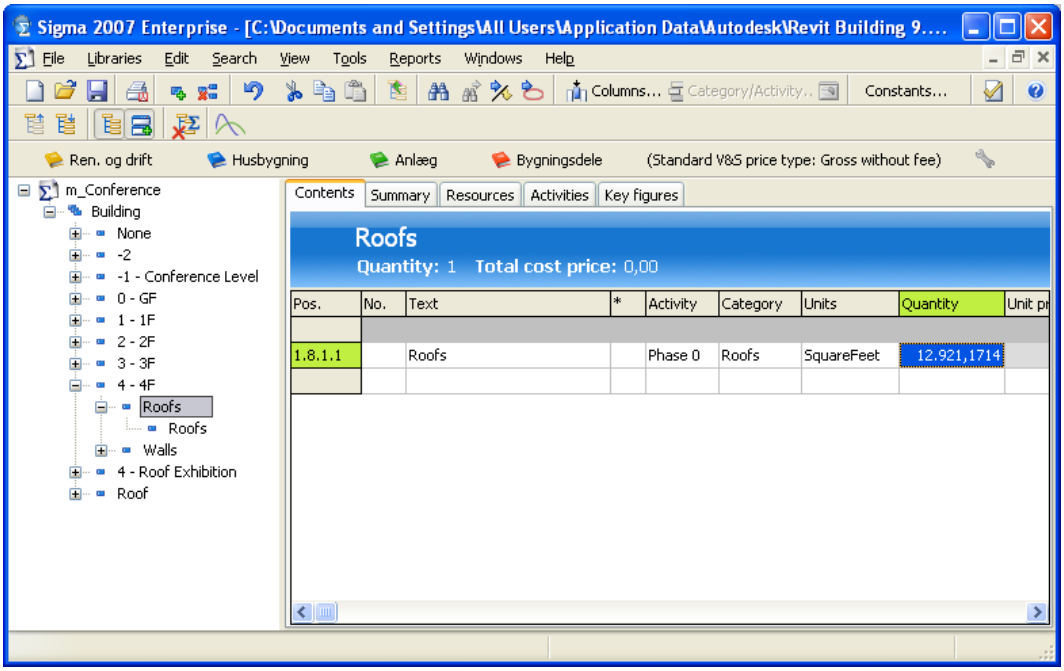
Technical Whitepaper

Integrating Revit CAD models and Sigma Cost Estimation

With the new Sigma – Revit Integration Module from CodeGroup A/S, it is possible to easily do quantity take-off from Autodesk® Revit® into Sigma for process oriented cost estimation.

An add-on is installed into Autodesk® Revit® that allows Sigma Cost Estimation tool to do professional cost estimation of the model, and update data back into the model.





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Sigma Revit Integration Whitepaper

Purpose of Sigma Revit integration

By integrating to Autodesk Revit, it is possible to extract building information from the Revit model into Sigma for further calculation.

Autodesk Revit exists in 2 different versions:

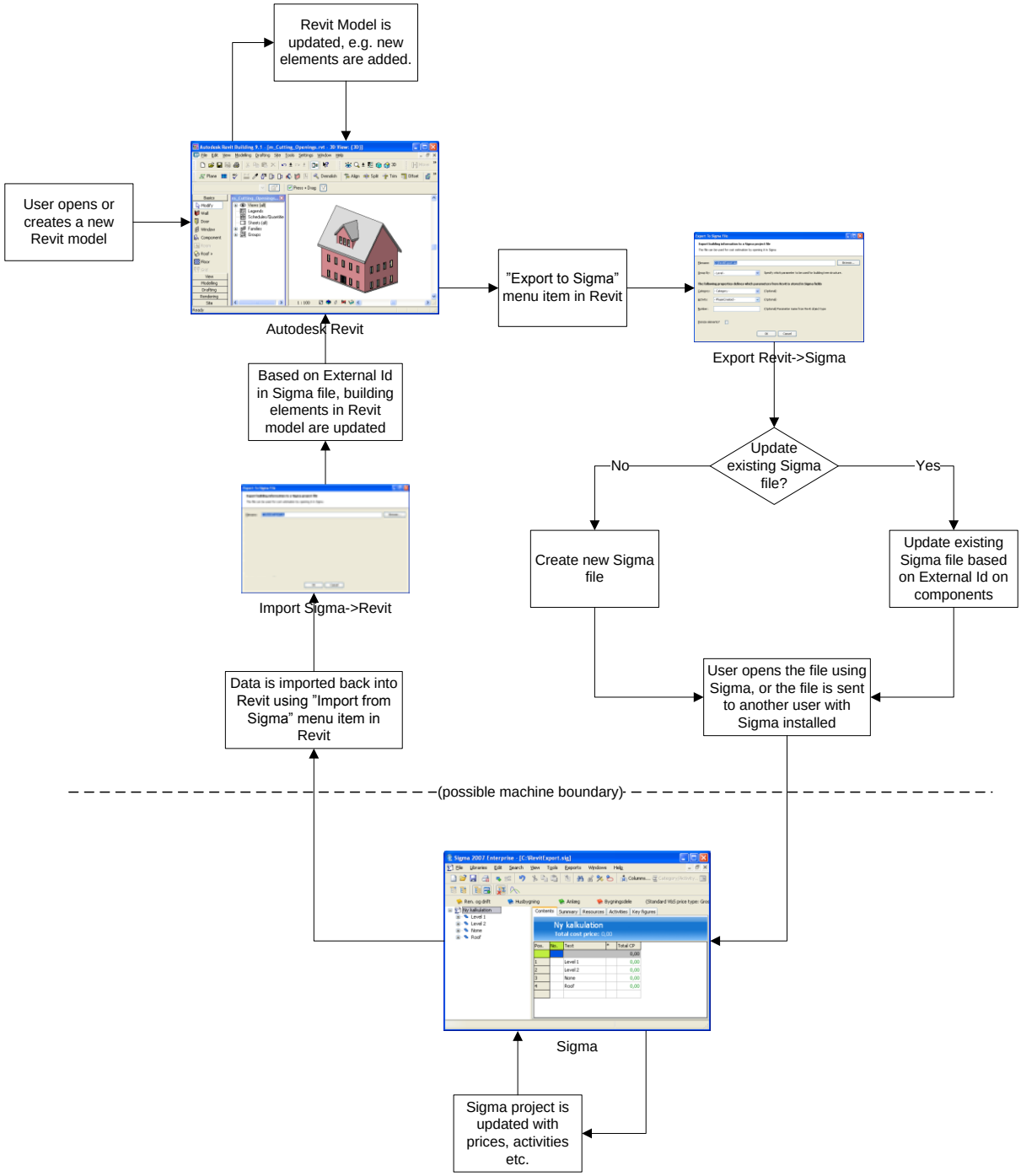
- Revit Building (named “Revit® Architecture” in next version).
- Revit Structure (named “Revit® Structure” in next version). This version should contain more structural data (steel constructions etc) than Revit Building.

A .NET 2.0 API is available for integrating with Revit and the integration has been tested for both Building and Structure. Using this API makes it possible to invoke a .NET application from a menu item within the Revit application.

The Sigma Revit integration is implemented using the Revit API.

General user flow

This section describes the flow when a user extracts information from Revit into Sigma, updates the information in Sigma, and imports information back into Revit.


Revit Model is updated, e.g. new elements are added.
User opens or creates a new Revit model
Autodesk Revit
”Export to Sigma” menu item in Revit
Export Revit->Sigma
Update existing Sigma file?
No
Yes
Create new Sigma file
Update existing Sigma file based on External Id on components
User opens the file using Sigma, or the file is sent to another user with Sigma installed
(possible machine boundary)
Sigma
Sigma project is updated with prices, activities etc.
Data is imported back into Revit using ”Import from Sigma” menu item in Revit
Import Sigma->Revit
Based on External Id in Sigma file, building elements in Revit model are updated

Installation

Pre-requisites

The following components must be installed before installing the Sigma Revit Integration module:

- Autodesk Revit Building 9.1 or Autodesk Revit Structure 4.0
- Microsoft .NET 2.0

Optional components:

- Sigma Enterprise 3.1.0 or later. If Sigma is installed, it is possible to open Sigma directly from Revit after exporting elements.

If Sigma is not installed on the machine, it is only possible to export to a Sigma file. This file can then be sent to a person with Sigma for further calculation.

Exporting and importing data between Revit and Sigma

ExternalId: Linking Revit and Sigma objects

Once the files required by the Sigma Revit Integration module have been installed into a subfolder of Autodesk Revit, it is possible to both export and import data between Revit and Sigma.

