# REVIT INTEROPERABILITY WITH VECTORWORKS LANDMARK: A GUIDE

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# INTRODUCTION

An increasing number of site design professionals are implementing a BIM workflow in their landscape architecture or landscape design process. This can require a practice/firm to commit to some variations to their standard CAD practice, for example in planning for interoperability with BIM standard file formats. It's important for each firm to evaluate the benefits and challenges they would encounter in every file format exchange.

Though the best practice BIM file exchange format remains to be with the Industry Foundation Classes (IFC) format, this guide will focus on file exchanges Vectorworks Landmark (or Design Suite) design professionals have with collaborators using Autodesk's Revit® proprietary format (RVT) and the Revit family file format (RFA). With its 2017 version, Vectorworks introduced RVT and RFA import capabilities, and with version 2020 RVT export was introduced, meeting the requests of many users being required to receive and share using these formats. Since these releases, and with the help of the Open Design Alliance (ODA) libraries, these exchanges have continued to see enhancements, making the user collaboration experience easier.

# INTEROPERABILITY WITH REVIT

## FILE IMPORT

Because Revit features intelligent model-based objects used for designing, constructing, and managing buildings and infrastructure, it might be expected that items saved, or exported, from Revit would be less usable in a CAD or BIM solution that is not solely focused on building design. Additionally, one might believe that applications other than Autodesk products would not handle Revit file content properly. Fortunately, this is not the case with Vectorworks Landmark.

The following list are the formats saved or exported by Revit which Landmark will import:

Revit Native Formats:

- RVT (Revit proprietary format)
- RFA (Revit family format)

Other Formats:

- DWG, DXF, and DWF (general CAD formats)
- IFC and SAT (3D model formats)
- BMP, JPEG, PNG, and TIFF (image/raster formats)
- PDF (raster and vector formats)

The intent for this guide is to assist Landmark users in best practice workflows in exchanging with Revit users via RVT and RFA formats. For guidance on importing any of the non-native file formats saved or exported from Revit, visit the Vectorworks Help menu, making sure the help content is from the most current Vectorworks version.

Lastly, before moving further into the Import RVT and RFA sections, recommendations related to origins, project base points and georeferencing are collectively addressed in a dedicated section, after File Import. Reviewing all sections is encouraged before proceeding with your RVT file exchanges.

# INTEROPERABILITY WITH REVIT

## PREPARING TO SAVE FROM REVIT

### SET UP VIEW (TO ONLY EXCHANGE MINIMUM REQUIRED INFORMATION)

File size (memory) and application performance are two valid concerns, when it comes to bringing any sizable BIM file into another BIM application. With this in mind, communication about what the incoming BIM model should contain, or not contain, is crucial. This typically would be done when the BIM execution plan (BEP) is established with the collaborating design team members.

Collaborators on either side of an exchange should look to send only the essential geometry needed by the receiving party. For example, landscape architects would typically not require more than the exterior shell of proposed buildings from their collaborating architect, so receiving more than this would provide an extra burden on the resulting combined BIM file. Where possible, the data related to the building and its operation, should be appended to or within the model. This is helpful in proper planning for site amenities related to the building and site's intended use.

**EXAMPLES OF WHAT GEOMETRY LANDSCAPE ARCHITECTS TYPICALLY NEED FROM BUILDING/STRUCTURE COLLABORATORS:**

- Roofs
- Exterior walls
- Interior walls (structural support for rooftop amenities)
- Other structural members (where interacting with proposed landscape)
- Floors
- Windows
- Doors
- Utility service penetrations/enclosures/meters
- Other outward-visible features

Conversely, landscape architects would want as much of the site file they could receive from the civil engineers, since much of the proposed landscape treatments would regard the existing and proposed site conditions.

# INTEROPERABILITY WITH REVIT

## IMPORTING RVT FILES

RVT or RFA files created in versions 2011 and later can be imported into Vectorworks Landmark. When RVT or RFA files are imported, the following can be expected when it comes to imported geometry:

1. All 2D views (floor plans, ceiling plans, and sheets) import as Sheet Layers, with the graphics inside the annotation group of an empty viewport.

2. The 3D model imports as one or more Design Layers; a design layer is created for each story of a multi-story model. If your file exchange needs to maintain Revit Story to Vectorworks Story mapping, this is also possible

3. Revit families (RFA) import as symbols and associated resources such as textures, fills, nested models, record formats, object styles, etc..

- For RFA files, a record is created for the family definition and for every nested family.

- For RVT files containing families, a record is created for every family definition.

4. Straight and round walls are imported as Vectorworks walls, with components, and wall joins preserved. **(Figure 1)**

- Non-perpendicular walls and walls with horizontal peaks do not import as walls.

5. Windows and doors import as custom window and door symbols and are properly placed in walls. **(Figure 2)**

6. Floor objects import as slab objects.

7. Appropriate symbol names and IFC data remains attached to all imported objects which creator appended such data.

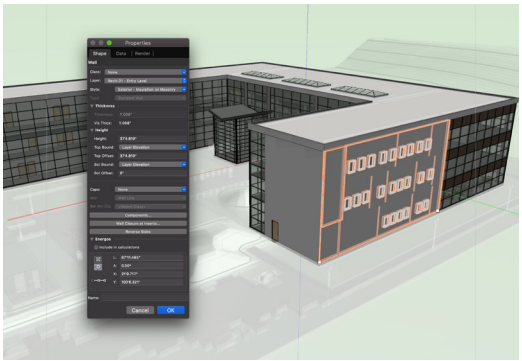

FIGURE 1: Imported RVT wall becomes Vectorworks wall.

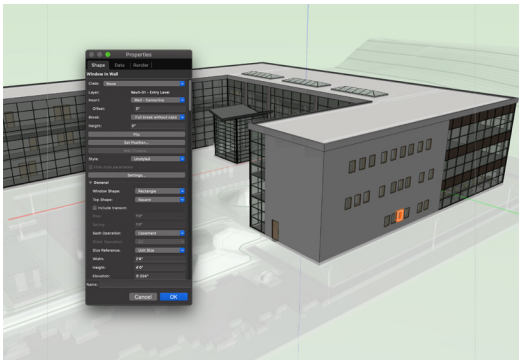

FIGURE 2: RVT window becomes Vectorworks window in wall.

# INTEROPERABILITY WITH REVIT

## IMPORT OPTIONS

Once an import is initiated via File>Import>Import Revit, the file browser is enabled to locate the target RVT file. Once the target RVT file is chosen, a dialog will offer options for import settings relating to imported views, elements, and textures.

There is another option for importing Revit (Batch), but this second option is intended for multiple RFA files. This latter option will be covered in the RFA portion of this guide.

## IMPORT VIEWS

**Active view only** - Since this option makes use of the active view of the file the Revit using firm saves, it is recommended to request the Revit-using firm make their active view the 3D model prior to saving.

**3D Model View** – Straightforward option when only seeking the 3D model of the building/structure and not 2D sheet-based information.

**2D and 3D views** – This is considered the "catch-all" option, which would include everything the Revit firm is saving and sharing.

