

Survey Coordinate Tool

for ARCHICAD 23 & 24

User Guide

GRAPHISOFT®

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Survey Coordinate Tool User Guide

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GRAPHISOFT UK would like to thank all participants for their valuable contributions to this add-on release of Survey Coordinate Tool for ARCHICAD in the UK and Ireland.

Special thanks go to Marcus Scott.

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Introduction

To assist our customers GRAPHISOFT have developed a new ARCHICAD add-on that simplifies and streamlines the interoperability workflow.

The Survey Coordinate Tool aims to provide a help with the focus on solving project coordinate location translation. The add-on creates a data driven approach that allows correct and precise translation of coordinates between ARCHICAD and other BIM authoring tools. This strongly complements GRAPHISOFT's approach to Open BIM initiatives and workflows.

Installation

Note: **XX = 23 or 24**

Windows

ARCHICAD XX

Download the Updated Survey Coordinates Add-On via (UAS Exclusive Downloads – Tools section) and unpack the Add-On from the .zip folder (UpdateSurveyCoordinates.apx and en)

Navigate to the Add-Ons folder of where ARCHICAD has been installed. By default, the location is C:\Program Files\GRAPHISOFT\ARCHICAD XX\Add-Ons

Drag and drop the UpdateSurveyCoordinates.apx and en we unpacked in step one and drop it into the Add-Ons folder

Mac

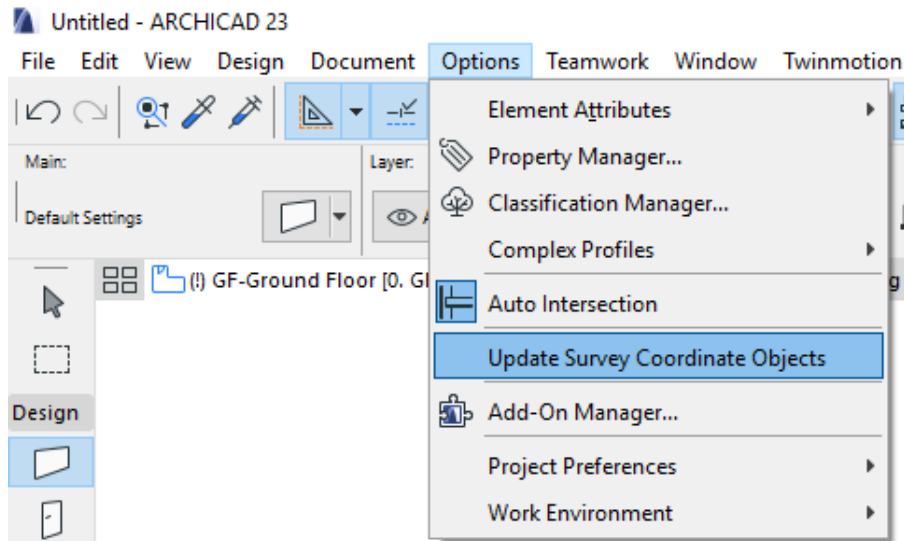
ARCHICAD XX

Download the Updated Survey Coordinates Add-On via (UAS Exclusive Downloads – Tools section) and unpack the Add-On from the .zip folder (UpdateSurveyCoordinates.bundle)

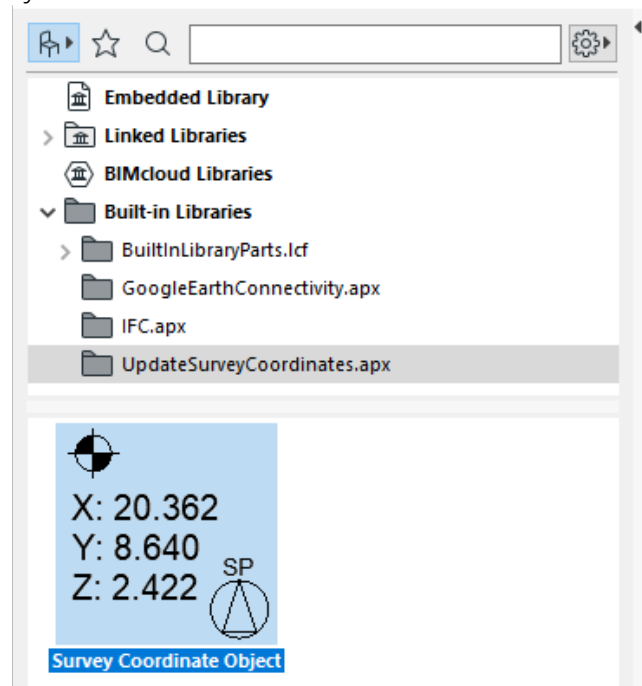
Navigate to the Add-Ons folder of where ARCHICAD has been installed. By default, the location is Macintosh HD/Applications/GRAPHISOFT/ARCHICAD XX/Add-Ons

Drag and drop the UpdateSurveyCoordinates.bundle we unpacked in step one and drop it into the Add-Ons folder

After the Add-On has been installed you should find the following:
In the Options Menu a new command called Updated Survey Coordinate Objects.



