

AS501209

Revit 2021-'23: The Hits Keep Coming!

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Learning Objectives

- Discover the new features appearing in the past few releases of Revit.
- Discover the key themes driving Revit software's recent product development efforts.
- Determine which new Revit features and workflows will best impact your own firms.
- See the connections between customer feedback (Revit Ideas) and investment by Autodesk.

Description

Design professionals have access to an ever-expanding set of capabilities in Revit software. Staying on top of these improvements can be a challenge—especially when we've all been apart for so long! In this session, we'll catch you up on the most important features and workflow enhancements included in Revit throughout the past couple of years. Revit 2021 introduced Generative Design in Revit, along with features like real-time realistic views and slanted walls. Electrical enhancements arrived, PDFs and raster images became linkable, a bunch of concrete (rebar) and steel (connections) features were introduced, and more. Revit 2022 was a mammoth release, with more than 80 new features covering the key themes of design productivity, documentation efficiency, and interoperability—as well as some API love for developers. Now, Revit 2023 is here. Join us LIVE at Autodesk University to see how these releases complement each other... "the hits keep on coming!"

Speakers



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Sr. Mgr., AEC Technical Marketing, Autodesk, Inc.

Aaron leads a global team of technical marketing managers at Autodesk in the development of compelling storytelling assets for the AEC industry. He's a broadly-experienced AEC industry professional, has led BIM transitions in two previous firms, and has spent more than ten years providing technical sales and training services to AEC firms.



Cesar Escalante, AIA, CCCA, LEED AP BD+C, CM-BIM
Technical Marketing Manager, Architecture, Autodesk, Inc.

Cesar creates and evangelizes compelling content on new and emerging technologies in architecture to colleagues, channel partners, and Autodesk customers around the world. He has deep industry expertise at large international firms, founded the San Francisco Computational Design Institute, and is a frequent speaker and teacher on topics related to technology in architectural practice.

Introduction

Design professionals have access to an ever-expanding set of capabilities in Autodesk Revit. Staying on top of these improvements can be a challenge—especially when we’ve all been apart for so long!

In this session, we’ll catch you up on the most important features and workflow enhancements included in Revit over the past couple of years.

Revit 2021 debuted Generative Design in Revit—bringing the scale, speed, and precision of algorithmic problem-solving to the design decision-making process. This was largely targeted at architects in its initial release, along with features like real-time realistic views and slanted walls. Meanwhile, a number of MEP enhancements—especially electrical—found their way into the release, PDFs and raster images were now linkable, a bunch of concrete (rebar) and steel (connections) features arrived, and much more. Revit 2021.1 took this a step further, improving interoperability with Autodesk InfraWorks, FormIt Pro, and various third-party file formats, adding new Generative Design sample studies, and improving both the installation experience and product performance.

Revit 2022 was a mammoth release, with over 80 new features covering the key themes of design productivity, documentation efficiency, and interoperability...as well as some API love for developers. This release was the first to be certified by buildingSMART International for IFC4 architecture and structure reference views, and it offered IFC4 export out of the box. Native 2D PDF export was added. Early-stage design was a focus, from linking Rhino files to the introduction of a completely new round-trip workflow between FormIt Pro and Revit. Inventor assemblies could now be linked as Revit families. Many documentation enhancements rolled out, directly addressing over 8,000 votes on Revit Ideas with improvements to schedules, annotations, tags, revisions, grids, and more. Tapered wall support was added, and slanted walls were further enhanced. Detailed load and sizing reports for HVAC systems were now visible directly in Revit. Rebar enhancements continued to roll out. Then Revit 2022.1 came on the scene, and the work continued. We could now duplicate sheets, snap to the midpoint between any two points, find elements in the Project Browser, and many other small enhancements.

Now, Revit 2023 will be stepping up to the plate. We’re excited to share the latest and greatest that Revit has to offer. Join us on this whirlwind adventure in revisiting the highlights of Revit 2021 and 2022 and exploring the new features in Revit 2023!

LET’S GET STARTED...

By the Numbers

If you've not yet implemented Revit 2021-'23, you've missed a lot! We're talking about...