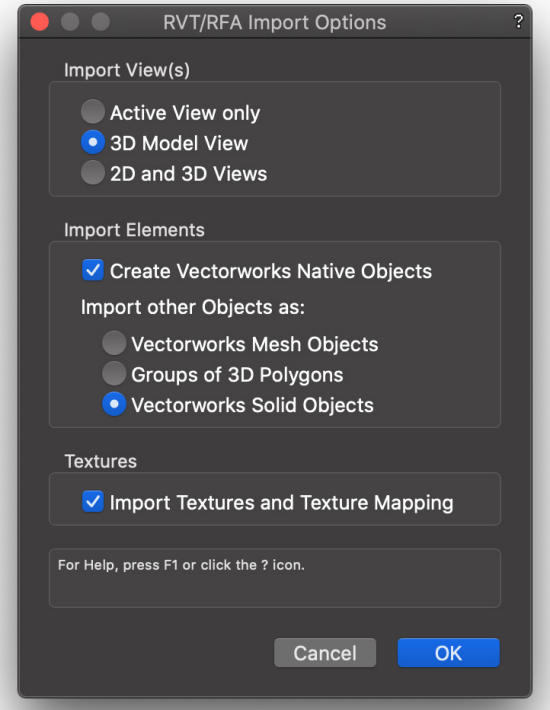


FIGURE 3: RVT/RFA Import Options Dialog

# INTEROPERABILITY WITH REVIT

## IMPORT ELEMENTS

The Revit file being imported is expected to contain smart BIM objects, modeled not only to display the most visible outside shell, but it would also likely contain 3D components replicating how that object would be constructed. These "elements" can be represented as fully as they were designed or could be simplified for building massing geometry recognition only.

**Create Vectorworks Native Objects** – this should be chosen for the scenarios when the landscape architect wants to keep the intelligence associated to those building elements as well as its geometry. With this setting enabled, Revit-created objects like walls become Vectorworks walls... and a Revit-created window or door within one of those walls become a Vectorworks window in wall or door in wall. **(Figures 1 and 2)** Imported Revit-created objects which may not have a directly related Vectorworks object would become a Revit Entity.

**Import other Objects as** – One of these options must be selected to handle the objects which are not one of the previously noted examples. It may be best to test each of these scenarios to determine which method of geometry treatment is best for your firm's workflows and processing speed, though this can also be treated on a file-by-file basis.

**Vectorworks Mesh Objects** – This option, which creates data-free mesh objects within the Vectorworks file, results in the smallest file size. Firms can expect a reasonable import time. Disadvantages are that the mesh objects may seem harder to discern where objects stop and other elements start, and there is no real way of carrying appended data in the import.

**Groups of 3D Polygons** – This option creates one or more data-free groups of 3D polygons. Though the import time is still reasonable, it has the potential for creating the largest of the file sizes. Like mesh objects, imported objects would not carry data, but the user can recognize 3D geometry in groups, which means each site element is treated individually.

**Vectorworks Solid Objects** - This last option creates one or more data-free solid objects, or mesh objects where solids are not possible. This may be more desirable to the user in that the solid objects are handled similarly to individual symbol objects. Though the file size is considered to be reasonable, the process can be very slow, and its import may take a long time.

## RECOMMENDED PROCESS

Through testing each of the above options with a typical, 3-story commercial building model, and undeveloped terrain surface, the options selected in the dialog box displayed in **Figure 3** provide the best result when considering both import time and resulting quality of imported objects.

# INTEROPERABILITY WITH REVIT

## TEXTURES

**Import Textures and Texture Mapping** - Textures defined in Revit materials will be imported as Vectorworks Texture resources. Textures are mapped on their appointed objects properly and appear in the Resource Manager with correct thumbnail and can be reapplied to different objects. When a Revit object has a composite structure with multiple components, where each component is assigned a different texture, the created native Vectorworks object with components (Slabs, Walls) will have the same respective texture for every single component.

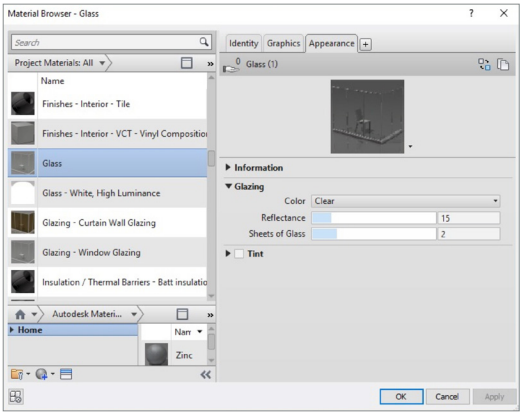


FIGURE 4: The Revit texture in its native browser.

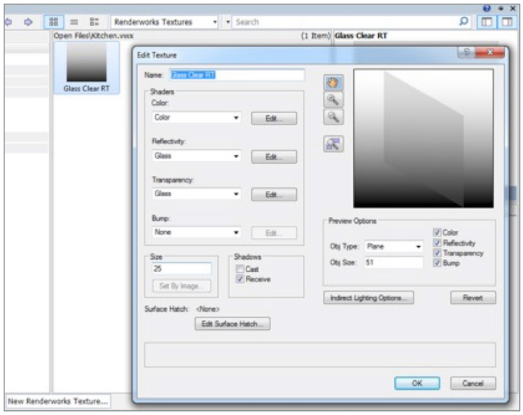


FIGURE 5: You have full access to the imported Revit texture via the Resource Manager and Edit Texture dialog.

When importing 3D objects from the architect which are not creating Vectorworks native objects, there may be a need to create a symbol for best representation in 2D Top/Plan views:

1. Select the 3D object (or all of its 3D elements if not within a symbol).
2. From the Modify pull down menu, choose Convert, and then Convert Copy to Polygons. (Group is formed containing polygons)
3. Select the group, and make sure the fill best represents the 2D color representation of the object. (This can be done in the Attributes Palette.)
4. Select both the newly created group and the 3D symbol/geometry.
5. From the Modify pull down menu, choose Create Symbol.
6. Imported RFA object is now 2D/3D Symbol in Vectorworks

# INTEROPERABILITY WITH REVIT

## SITE MODEL CONSIDERATIONS

It is understandable that the alignment of the architect's building and the civil/survey engineer's terrain may not automatically take place upon import, if those collaborators did not already establish a common project origin, or common elevation (Z) position. Each of these contributing firms should diligently identify these common reference points and establish a project spatial definition so that your positioning can be accurately recognized in your working file.

In most cases, your firm would likely receive terrain data from civil/survey engineers, or perhaps internally generated, if your workflows typically include this service. If your firm receives a project's terrain model from the Revit collaborator, it is important to note that the terrain surface can become a native Vectorworks site model and continue to be managed within Vectorworks Landmark.

The imported terrain model will come in as a Revit Entity and you can then use the elevation data from this to create a native site model – this gives you full access to all the site modifying tools and commands in Vectorworks.