And a new object called Survey Coordinate Object which is in the Object tool, Built-In Libraries > UpdateSurveyCoordinates folder.



Scope and Basic Concepts

The Survey Coordinate Object has the following features:

- Reads from a placed Survey Point in the model
- Angle as defined in Rotate Orientation command is now considered when X/Y values are reported
- Coordinate Values (X, Y, Z) can be scheduled via an Element Schedule
- Coordinates can be shown in 3D
- Formatting options available (Different font types, symbol types, frames, etc)
- Survey Points which are placed in hotlinks are ignored
- Allows you to affectively work at 0,0,0 but still provide “real world coordinate”
- information for both documentation and IFC exports

Workflow

Example

We will use the following coordinates below to demonstrate the setup of the Survey Point position in order to read the agreed X/Y coordinates based on a rotated orientation:

Reference Point	Grid	Easting (X)	Northing (Y)	Angle to True North
Origin	N/A	10,000	10,000	10.0000°
Grid	A/1	34,037	31,147	10.0000°

Step 1 - Define orientation

Use the rotate orientation command to set the “True North” value. Based on the above table we will need to rotate the orientation by 10.0000° degrees in order to correctly place the Survey Point.

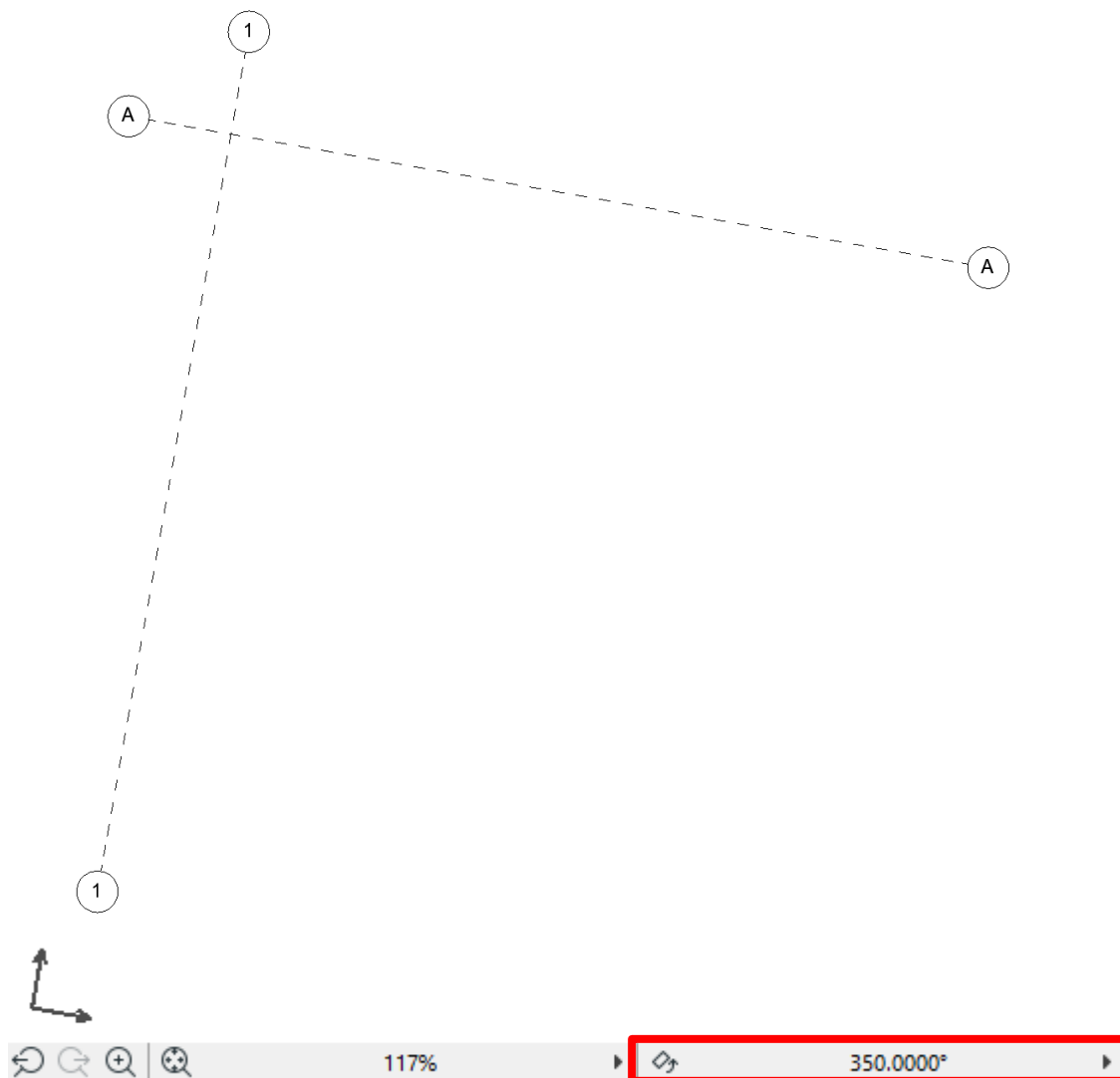


Image above shows the ARCHICAD model orientated by 10.0000° degrees. If the angle is positive, you will need to rotate the orientation clockwise.

Step 2

Positive angle to true north

Navigate to the Options Menu> Project Preferences> Project Location dialogue. In order to generate the correct True North angle, the rule of thumb is as follows:

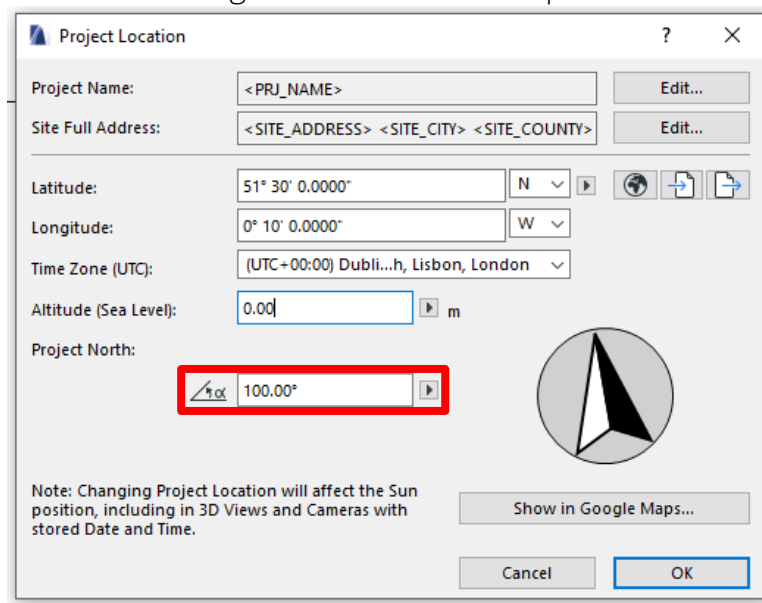
If the angle is positive as in the example above, then you need to add the true north angle to 90.0000° degrees. For example, $90.0000^\circ + 10.0000^\circ = 100.0000^\circ$

Negative angle to true north

If the angle is negative, then in step 1 you will need to rotate the orientation anticlockwise. Navigate to the Options Menu>Project Preferences>Project Location dialogue. In order to generate the correct True North angle, the rule of thumb is as follows:

If the angle is negative, then you need to subtract the true north angle from 90.0000°. For example, $90.0000^\circ - 10.0000^\circ = 80.0000^\circ$

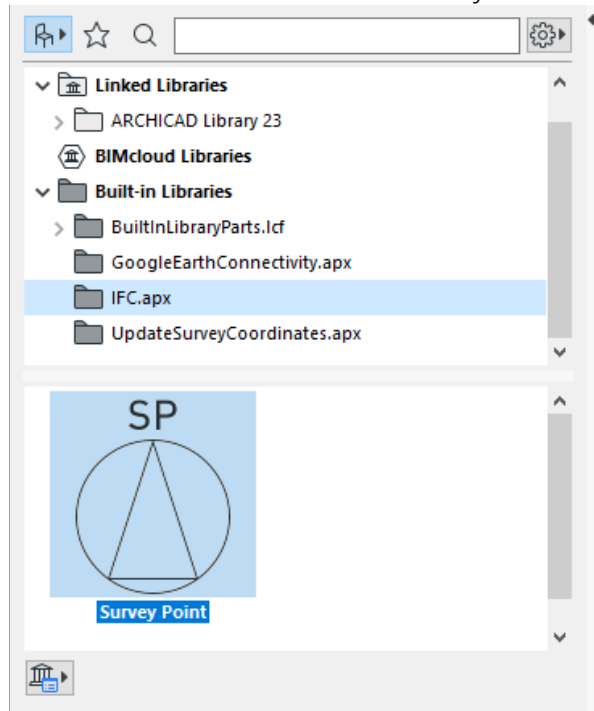
Image below shows the correct Angle to True North setup as based on the example above.