When exporting from Revit to Sigma, the unique element id from Revit is assigned to the Sigma component. This link from the Sigma component to the Revit element is referred to as “ExternalId” in the remainder of this document.

Cost estimating

Within Sigma, building elements and structures can easily be calculated by combining price databases, statistical assumptions, empirical figures etc.

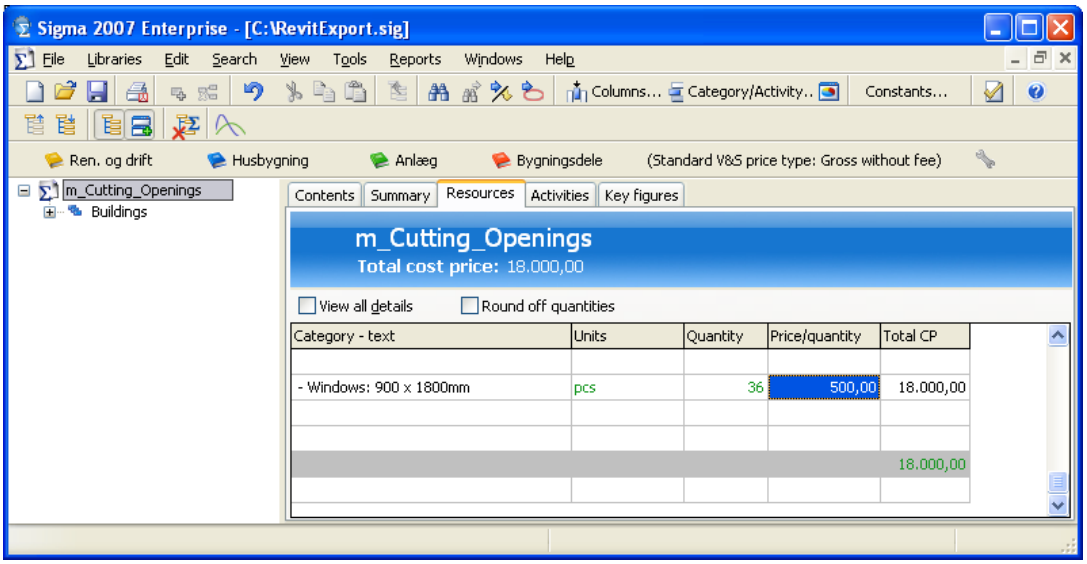
Using price databases enables the cost estimate to be automatically broken down into materials, wages, machinery, etc., which can be used for detailed calculations, planning, ordering and much more.

Since Sigma is can integrate with any type of price database, there is no limit to the type of models or calculations.

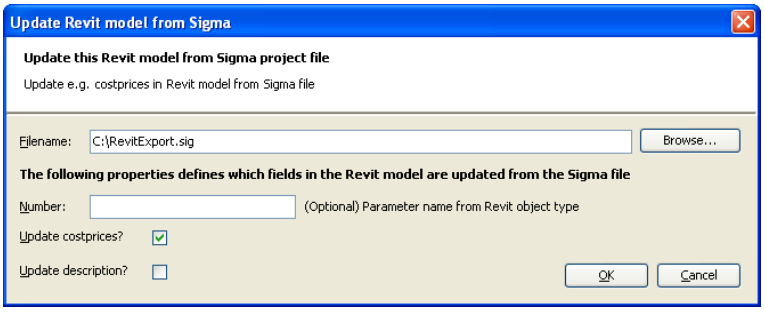
In addition to the model quantities, it is possible to calculate cost for e.g. building site, management, cranes, trucks, purchase of land. These elements are important to have a more realistic price.