**TO USE/OR EXTRACT THE TERRAIN DATA FROM THE RVT FILE, CHOOSE ONE OF THE FOLLOWING WORKFLOWS:**

1. Select the Revit Entity
2. From the Modify pull down menu, select Ungroup (accept the alert notice)

**OR**

1. Select the Revit Entity
2. In the Object Information Palette select Edit Geometry
3. From the Edit pull down menu, choose Copy
4. Exit the editing space by clicking on Exit Revit Entity
5. From the Edit pull down menu, choose Paste-in-Place

At this point, you now have the source data you need to create the Site Model.

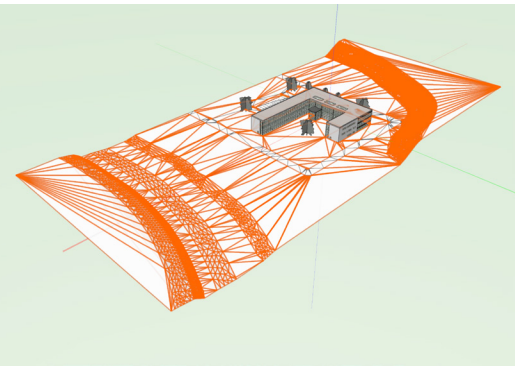

FIGURE 6: Terrain model imports as Revit Entity

# INTEROPERABILITY WITH REVIT

**USE SURFACE GEOMETRY TO MAKE THE SITE MODEL:**

1. Select the resulting 3D polygons
2. From the Landmark pull down menu, choose Create Site Model from Source Data
3. Set all the settings preferred for the Site Model
4. Click OK

Your Site Model is ready to receive grade changes by way of site modifications to adjust the surface for surfacing, stairs, walls, drainage, etc.

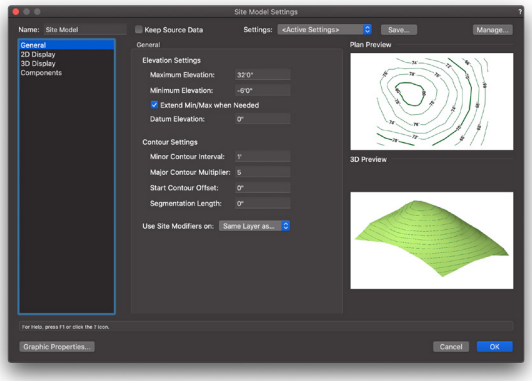


FIGURE 7: Site Model Settings dialog

## IMPORTING RFA FILES

Though Revit Family (RFA) files can be assembled BIM objects with sub-parts, the most common purpose for integrating RFA files is for manufactured content. Just as manufacturers have made 2D CAD files and 3D model files of their products available for years in on their product catalog web pages, they have been continuing to build content in BIM objects in the RFA format. Before taking the time to download such object libraries, take note in the existing manufacturer's content library already available with Vectorworks Landmark. You may find the same ready-for-specification content without taking the RFA import steps. **(Figure 8)**

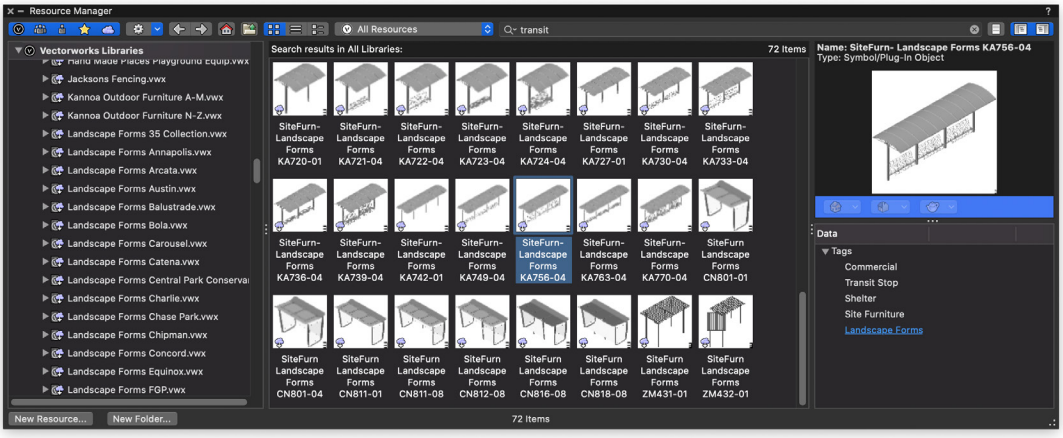


FIGURE 8: Manufacturer's BIM content libraries in Vectorworks' Resource Manager

# INTEROPERABILITY WITH REVIT

In situations where a specific manufacturer's content is not already within the available library files, then importing their RFA files could provide the BIM content you need to identify and visualize the products you wish to specify in the project.

The process of importing an RFA file is different from the RVT import in that you would opt for the Import Revit (Batch) method. This does not mean more than one RFA file must be imported.

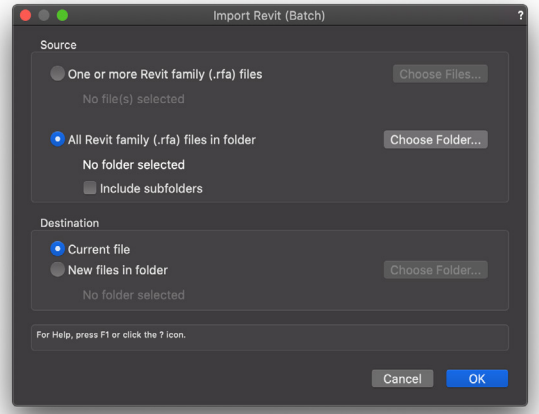


FIGURE 9: Import Revit (Batch) settings for importing RFA files

### IMPORT REVIT (BATCH) – SOURCE OPTIONS

**One or more Revit Family** – Choose this option when you want one, or a selection, of RFA files.

**All Revit Family files in folder** – This option should be chosen when you want all RFA files imported from a folder.

### IMPORT REVIT (BATCH) – DESTINATION OPTIONS

**Current File** – Choose this option when you are bringing the object into the file you are currently producing.

**New files in folder** – This option should be chosen when you are bringing multiple objects into a folder, likely to be used as a collection of manufacturer's BIM object files.

FIGURE 10: Victor Stanley RFA objects imported as a batch into Vectorworks

# INTEROPERABILITY WITH REVIT

## RECOMMENDED PROCESS

When importing the Revit family file, using the File>Import>Import Revit (Batch) process makes the most sense for the RFA files. Though the File>Import>Import Revit process does still provide a way to import them, the settings are still required to be chosen, whereas the former process makes this more automated.

Once an RFA object is imported, the object is not already placed in the file, nor will it be placed at the "next click." In the case of imported RFA objects, they and their supporting texture and other 3D resources will be brought into an object-specific folder, visible within the Resource Manager. This folder contains all these resources as seen in **figure 11**.

By dragging the 3D symbol (sometimes it may be referred to as a 2D/3D symbol) in the active design space, this inserts the object in the file, which can then be situated as preferred.

If the object does not display a fill (looks to be only wireframe), you would need to right click or double click to edit the 3D geometry and make sure the fill is set to solid. This may be needed for each subpart of the 3D symbol if the subparts do not all show solid.