Step 3 - Placing Survey Point

Open the Object tool and locate the Survey Point object. By default, the Survey Point is located within the Built-In Libraries folder followed by the IFC folder. Alternatively, you can use the search function at the top of the Object settings dialogue and search for the keyword "Survey" and ARCHICAD will find the Survey Point automatically.

Screenshot below shows the default location of the Survey Point object



To place the Survey Point:

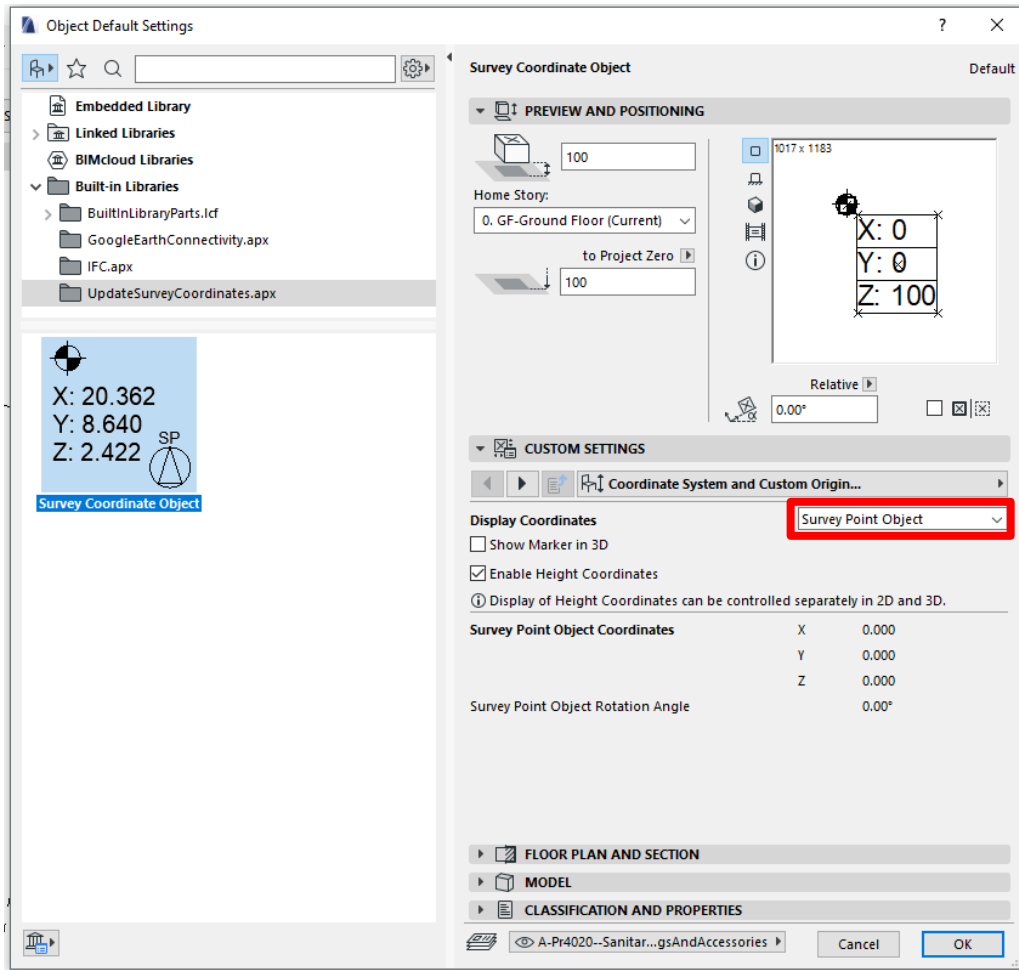
- Hover your cursor over ARCHICAD's origin (0,0,0) as indicated as a black X on the floor plan.
- Press "X" on your keyboard and type in the desired coordinate. Based on the table above our X coordinate would be typed as 10000- (coordinate value followed by minus sign "-")
- After the X coordinate has been entered press the tab key to drop down into the Y coordinate and type in the desired coordinate. Based on the table above our Y coordinate would be typed as 10000- (coordinate value followed by minus sign "-")
- Press the enter key and the Survey Point object will be placed at the entered coordinates but in relation to the orientation angle as defined in Step 1.

We recommend locking the Survey Point's layer after the Survey Point has been placed to the desired coordinate.