5 releases

Revit 2021, Revit 2021.1, Revit 2022, Revit 2022.1, and Revit 2023

240+ features added or enhanced

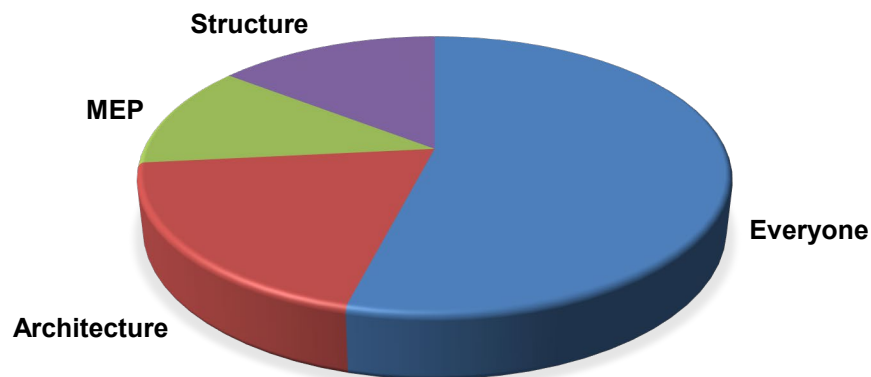
Including 70 user-requested features representing more than 12,000 votes on Revit Ideas

1,000+ issues addressed

Fixing, updating, and improving stuff you might not have even known about

There's just too much content to walk through every feature and enhancement, so we're going to break them down in a couple of different ways. First, we'll cover industry-specific highlights for architecture, MEP, and structure. Then, we'll take the rest of the features—collectively referred to as “platform”—and break them down into categories, e.g. “design productivity”, “documentation efficiency”, and so on.

Features by Industry



Top Features for Architecture

Generative Design (Revit 2021+)

Generative design is a design exploration process to quickly generate and evaluate high-performing design alternatives. Until now, many generative design tools have been hard to use because they required our customers to know how to code, understand special terminology, or know how genetic algorithms work.

Starting with Revit 2021, you can use generative design directly in Revit to quickly generate design alternatives based on your goals, constraints, and inputs. Generative Design provides a set of sample study types to demonstrate how this tool can be used to generate outcomes for design challenges.

You can easily run one of the predefined studies or “recipes” with Generative Design in Revit, such as Workspace Layout or massing.

- Create and explore generative studies directly in Revit
 - Generate design options
 - Filter and rank results
 - Explore outcomes
 - Evaluate goals
 - Create Revit elements
- Sample studies included



Quickly evaluate design options
and save time with automation

Let's suppose you want to determine the best arrangement of desks in a large room. Your goals are to maximize the number of desks while also maximizing views to the outside. You may also want to minimize the distance from each desk to the nearest exit. After Generative Design has completed a study, you can explore the design alternatives to find the solution that best meets your needs. For each outcome, the parallel coordinates chart highlights its input and output values. You can also use this chart to filter and prioritize outcomes by simply clicking and dragging over one or more of the columns. Another way to review and analyze outcomes is through a scatterplot. You can use this chart's options to change the criteria used for the X and Y axes and format the outcome values. Once you've selected the outcome you'd like to implement in your model, simply select that outcome and click Create Revit Elements. The design change will appear in the model immediately.

There are two other studies or “recipes” ready to be used:

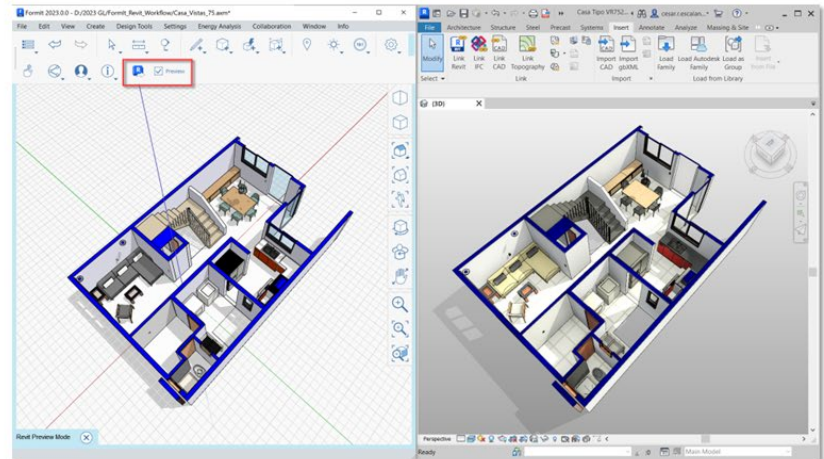
- *Maximize Window Views* – you may use this sample study type with Generative Design to generate alternatives to determine the best position in a room for optimal views to the outside.
- *Three Box Massing* – to generate alternatives for three adjacent buildings (as simple masses) to maximize floor area while minimizing surface area.