Since Vectorworks Landmark makes use of hybrid (2D/3D) objects and workflows, you may prefer that these 3D symbols be treated the same way. This means the symbol must be combined with a 2D representation, which then allows the designer to reuse this object as a BIM symbol object and see it properly in both 2D plans and 3D model views.

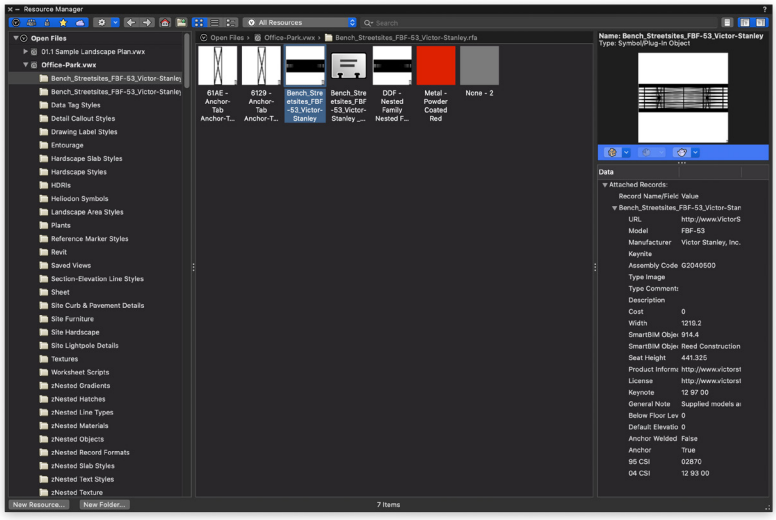


FIGURE 11: Imported Revit family object and associated resources in Vectorworks Resource Manager

# INTEROPERABILITY WITH REVIT

To do this, the object should be viewed in the top/plan view, and the following steps can be followed:

1. Select the 3D object (or all of its 3D elements if not within a symbol).
2. Within the Modify pull down menu, choose Convert, then choose Convert Copy to Polygons.

(Group is formed containing polygons)

3. Select the group, and make sure the fill best represents the 2D color representation of the object. (This can be done in the Attributes Palette.)
4. Select both the newly created group and the 3D symbol/geometry.
5. Within the Modify pull down menu, choose Create Symbol. **(Figure 12)**

The Imported RFA object is now a 2D/3D Symbol in Vectorworks. **(Figure 13)**

It is recommended that as each new symbol resource is created and ready to be placed in your project file, it should also be saved to your favorite folder for such symbols. If shared with others in your firm, it should be placed in your workgroup folder. Note that the initial imported 3D object retains its manufacturer's data appended via a record format. Once made into a new 2D/3D symbol, it may need to be reattached to ensure its records are easy to attain when tabulating in a material report. Simply do this by activating the OIP data tab and attach the record format.

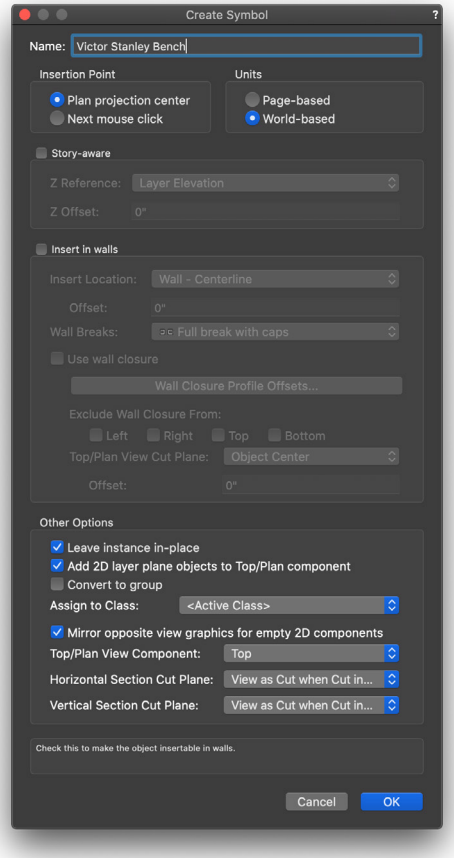


FIGURE 12: Create Symbol dialog

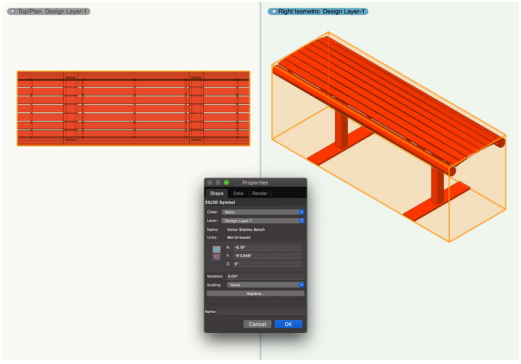

FIGURE 13: 2D/3D Vectorworks symbol created from imported RFA object

# INTEROPERABILITY WITH REVIT

## WORKGROUP REFERENCING CONSIDERATIONS

### SHUTTLE FILE

Unlike external DWG, IFC, PDF, and Image files, which can be referenced into the Vectorworks Design Layer environment, RVT and RFA files cannot. However, if the Revit file is imported and saved into a separate "blank" Vectorworks file, it can be referenced into the working Vectorworks file.

Such benefits include:

- Cleaner file organization. (layers and classes in working file are separated from those in the referenced file)
- Viewport-like visibility controls.
- Easier exports. (Background model information is more easily held out of export.)

### RECOMMENDED PROCESS

1. Create a project template in Vectorworks with GIS/project coordinates correctly set up.
2. Import the Revit file into a version of the project template.
3. Save with firm-approved name convention of other referencing scenarios.
4. Open active working Vectorworks file.
5. Within the View pull down menu, choose Create Viewport.

    a. Give viewport a name.

    b. Select source. (external document)

    c. Layer visibility can be set now or any time later.

    d. Select OK.

Once referenced, the viewport with referenced file will be in view, and the Class and Layer visibility for the referenced file can be adjusted through the OIP Class and Layer settings, as well as other visibility features controlled by the viewport.