Updating Revit model from Sigma file

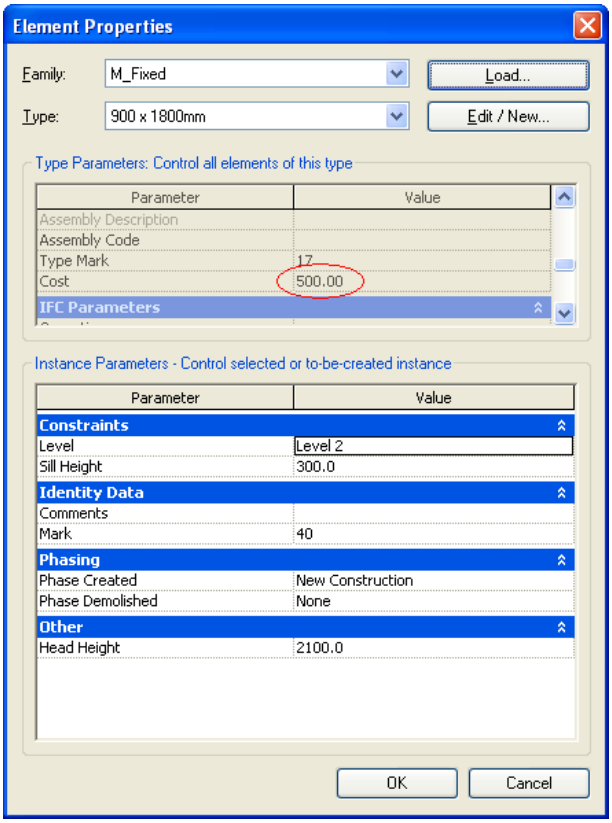
Among other things, it is possible to update the cost price in the Revit model from the Sigma calculation. In this example we specify a unit cost price of 500:



When closing Sigma, the "Update from Sigma" dialog is shown in Revit:

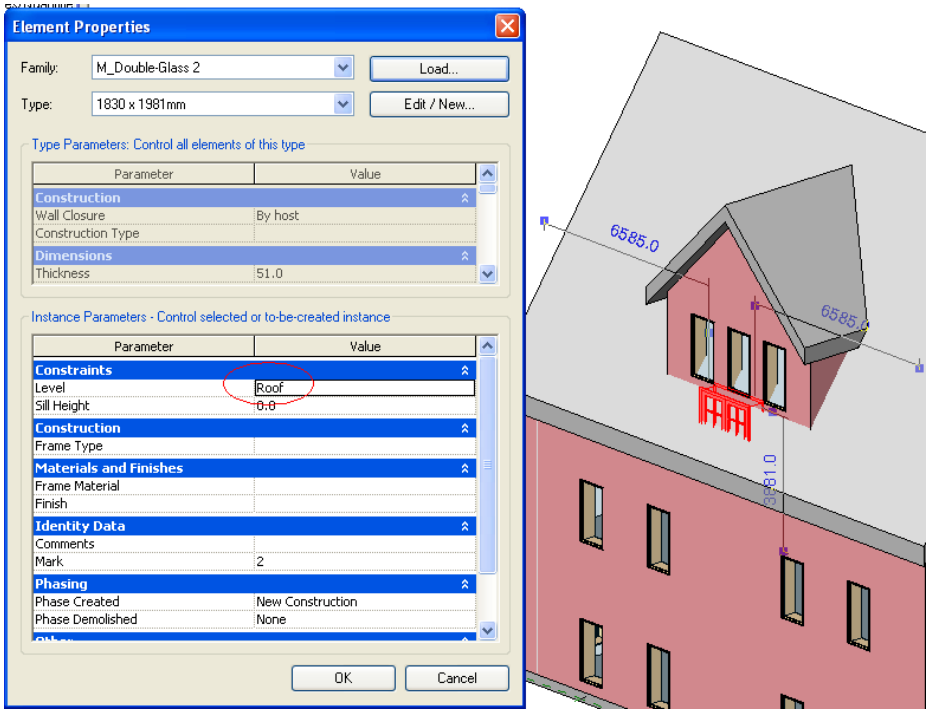


If we then choose to update cost prices, we find that afterwards the cost price for the Revit object type has been updated:

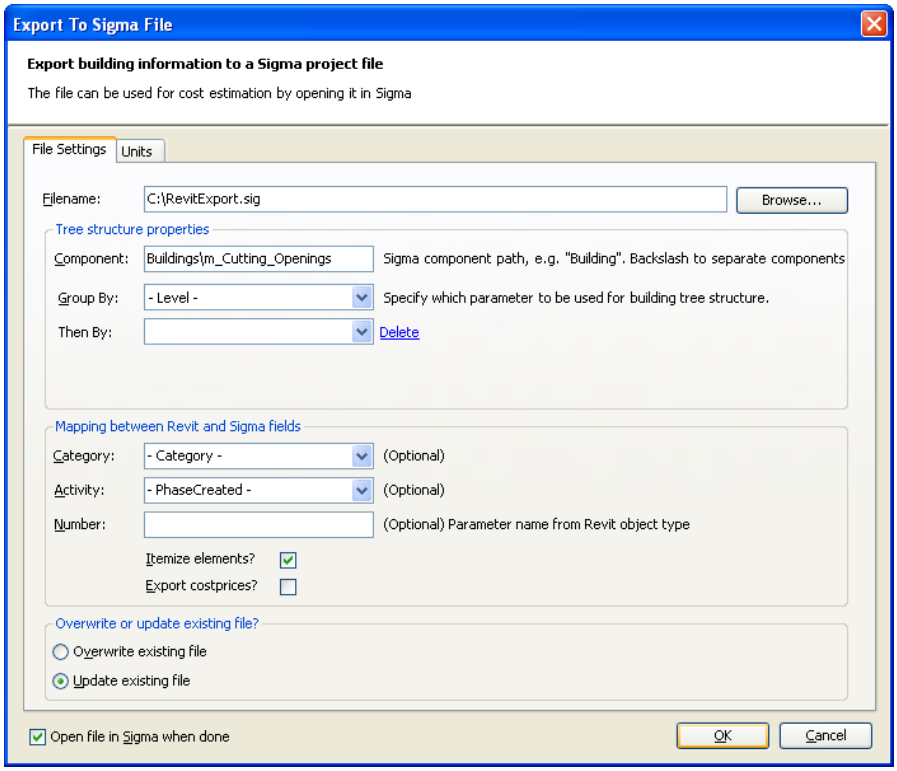


Moving elements in the Revit model

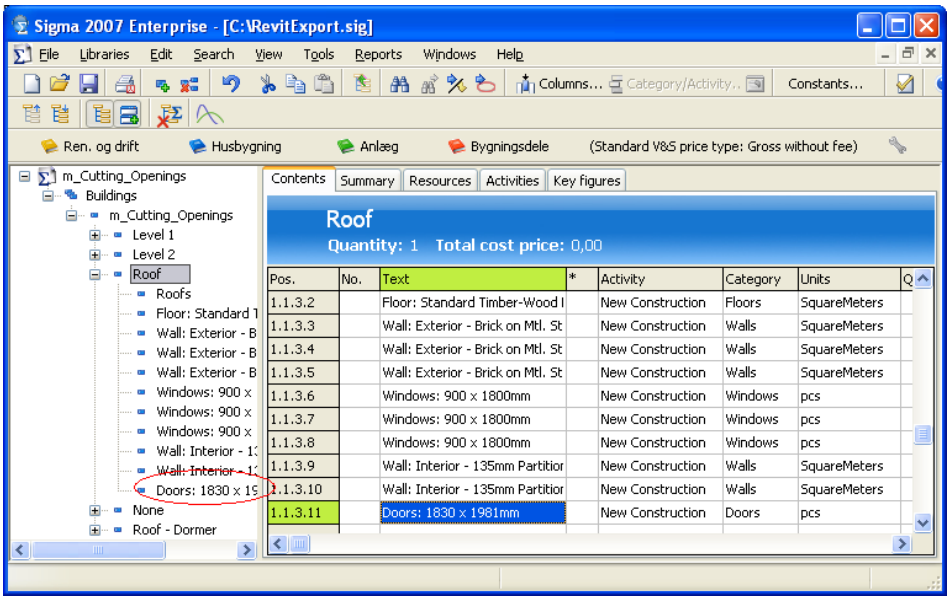
We now move the door to the level “Roof” and update the Sigma file.



In the “Export to Sigma File” dialog, the option “Update existing file” is selected:

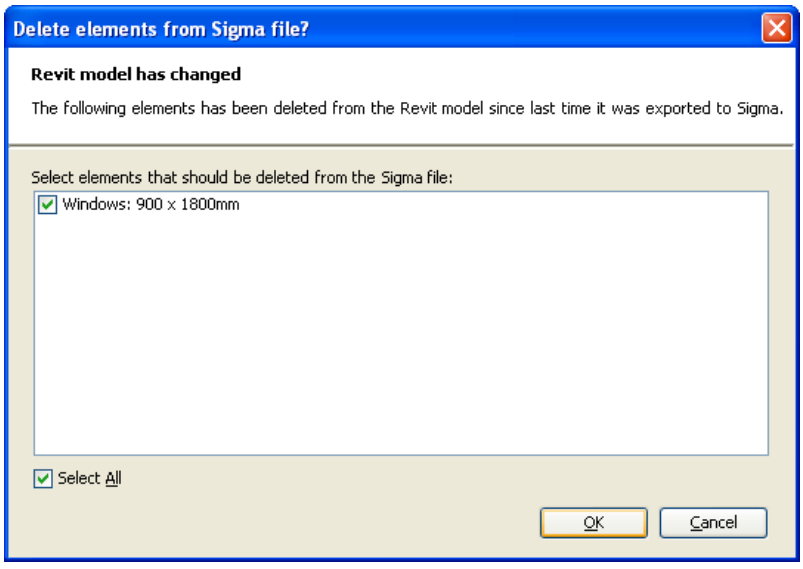


And when the Sigma file is opened, the actual door is now a child of the “Roof” component.