Bottom line: Start using Generative Design in Revit today to quickly evaluate design options and save time with automation.

FormIt Pro interoperability (Revit 2023+)

Revit 2023 and FormIt Pro 2023 introduced expanded features for interoperability, making it even easier to iterate on early-stage designs.

- Updated 3D Sketch workflow
- Send to Revit as a CAD link
- Send to Revit Preview Mode in FormIt Pro



Iterate on conceptual designs faster
with FormIt Pro and Revit

FormIt 3D Sketch linking workflow – The 3D Sketch feature, first introduced in Revit 2022, enables you to launch a FormIt session from Revit, translate Revit elements as context geometry into FormIt, and import any new FormIt design study back to Revit using the Send to Revit command. In Revit 2023, this FormIt geometry is brought into Revit as a linked file instead of a CAD import, streamlining your roundtrip workflow.

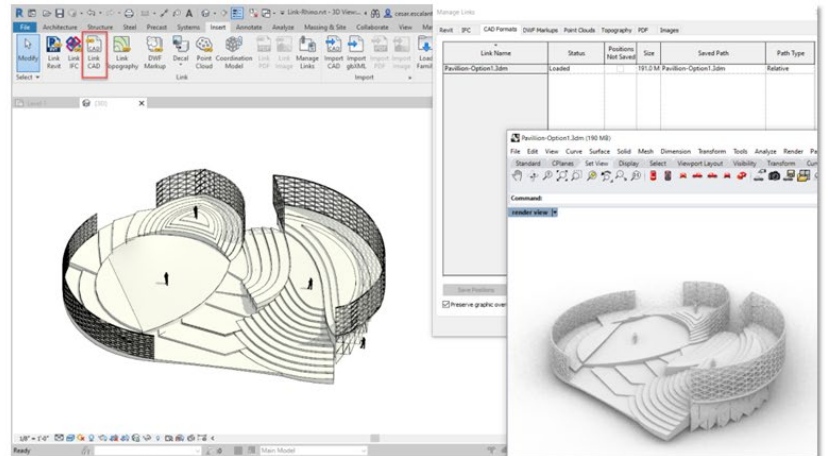
Send to Revit Preview Mode – Enable the Preview Mode setting in FormIt and select those layers that will transfer to Revit. A blue frame at the view boundaries will highlight the geometry to be sent. Once you have verified your selections, use the Send to Revit command to update the linked model in Revit—or save the FormIt file and reload it in the Revit Link dialog.

Bottom line: Experience an improved iterative design workflow on your projects with these interoperability enhancements in Revit 2023 and FormIt Pro 2023.

Link Rhinoceros® (3DM) files (Revit 2022+)

Revit 2022 enabled linking of files from McNeel Rhinoceros. Changes to the Rhino file are immediately updated in Revit by reloading the link or reopening the project.

- Link 3DM files as a CAD format under Manage Links
- Rhino layers are preserved and controlled via Visibility/Graphics Overrides
- Snap to linked geometry in projection views



Accelerate conceptual documentation workflows with linked Rhino files

Host and link your conceptual Rhino file in Autodesk Docs and ensure all stakeholders have access to the latest and greatest design information.

Bottom line: Link Rhino files directly to Revit to accelerate your project documentation.

Real-time realistic views (Revit 2021)

Work directly in better, easier, and faster live rendered views, starting with Revit 2021. This feature replaced Realistic views available in past releases. Experience over 10x faster performance and automatic exposure control.

This mode is available in all types of views and allows direct editing of the model with rendered materials and lights. Walk through a finished model, design and modify your building with realistic lighting and materials while you work, or place views with materials and lighting onto sheets.

- More than 10x improvement in performance – much faster and smoother view navigation
- More convincing material and lighting appearance
- Automatic lighting exposure control
- Replaces previous realistic mode

Work directly in better, easier, and faster realistic views



Note: A graphics card with at least 4GB of memory is recommended.

Bottom line: Work directly in better, easier, and faster realistic views, starting in Revit 2021.