# INTEROPERABILITY WITH REVIT

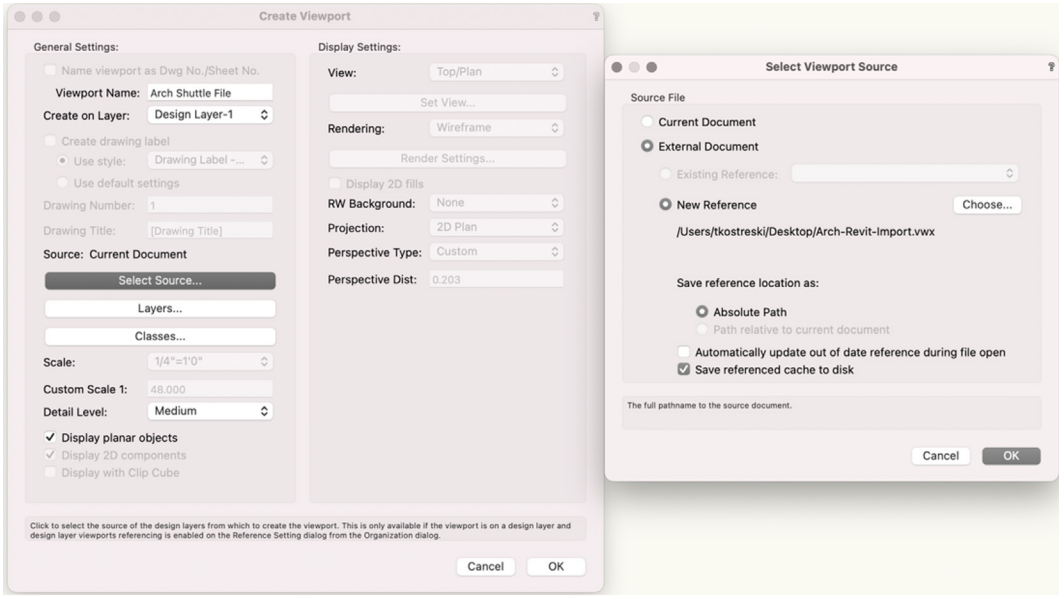


FIGURE 14: External file referencing via viewport in Vectorworks

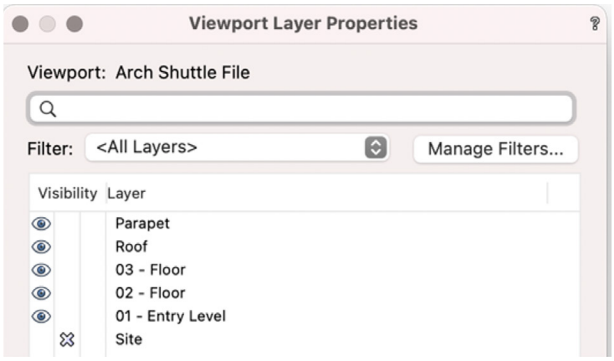


FIGURE 15: Viewport layer visibility control

# INTEROPERABILITY WITH REVIT

## FILE EXPORT

As you have conversations with collaborating firms, clients, or contractors about which BIM file format they require, if they either implicitly or explicitly equate BIM files as RVT files, it is important to understand why that specific file type is needed. In exchanges being made for collaboration in Revit, Autodesk Build, Navisworks, Solibri, etc. or clash detection purposes, the Industry Foundation Classes (IFC) format remains to be the best format for both importing and exporting. Particularly because it is a neutral/nonproprietary format which enables AEC data to be shared with engineers, architects, and construction companies at various points throughout design. Please refer to the BIM Interoperability for Landscape Architecture: IFC exchanges in Vectorworks Landmark guide for more information on exchanging with the IFC format.

The following list are the formats saved or exported by Landmark which Revit will import:

Revit Native Formats:

- RVT (Revit proprietary format)
- RFA (Revit family format)

Other Formats:

- DWG, DXF, and DWF (general CAD formats)
- IFC, SAT, and SKP (3D model formats)
- BMP, JPEG, PNG, and TIFF (image/raster formats)

If the collaborators, clients, or contractors persist with the requirement for receiving an RVT format file from your firm, the following will assist you in providing them with such.

## EXPORTING AN RVT FILE

Unlike the import process, there are no dialog settings to be made for exporting your Vectorworks file to Revit. There are things you can do to prepare your model for exporting to attain the best result. Please also note that there are georeferencing and origin aspects to employ; those will be covered in the georeferencing section.

With Vectorworks Landmark 2021 and later, Vectorworks objects are exported as individual objects. Prior to this, the entire model file exported as a single mesh. As we see in **figure 14**, the exported green roof, as well as other exported items are represented as separate objects. Even separate parts of the green roof installation can be separate, as seen with the extensive planting and the surrounding ballast.

# INTEROPERABILITY WITH REVIT

FIGURE 16: Exported Vectorworks objects represent as separate objects in Revit.

# INTEROPERABILITY WITH REVIT

When choosing or creating 3D geometry with the intent to export for BIM collaboration efforts, it is recommended to consider the "less facets and vertices the better" mantra. For example, in the plant style graphics tab, a plant object can take on a "generated" 3D representation. Of the options displayed in the example for **Figure 17**, the "shell" and "grid" options on the left and middle respectively would each have much lower vertices count than the "volume" option on the right. Thus, giving you a smaller file size.

If the BIM Execution Plan you have with your collaborators requires that the exported objects contain data for each feature, the exports from Vectorworks Landmark version 2021 and later allow for items with IFC tags to carry that data over to their respective Revit objects. **(Figure 18)**

## RECOMMENDED PROCESS

Along with the recommendation of lower facets/vertices count, ensuring that the exported file does not contain non-essential geometry is equally important. This control can be accomplished in Vectorworks by keeping the essential and non-essential items in respective design layers. Design layers containing items the recipient would not expect or want should be turned off within the navigation palette, while the essential items should be in turned on layers.

Though textures on the Vectorworks objects will not export to the RVT or RFA format, colors will. This should be sufficient for expected clash detection and other collaborative file visualizations. This also has implications for the receiving firm's potential intent to transform colors in their models to textures in post modeling rendering software. **(Figure 19)**

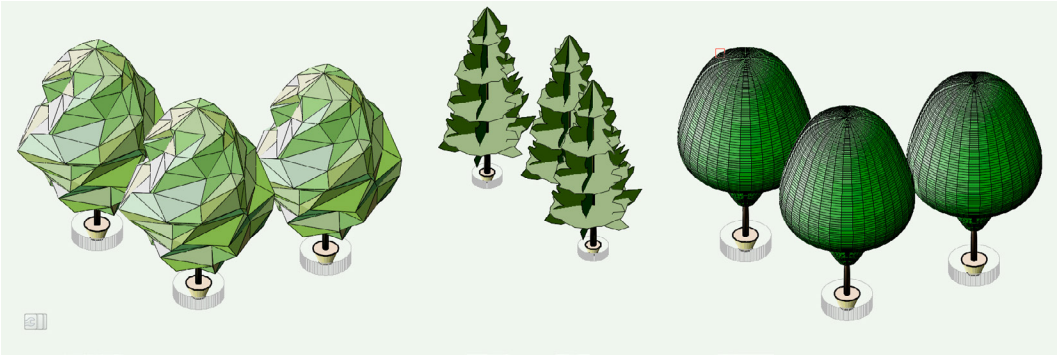

FIGURE 17: Generate 3D Plant Geometry options Shell and Grid contain less vertices than the Volume option.