After the Survey Point has been placed you can set the orientation back to 0.0000°

Step 4 - Placing the Survey Coordinate Object

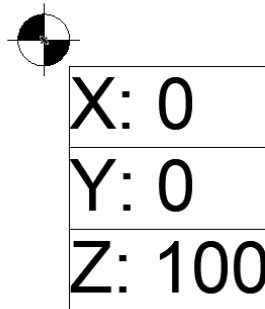
After the Survey Point is placed, we can now start to use the Survey Coordinate Object to report the coordinates on floor plan. Open the object tool and locate the Survey Coordinate Object and ensure that the Display Coordinates parameter is set to Survey Point Object as shown on the screenshot below:



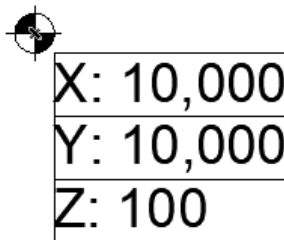
Place the Survey Coordinate Objects down onto your model. By default, the objects will read their local coordinates from ARCHICAD's origin (0,0,0) To show the Survey Coordinate Objects X/Y values in relation to the Survey Point navigate to the Options Menu and run the Update Survey Coordinate Objects command.

Survey Coordinate Object examples

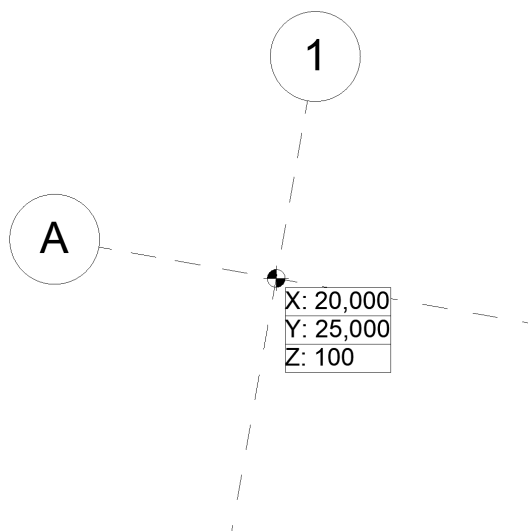
The image below shows how the Survey Coordinate object will display by default when placed onto the ARCHICAD origin (0,0,0)



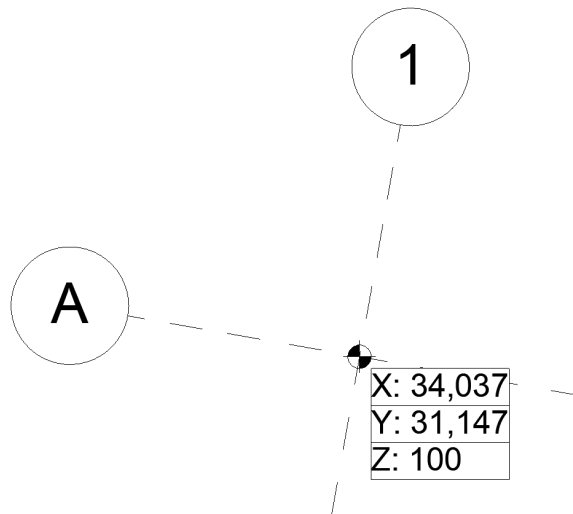
The image below shows the X/Y coordinates after the Update Survey Coordinate Objects command is run. The X/Y coordinates are now shown in relation to the Survey Point position.



The image below shows how the Survey Coordinate object will display by default when placed at a difference location. In this instance grid intersection, A/1.



The image below shows the X/Y coordinates after the Update Survey Coordinate Objects command is run. The X/Y coordinates are now shown in relation to the Survey Point position.