Tapered walls (Revit 2022+)

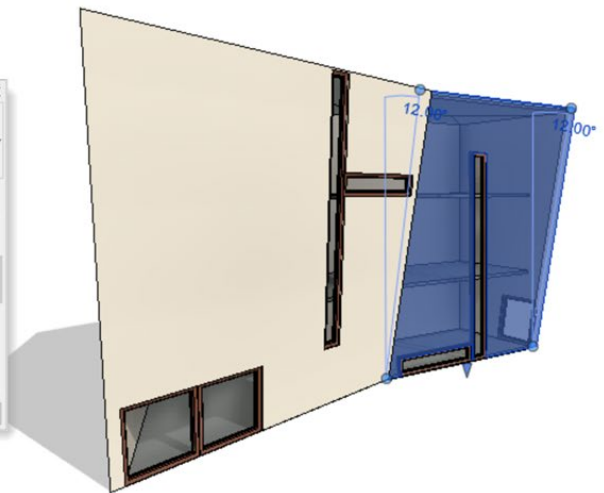
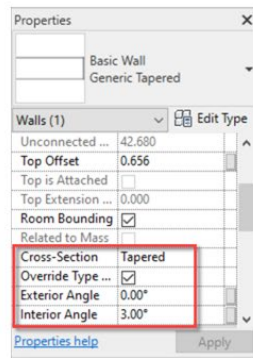
Revit 2022 introduced tapered walls.

Change any wall to a tapered representation by changing its cross-section parameter to 'tapered.' Update the sloping angles using instance overrides or the wall's temporary dimensions.

Align wall-hosted components to the sloped interior or exterior faces of the wall. Tapered walls will display clean joins at corner conditions.

Modify the sketch boundaries of a slanted wall along its work plane. This gives you greater control over the display of your wall geometry.

- Specify sloping angles for interior and exterior surfaces
- Override type slope properties at the instance level



Improved wall modeling in Revit

Bottom line: Enjoy improved wall modeling with tapered and slanted wall enhancements.

Route analysis tools (Revit 2022+)

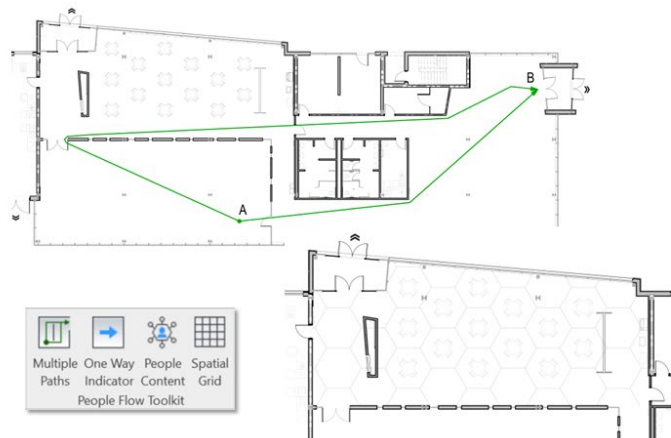
In Revit 2022, the People Flow Toolkit technology preview was incorporated into Revit.

Four new tools are provided under Route Analysis tab so that customers can automate, visualize, and analyze the routes within a model to understand the impacts of physical distancing within the context of a design project:

- Generate multiple paths of travel options between point with the ability to summarize them in a schedule;
- Indicate the direction of travel with One-Way Indicator family; this indicator of the annotation category can be nested within door families if needed;
- Place people content to represent occupants with built-in buffers. These buffers are recognized as clearances during route analysis; and
- Overlay a spatial grid in rooms to visually aid in distributing elements to meet prescribed physical separation requirements.

Control the four new tools visibility through Option>User Interface>Route analysis tools.

- Visualize the multiple ways occupants move in space
- Use one-way indicators to restrict the direction of a path
- Place elements with built-in clearances
- Overlay spatial grids in rooms to aid with element distribution with physical distance requirements



Automate distance and physical separation requirements in route analysis

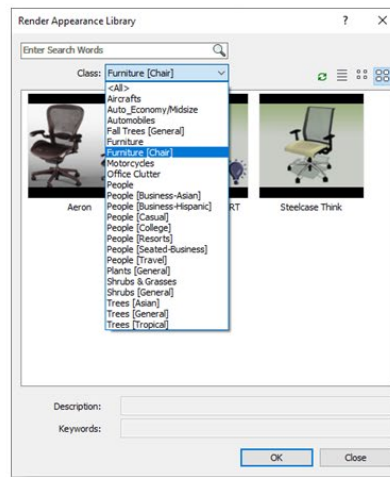
Bottom line: Automate distance and physical separation requirements using route analysis features added in Revit 2022.