# INTEROPERABILITY WITH REVIT

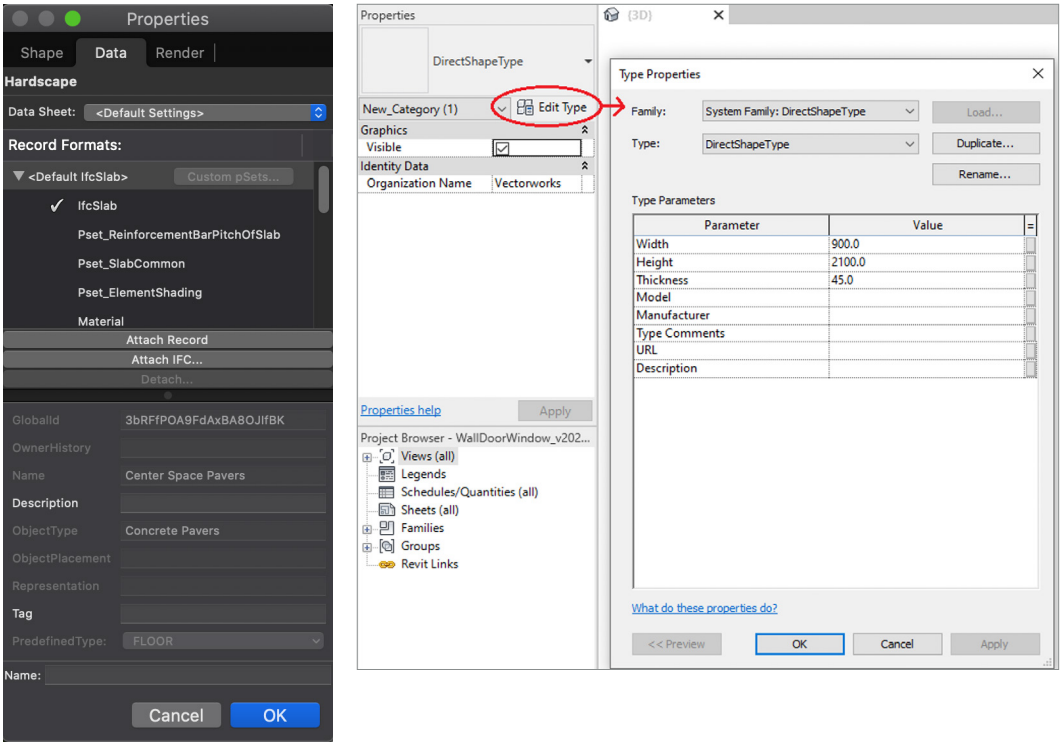


FIGURE 18: IFC data tagging in Vectorworks provides data on objects in Revit.

FIGURE 19: Color on Vectorworks' objects is retained on exported objects in Revit.

# GEOREFERENCING

## ORIGIN COORDINATION

As per Autodesk Knowledge, the Positioning workflow for Revit is to:

- Specify the geographic location.
- Define the Survey Point at a known point in the physical world.
- Rotate True North to define Y axis of Survey.
- Define Project Base Point. (aka PBP)

**Internal Origin** - is equivalent in both Revit and Vectorworks. It is the internal software origin that is used as a reference point for model coordination at import/export between Revit and Vectorworks. It must be equivalent to agreed project origin and must not have any decimals in the coordinates – decimals prevent exact coordination of files. This is what makes the coordination between files on import/export work seamlessly.

**Project Origin** - is the agreed coordinate point in close proximity to the project site. It can be a specific point like a corner of the building, chosen latitude and longitude or a survey grid intersection, but as said above, must be equivalent to the Internal Origin. In a BIM process, it should form part of the spatial definition within project's information standard.

**User Origin (Vectorworks)** - defines the origin point (0,0) of the cartesian (x,y) coordinate system and rulers. Setting the User Origin relative to the Internal Origin ensures real world context of the Vectorworks model.

**Survey Point (Revit)** - defines a known point on the coordinate system. While Vectorworks' User Origin is an origin and thus always (0,0), the Survey Point can be any point on the cartesian coordinate system that defines the rest of the coordinate grid around it. However, they both define the position of the project on the cartesian grid.

**True North** - is the direction along Earth's surface pointing toward geographic North Pole.

**Project North** - is a user defined Y axis relative to the project geometry – for example, the main longitudinal axis of the building.

# GEOREFERENCING

**Rotated Plan (Vectorworks)** - is the way of changing the viewing angle of your project, similar to setting a Project North in Revit. When you rotate Plan, the rotation always occurs through the User Origin, making it in effect the origin of the project coordinate system. This assures that the cartesian coordinates stay true despite viewing the drawing in rotation. You can rely on this grid for defining points within the project.

**Project Base Point (Revit)** - is the origin of the project coordinate system, used to establish a reference for measuring distances and positioning objects within the context of the model. In Vectorworks, User Origin is always the origin of the project coordinate system as well as the cartesian grid, whereas in Revit it is a user defined point, for example a structural grid intersection or a corner of the building.

Fundamentally, Revit deals with origins in the same way as Vectorworks. It abides by the same basic concepts such as Origins and rotations, although the terminology is slightly different, as seen above.

There is a difference, however, in the way orientation to True North and Project North is viewed within the two software. Default approach in Revit, and one typically favored by its users, is to work off of Project North. Whereas Vectorworks, on the other hand, can be operated from either a True North or a Project North approach. It imports using the True North approach.

### LINKING IFC/REVIT FROM VECTORWORKS FILES IN REAL WORLD COORDINATES

As mentioned in the previous section, although fundamentally using the same principles for Origins, Vectorworks projects are typically set up using True North as a priority. This makes sense for landscape projects, while Revit Users are typically using Project North. When a Vectorworks file is exported as an IFC or RVT file, it assumes its real-world coordinates. This is evident if imported to an IFC viewer (tested in Solibri and FZK Viewer). However, be aware that when linking (referencing) the file to Revit, by default, Revit can only import based on Project North -there is no option to import based on real world True North. If project north doesn't coincide with true north in the Revit file, this will then create an error in the alignment of any files based on true north.

There are two options available to overcome this over-rotation.

# GEOREFERENCING

## SOLUTION 1

In Revit, leave Project North rotation unchanged, and instead, after the import of the Vectorworks model into Revit, rotate the referenced objects manually to their correct position, using the internal origin as the center of rotation. This needs to be repeated every time a new link is created, but if merely updating the reference it will not be necessary.

Note: Do not attempt to use Rotate Plan within Vectorworks as a mechanism to achieve Project North, as this creates a secondary co-ordinate system which cannot be interpreted correctly by IFC readers such as Solibri and BIM Vision. However, IFC exports from Rotated Plan view will behave like ones exported from regular non-rotated views when linked in Revit.

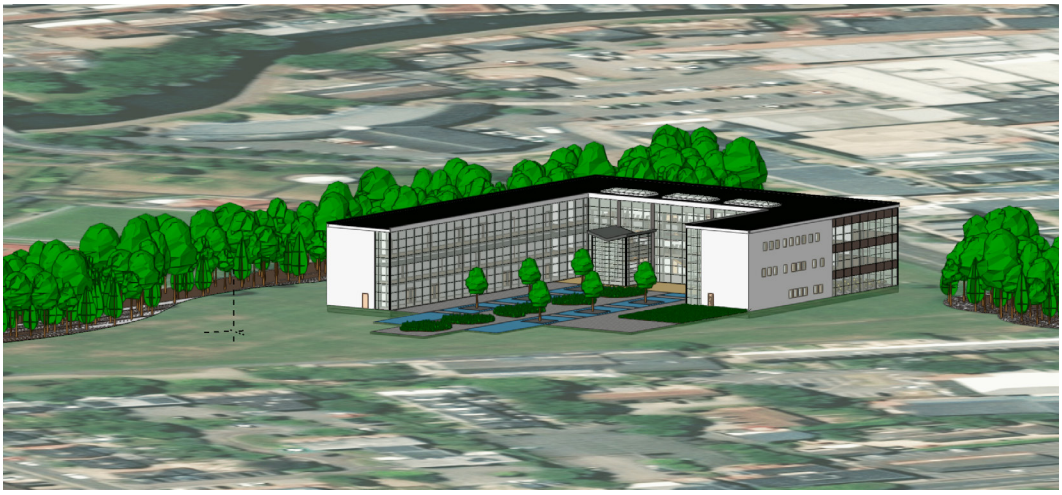

FIGURE 20 & 21: The Revit model is imported to Vectorworks, and the landscape is designed. The file is based on true north.