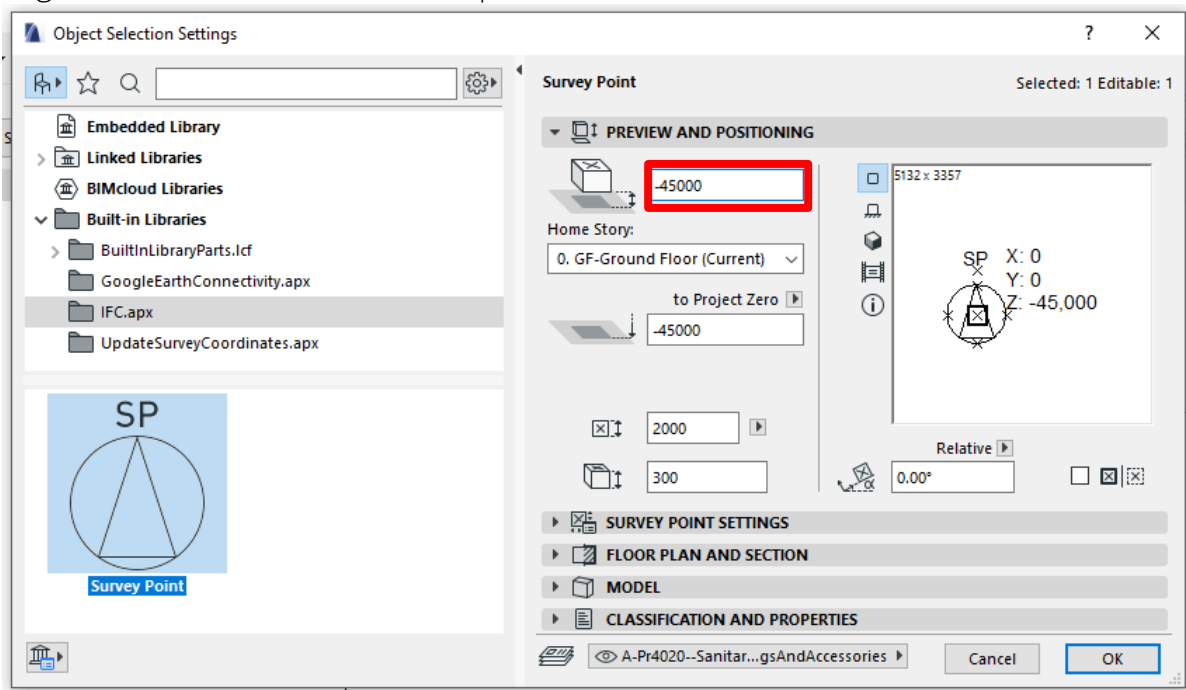


We now have the correct “Real World” coordinates shown on our model but in reality, the ARCHICAD model is still located close to ARCHICAD’s origin (0,0,0)

Step 5 - Defining Sea Level

An additional step for exporting an IFC to “Sea Level” is to enter the agreed datum into the Survey Point object.

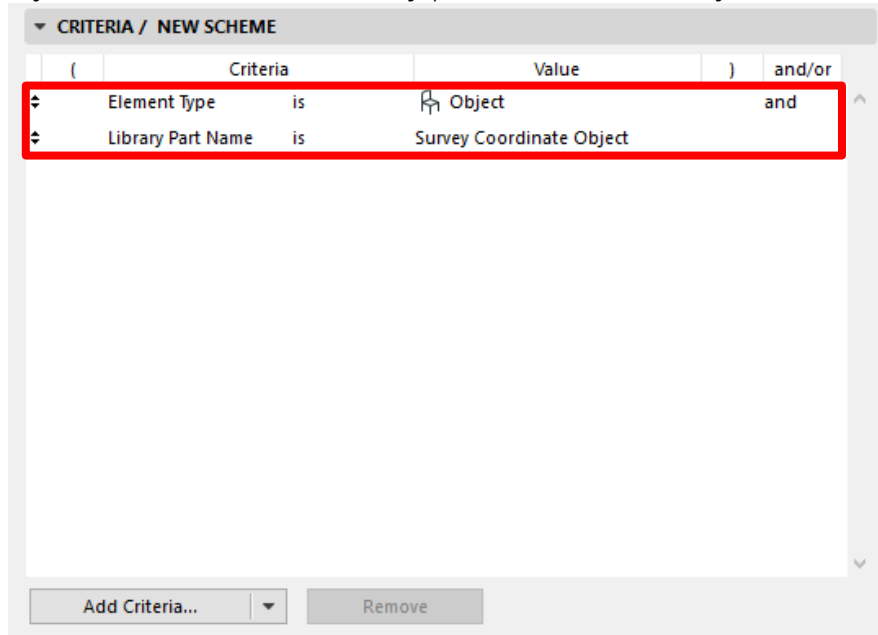
For example, if the agreed datum is 45,000mm the value must be entered as negative (e.g. -45,000mm) in the elevation parameter, as shown below:



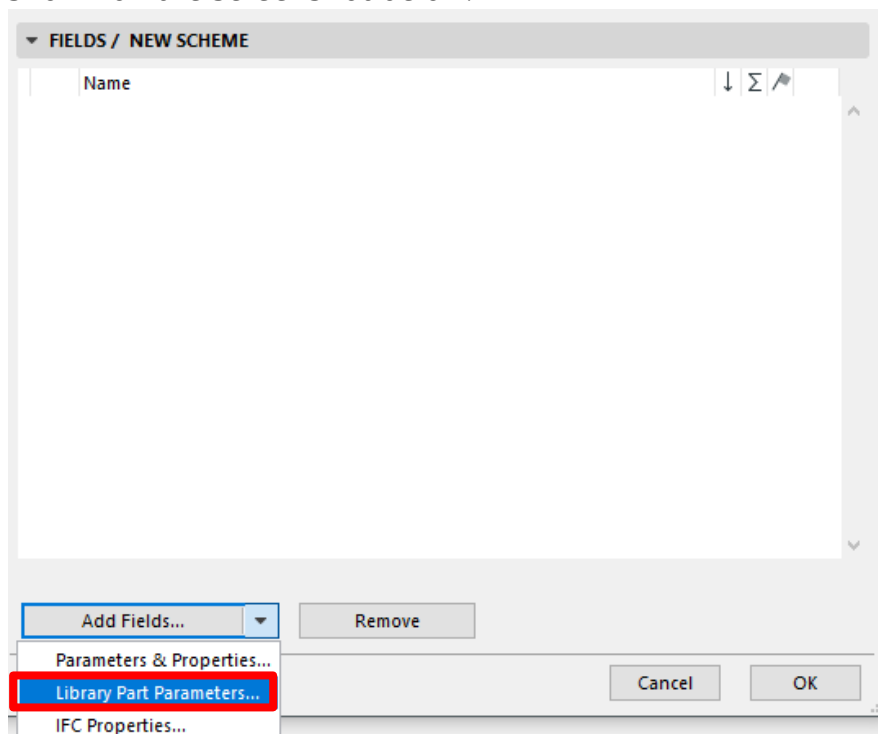
How to schedule the X/Y/Z coordinates

Create an element schedule then set the criteria to Element Type is Object, add another criterion and set it to Library Part Name is Survey Coordinate Object.

Screenshot below shows the criteria added to the element schedule. The criteria above will schedule only objects which have the library part name of "Survey Coordinate Object"



In the subheading fields click on the arrow next to Add Fields followed by Library Part Parameters as shown on the screenshot below.



In the Additional Object Parameters dialogue, set the Select Object By drop down menu to Folder View (used Objects only) Open the folder called UpdateSurveyCoordinates, then select the Survey Coordinate Object.gsm

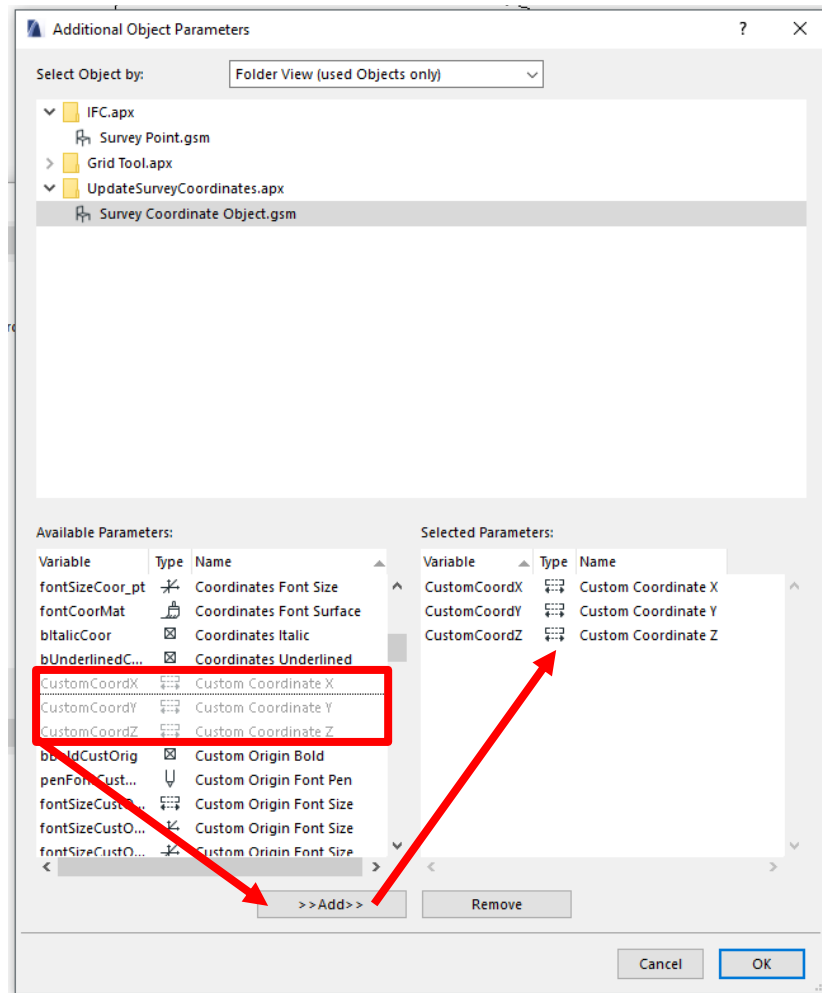
On the left locate the following parameters:

Custom Coordinate X

Custom Coordinate Y

Custom Coordinate Z

Select all three parameters above and click the Add button below to add them to the schedule.