RPC enhancements (Revit 2022)

Revit now supports the new RPC 2.0 file format, which displays complex, high-resolution geometries, physical-based materials and lighting, and more intelligent ways to control the asset parameters.

Experience the improved performance of realistic views with options to switch off all RPCs in the model and/or display the orientation in 'Billboard' mode towards the camera.

- RPCs in realistic views
 - Display complex geometries, physical-based materials and lighting
 - 'Billboard' mode orients RPCs towards the camera
- Use RPC for furniture category
- Expanded RCP asset library



Create better photorealistic renderings with RPC enhancements

Additional features include a simplified representation of RPCs in non-rendered views; support for the furniture category in the family editor; and an expanded library of rendering assets, including people, transportation, and furniture.

Bottom line: Create better photorealistic renderings with the RPC enhancements introduced in Revit 2022.

IFC4 certifications (Revit 2022+)

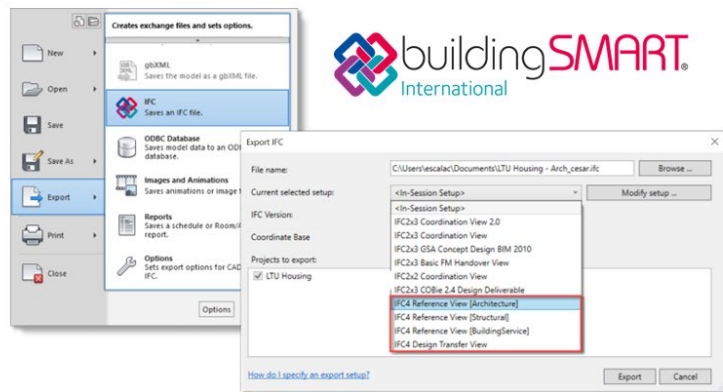
With Revit 2022, Revit achieved IFC4 Reference View certification for architecture and structure exports.

IFC property set definitions and the associated Revit shared parameter definitions have been updated with the latest IFC4 PSDs of version 4.0.2.2 (partial update from the scope of IFC4 RV1.2 MVD).

Significant performance improvements have also been realized when linking in IFC files containing elements with many parameters.

The ability for IfcExporter to pick up information from SiteLocation regarding the GeoCoordinateReference in EPSG code format was also added, as required by IFC.

- Achieved IFC4 export certifications for Architecture and Structural Reference Views
- Improved the IFC4 export UI to provide better support for the IFC4 Geographic Coordinate Reference Information



Improved interoperability workflows
with updated IFC4 certifications

Bottom line: With Revit 2022, Autodesk became the first software vendor to support IFC4 exports for both architecture and structure.

Preserve values in key schedules (Revit 2023)

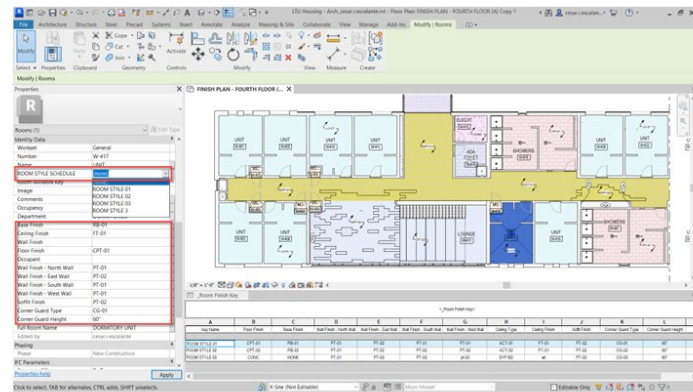
Key schedules provide a way to quickly add information to Rooms and Areas by adding the instance values from a key.

In previous versions of Revit, the Room and Areas parameter values cleared empty when a key was set to 'none'.

In Revit 2023, if a key is unassigned from an element, the last values assigned to the element are maintained.

Instance values are free from the key constraint and can be modified as needed.

- Automate Room and Area information
- Maintain values when the key is set to 'none'
- Values can be modified as needed



Better control over Room and Area information

Bottom line: Better control Room and Areas information and increase your documentation efficiency.