# GEOREFERENCING

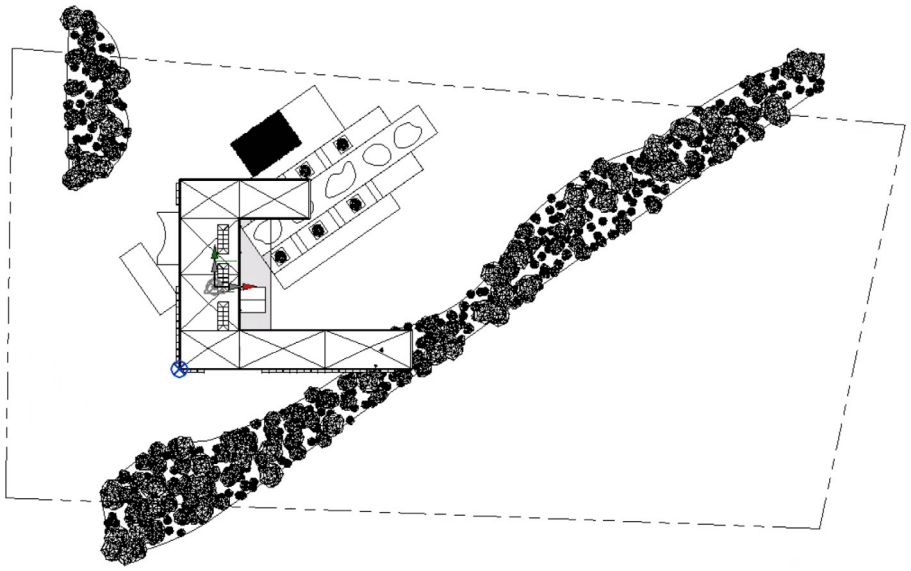

FIGURE 22: The Landscape is referenced into Revit. As Revit is set up with project North, there will be a discrepancy in the rotation between the landscape and the building. However, the internal origins are aligned.

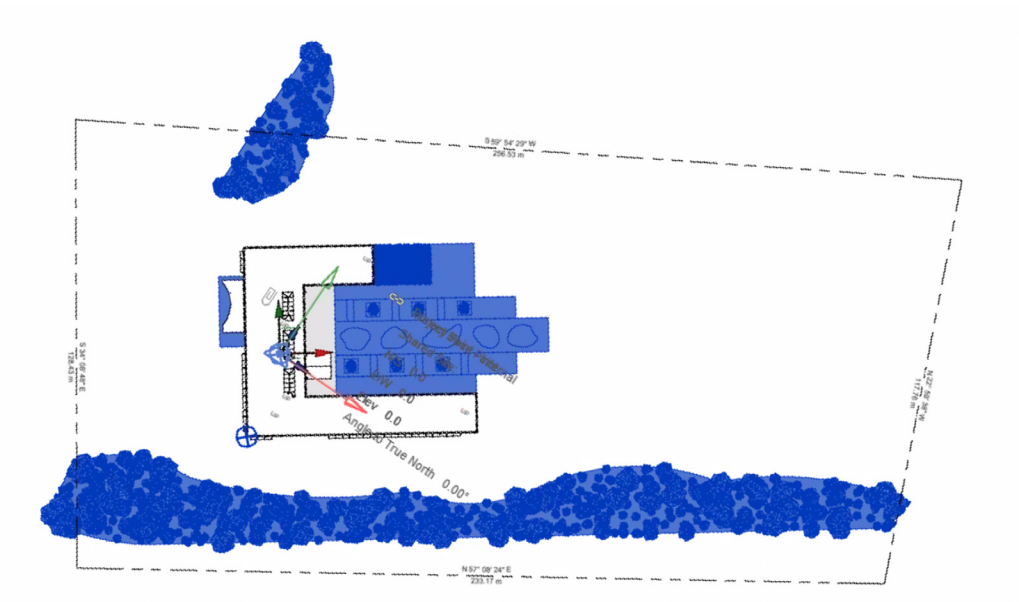


FIGURE 23: The imported landscape is rotated through the internal origin to align with the Revit objects.

# GEOREFERENCING

## SOLUTION 2

This solution requires the PBP and internal origin in Revit to be coincidental.

In Revit, rotate the Project North angle to match the True North orientation before the file from Vectorworks is referenced. The Project Base Point value for Angle to True North should change to 0.00. This will have the effect of changing the orientation of the project on screen from Project North to True North.

After this has been done, the referenced file will come in at the correct rotation. After the import, Project North can be rotated back to align as the user would like. As with solution 1, this needs to be repeated every time a new link is created, but if merely updating the reference, it will not be necessary.

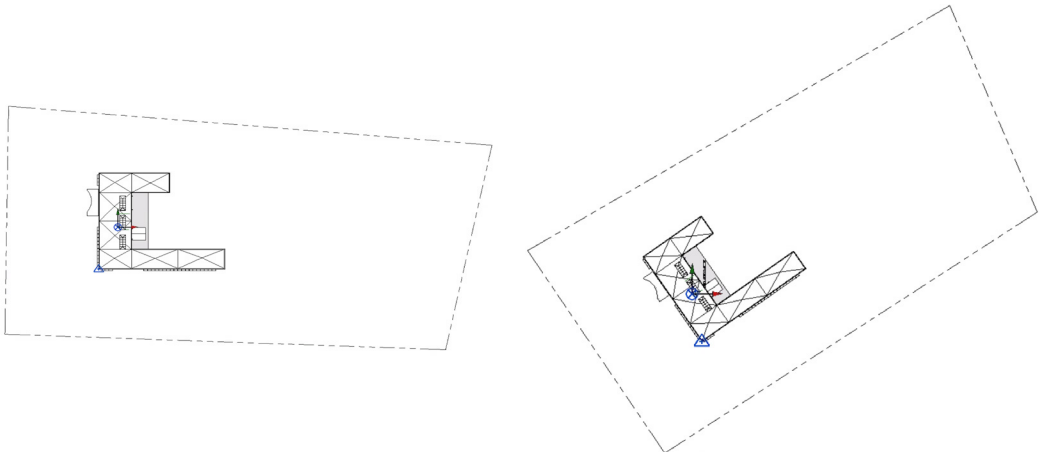

FIGURE 24 & 25: The Project North angle is rotated to match true north orientation.