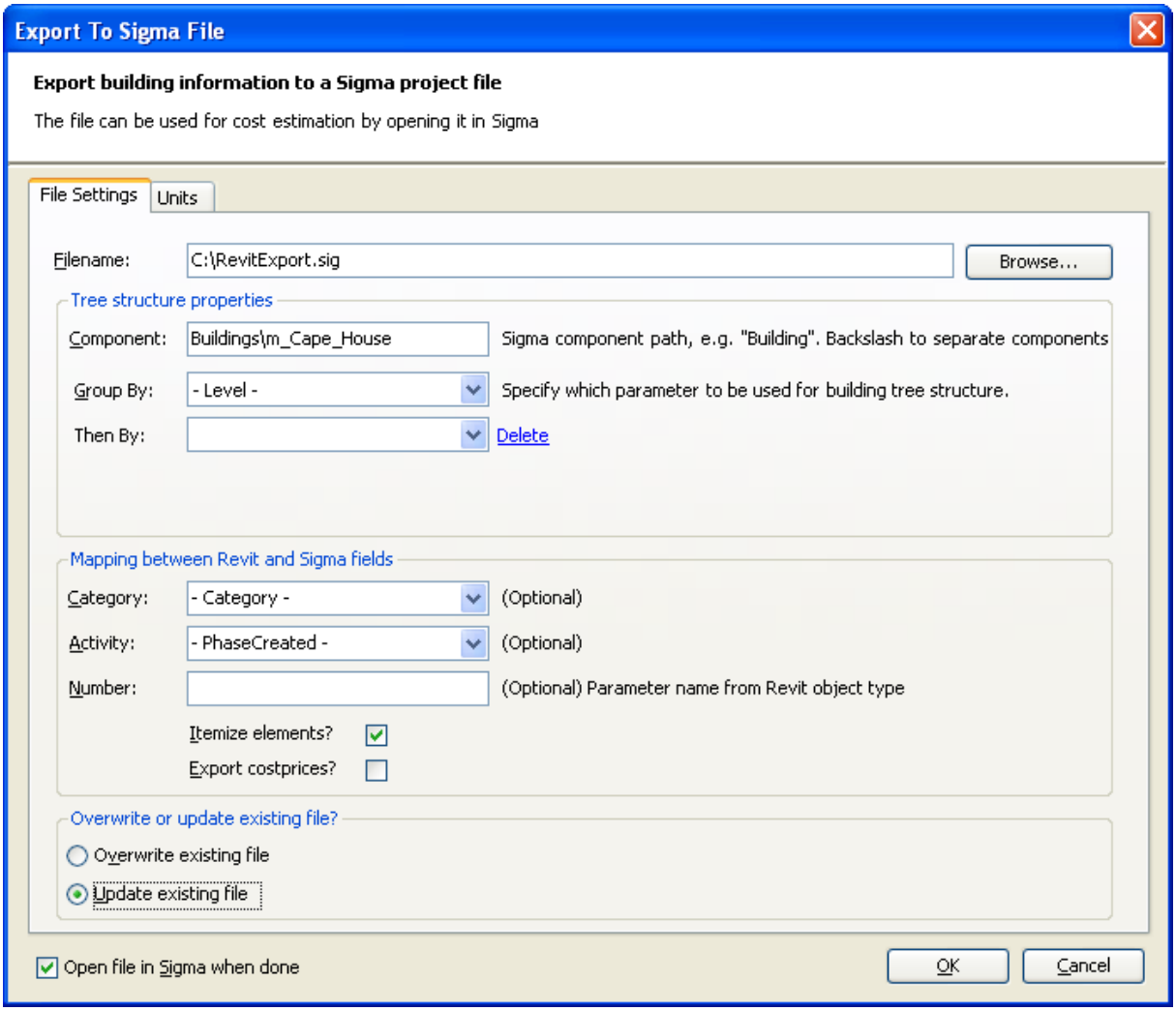
Deleting elements in Revit

In the same way it is possible for the Sigma Revit Integration module to detect if there are any components in the Sigma file, which no longer exists in the Revit model, again by using ExternalId. In case elements have been deleted from the Revit model, and the model is being exported to an existing Sigma file, a dialog asking the user if the component should also be deleted from the Sigma file is shown:

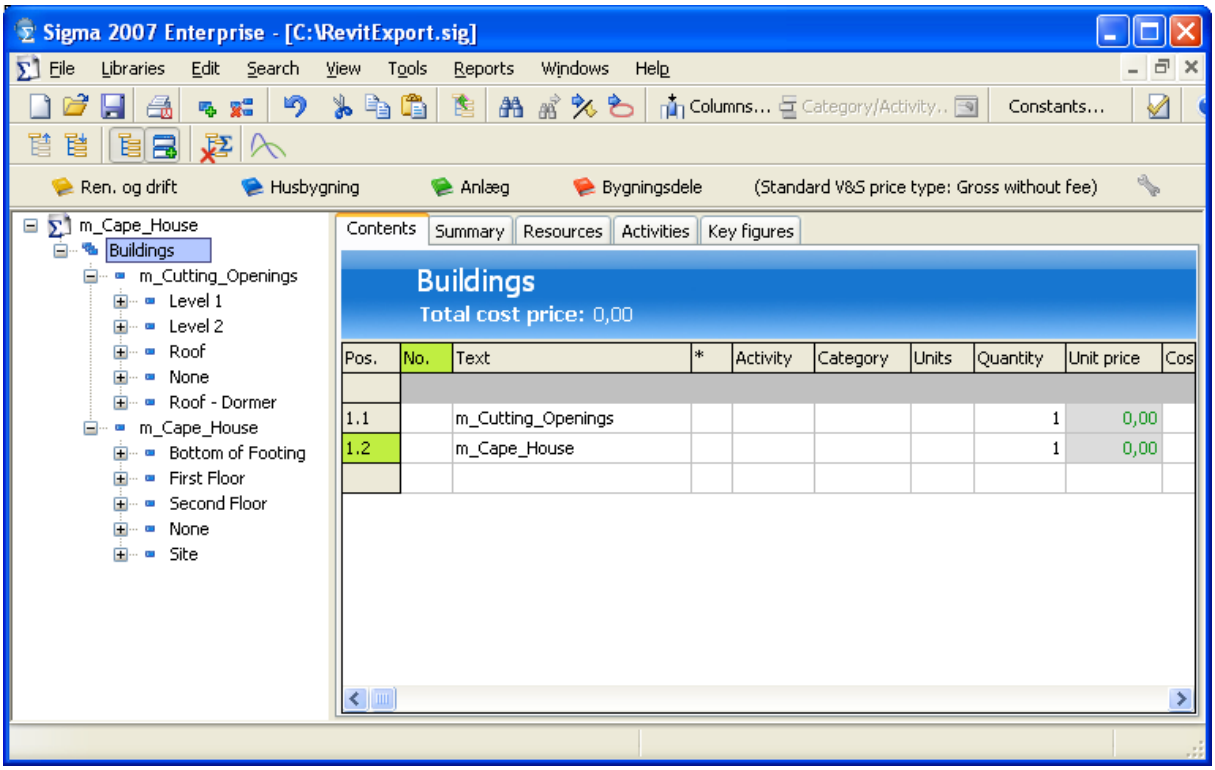


Exporting from several Revit models to the same Sigma file

It is possible to export from several Revit models into the same Sigma project file. The user simply selects the same Sigma file in the “Export To Sigma File” dialog:



Now the two different Revit models have been exported into two different components in Sigma:



In the Sigma project file, this is represented by two distinct ExternalDataSources, “Revit_1” and “Revit_2”. This means that each Sigma component links back to the correct Revit model, even if multiple Revit models have been exported into the same Sigma project file.