Architecture, continued...

Other features introduced specifically (or at least primarily) for architects in Revit 2021-'23 appear in the list below:

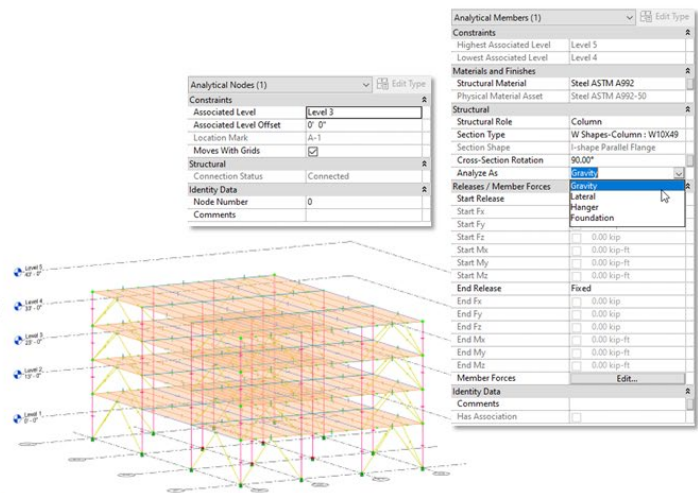
- Slanted walls (21)
- Revit to Inventor linking (21)
- Sun and shadow refinements (21)
- New sample studies for GDtR (21.1)
- FormIt Converter in Revit enhancements (21.1)
- SketchUp 2020 files import (21.1)
- Edit wall profile for slanted walls (22)
- GDtR - new sample study types (22)
- GDtR - save default settings (22)
- GDtR - drop-down inputs (22)
- GDtR - constant and variable inputs (22)
- GDtR - manage study type folders (22)
- Dynamo for Revit 2.10 (22)
- Spatial grids for documenting layouts (22)
- Place people as obstacles (22)
- One-way indicators for path of travel (22)
- 3D Sketch and Send to Revit with FormIt Pro (22)
- Import FormIt as a CAD format (22)
- Nameable reference geometry (22)
- Persistent tags for DirectShapes (22)
- Tag curtain wall mullions (22)
- Show wall core only in plan views (22)
- Improved default color fill scheme (22)
- Color fill API (22)
- Generative Design in Revit updates (22.1)
- OBJ and STL file format support (22.1)
- Import and link Rhino 7 and SketchUp 2021 (22.1)
- IFC ODA toolkit update (22.1)
- Revit levels in FormIt (22.1)
- Interactive solar studies (23)
- FormIt Pro in Link CAD Formats (23)
- Enhanced mesh capabilities (23)
- DirectShape import placement (23)
- UI improvements for GDtR and Dynamo Player (23)
- New input types for GDtR and Dynamo Player (23)
- New method names for GDtR (23)
- Floor folding lines and split lines (23)
- Contour label direction (23)

Top Features for Structure

New structural analysis approach (Revit 2023)

The analytical model is now completely autonomous, enabling you to initiate structural analysis workflows from Revit without any physical context.

- Create a structural analytical model in Revit without physical geometry
- Model fully parametric analytical elements
- Associate analytical model with grids and levels to control element positioning through datums
- Document analytical model data



Engineering driven, analysis-centric
Revit workflows

For example, when starting a project from scratch, you can focus exclusively on analytical modeling—just like you would in traditional analysis software.

In Revit, analytical elements are fully parametric and are associated with grids and levels, enabling you to control element positioning using these datums.

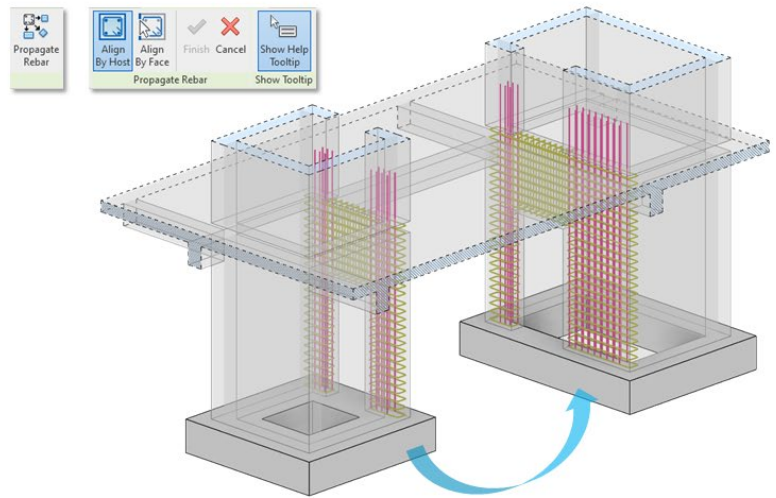
Bottom line: This new capability enables engineering driven, analysis-centric workflows directly from Revit.