After the Custom Coordinate X, Y and Z parameters have been added to the schedule you should see the following result:

Coordinate Schedule		
Custom Coordinate X	Custom Coordinate Y	Custom Coordinate Z
10,000	10,000	45,000
34,037	31,147	45,000

Working with Surveys

The above workflow is mainly for setting up a model which will be exchanged between different disciplines via IFC.

If you require to show coordinates in relation to an imported survey but you are not issuing an IFC file, then the steps are a little different as shown below.

Step 1 - Import the Survey

Place the Survey Drawing via the File Menu>External Content>Place External Drawing command.



Step 2 - Defining the origin point

Surveys are normally already orientated to their True North value, therefore in this case we do not need to use the rotate orientation command to place the Survey Point.

We do however need to choose a known point on site we would like to reference to. In the Survey I imported there are two station points as highlighted above in step 1.

Station Point A:

X: 250978.895 metres

Y: 386238.688 metres

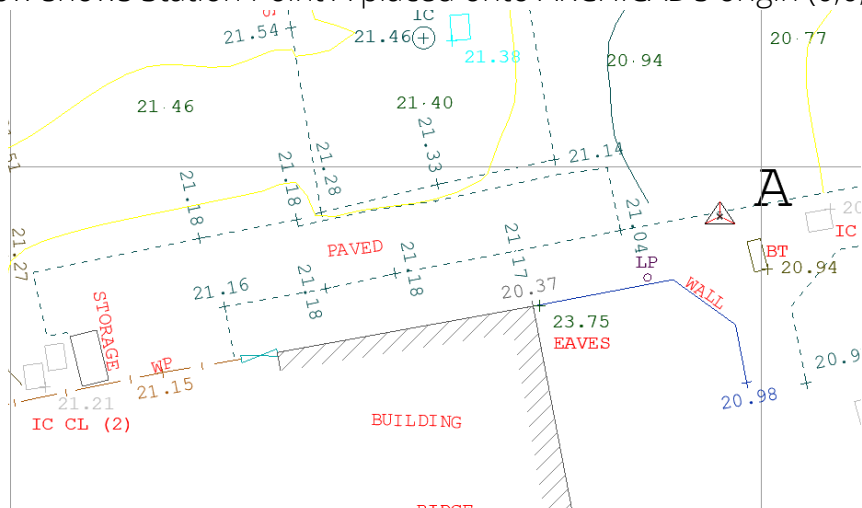
Station Point B:

X: 250986.919 metres

Y: 386272.885 metres

In this example I'll use Station Point A as my reference. Therefore, we need to drag the imported survey by Station Point A and place it onto the ARCHICAD origin (0,0,0)

Screenshot below shows Station Point A placed onto ARCHICAD's origin (0,0,0)



Step 3 - Placing the Survey Point

- Hover your cursor over ARCHICAD's origin (0,0,0) as indicated as a black X on the floor plan.
- Press "X" on your keyboard and type in the desired coordinate. Based on the Surveyors given coordinates above our X coordinate would be typed as 250978.895- (coordinate value followed by minus sign "-")
- After the X coordinate has been entered press the tab key to drop down into the Y coordinate and type in the desired coordinate. Based on the Surveyors given coordinates above our Y coordinate would be typed as -386238688 (coordinate value followed by minus sign "-")
- Press the enter key and the Survey Point object will be placed at the entered coordinates but in relation to the orientation angle as defined in Step 1.

Step 4 - Coordinate examples

Image below shows the Survey Coordinate Object placed on Station Point A with the correct coordinates as supplied by the Surveyor. (The Update Survey Coordinate objects command again must be run in order to show the correct X/Y coordinates)

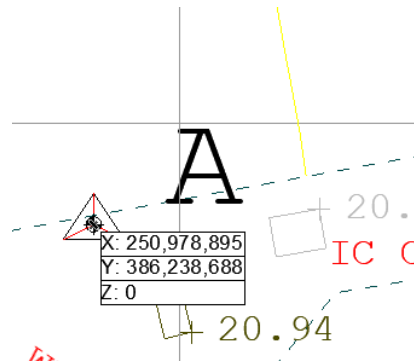


Image below shows the Survey Coordinate Object placed on Station Point B with the correct coordinates as supplied by the Surveyor. (The Update Survey Coordinate objects command must be run again in order to show the correct X/Y coordinates)