# GEOREFERENCING

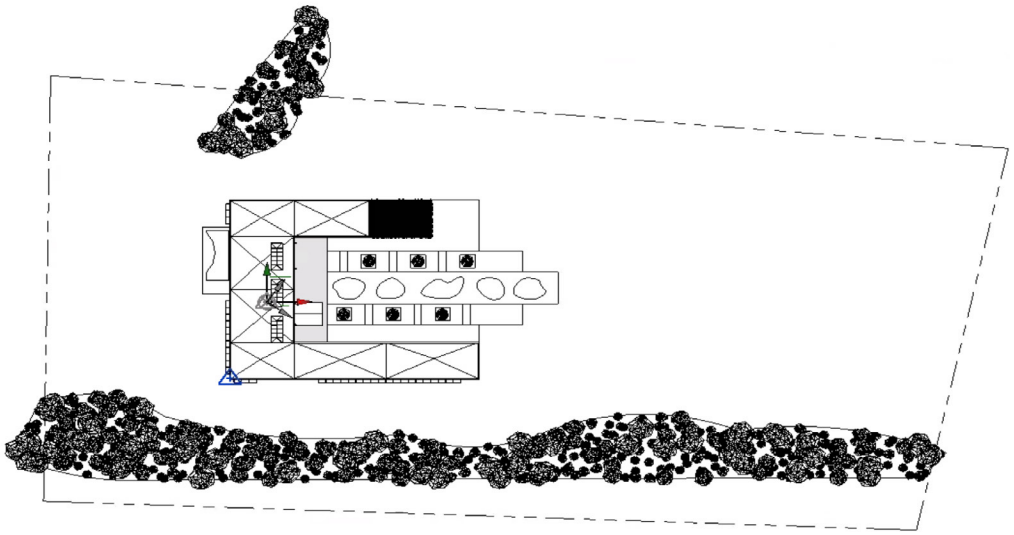

FIGURE 25: The Landscape is imported and will align immediately with the Revit model.

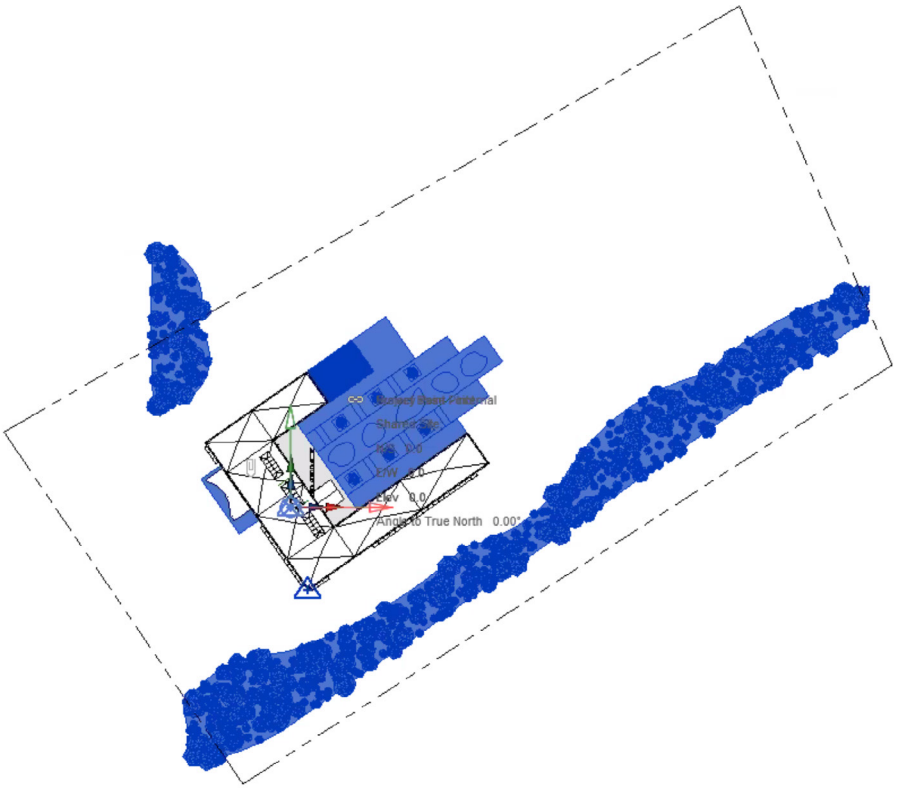


FIGURE 26: Project North is restored to original.

# OTHER RESOURCES AND INFORMATION

## TERMINOLOGY

**BIM Execution Plan (BEP)** – a comprehensive plan which all collaborating design team members create and use to identify file exchange requirements as well as other pertinent details of design product deliverables.

**BIM Implementation Plan (BIP)** – a plan which a design firm creates and uses to implement BIM workflows internally which evolves and refines with each project.

**Industry Foundation Classes (IFC)** – non-proprietary data specification and file format developed and expanded by buildingSMART international.

**Internal Origin** – The center of a new Vectorworks drawing which has fixed coordinates of (0,0). Initially, the Internal Origin and User Origin are coincident at 0,0.

**Mesh Objects** – comprised by a series of connected vertices, edges, and faces that define the shape of a 3D object. Meshes often result when importing 3D objects from other formats, such as OBJ, RVT, SketchUp, and 3ds, and they can be used to represent things as widely varied as an entire site model or a small decorative object.

**Open Design Alliance (ODA)** – a nonprofit organization which develops software development toolkits (SDK) for CAD and BIM interoperability through open standards.

**RFA (Revit family format)** – a 3D modeled object, or collection of 3D modeled objects which represent a built/manufactured entity in Autodesk's Revit.

**RVT (Revit proprietary format)** – a file format produced natively by Autodesk's Revit application.

**Solid Objects** - include extrudes (regular, tapered, multiple, and along path), sweeps, shells, fillets, chamfers, solid primitives (spheres, cones, etc.), solid additions/subtractions, and others. Solid objects contain a volume. Several tools and commands, primarily in the 3D Modeling tool set and in the Modify and Model menus, can create and reshape solids.

**Survey Point** - provides a real-world context for the Revit model. It represents a known point in the physical world, such as a geodetic survey marker or the intersection of 2 property lines. In a Revit model, the survey point defines a reference point for the survey coordinate system.

# OTHER RESOURCES AND INFORMATION

**User Origin** - drawing coordinates in Vectorworks display relative to the user origin. Initially, the User Origin and Internal Origin are coincident at 0,0. The User Origin can be moved and set relative to the Internal Origin. In a file which is georeferenced, the User Origin must be aligned with the georeferencing of the file.

**Project Base Point** - The project base point can be used to establish a reference for measuring distances and positioning objects in relation to the model. It identifies the origin (0,0,0) of the project coordinate system.

## LEARN MORE

BIM Interoperability for Landscape Architecture: IFC Exchanges in Vectorworks Landmark

Collaborative Design Tools for Landscape Architects (webinar)

Moving to Bim for Landscape: What You Need to Know (webinar)

Revit Interoperability Videos (You Tube links)

Strategic Planning Guide for Adopting BIM

Transitioning to Information Modeling Workflows (webinar)

When it Has to Be BIM (webinar)

# LEARN MORE

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