Adaptive propagation for rebar (Revit 2023)

Revit 2023 introduces adaptive propagation features for rebar to increase your productivity in detailing concrete structures.

When you are working on a design that has similar concrete elements, you can quickly and accurately copy shape driven rebar from one concrete host to another. These concrete host elements need not be identical for the newly created bars to match their new host. That's the power of adaptive propagation.

- Applicable for shape driven and free form rebars
- Copy all rebars selecting their host or individual bars
- Propagate rebar by host or by face
- Concrete host elements need not be identical for the newly created bars to match their new host



Model rebars faster and easier

To use this feature, simply select a concrete element that hosts rebar and click the Propagate Rebar command. Next, choose the alignment method—by host or by face.

The rebars are aligned based on the original and destination faces. A destination face can be selected from the same host or from another element in any Revit category that can host rebar.

Moreover, you can copy individual bars by making a rebar selection. Simply select one or more rebars in a host and propagate them aligned to a face in the same host or in a similar concrete element.

You can also switch between alignment modes when you have already selected a specific face or a host, making it easy for you to control the placement of newly created rebars.

When modeling complex structures such as civil infrastructure or curved buildings, you might use free form rebars instead of shape driven rebars. Free form rebars may be placed in virtually any concrete host.

The new adaptive propagation features work for free form rebars, too. Free form rebars can be propagated in a similar fashion to shape driven rebars. Free form bars can be aligned to a destination host or face.

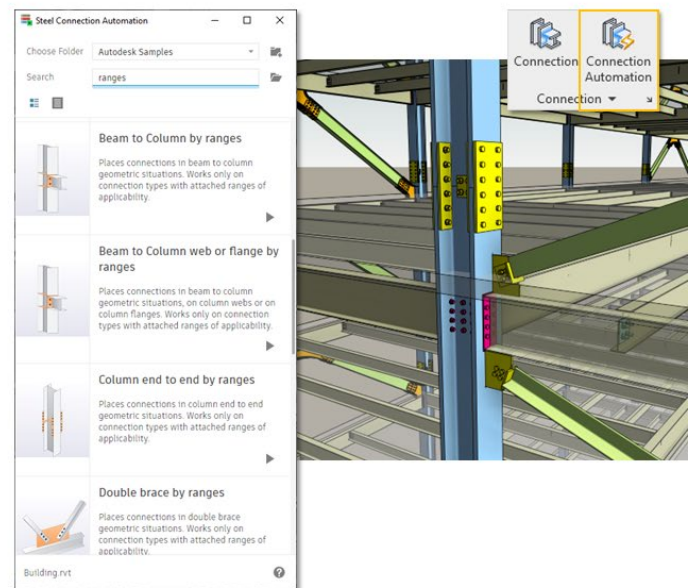
Bottom line: These new features will enable you to model rebars in Revit faster and easier, increasing your productivity in detailing concrete structures.

Connection automation libraries (Revit 2023)

Revit 2023 adds library-based steel connection design automation features. You can both model your design intent faster and embed structural engineering and fabrication rules to reduce iterations. Sample rules are provided for placing steel connections based on predefined ranges of applicability. These are found in the Steel Connection Automation player. Simply search for “by ranges” to filter out those that make use of the ranges of applicability.

- Model design intent with connections more quickly and accurately
- Perform cost estimation earlier
- Reduce iterations using design and fabrication rules
- Automatically apply logic based on international standards
- Expand predefined libraries to create your own

Design steel structures more quickly and accurately



An important fact to remember is that all structural members can leverage information stored inside analytical elements. You may use the Member End Forces dialog to specify internal forces and moments for steel connections. Your model can also use structural analysis results imported into Revit from Robot Structural Analysis Professional or third-party tools.

Rules for each type of steel connection are used to place them based on relevant criteria such as profile sizes, steel grades and capable internal forces. These rules work in tandem with predefined libraries of connections (Revit files) containing the connection types, desired geometry parameters, and associated ranges of applicability to ensure connections are selected appropriately.

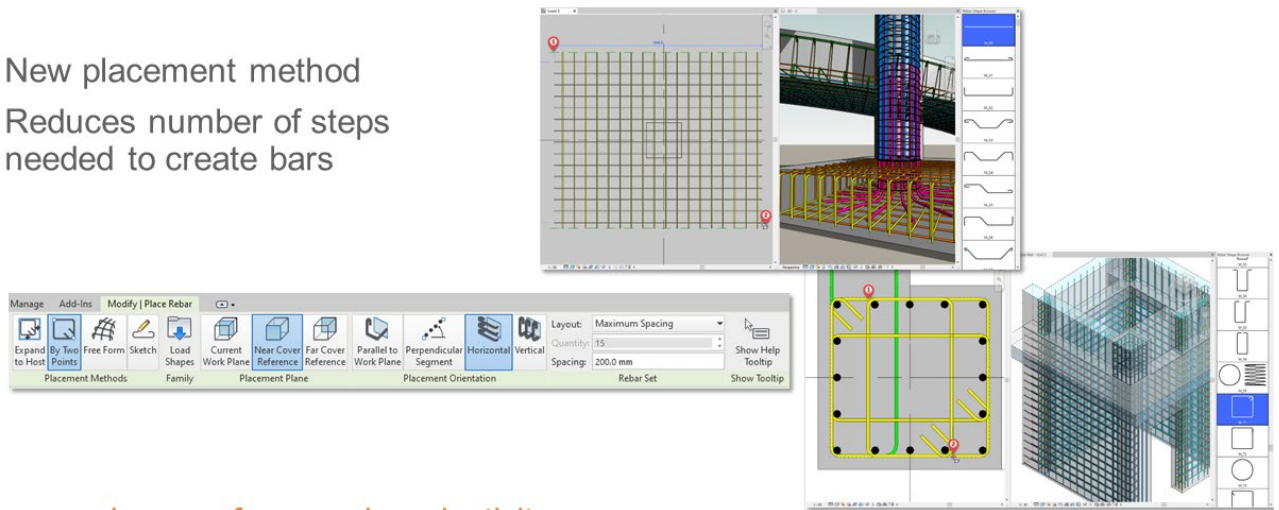
Revit 2023 includes sample steel connection libraries to support certain regional standards. These connection libraries are customizable, enabling you to adjust and extend them to meet your local or regional requirements.

Bottom line: The new library-based steel connection design automation features enable you to design steel structures more quickly and accurately using predefined and easily customized rules.

Rebar placement by two points (Revit 2022)

Starting in Revit 2022, you can place rebars of exact dimensions—aligned to any reference in the project—with just 2 clicks. This reduces the number of steps needed to create bars accurately and precisely.

- New placement method
- Reduces number of steps needed to create bars



Improved ease of use and productivity
in modeling reinforced concrete

This feature is huge for rebar modeling, and it is a real game-changer for rebar detailers working in Revit.

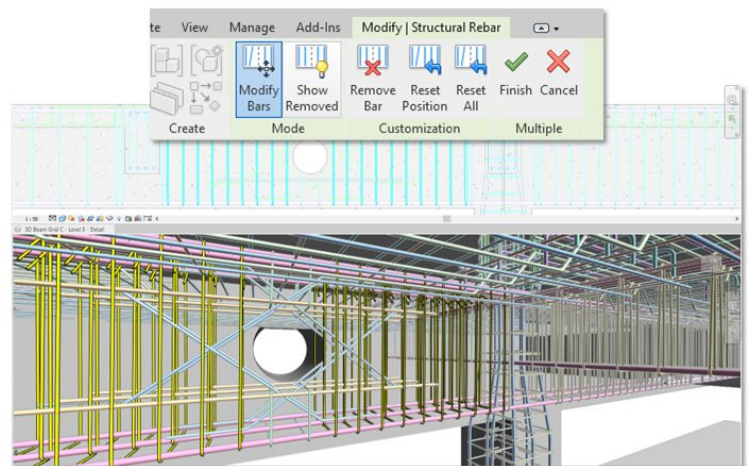
Bottom line: This new method of placing rebar improves Revit's ease of use and your productivity in modeling reinforced concrete details, both cast-in-place and precast.

Move rebar in a set (Revit 2022)

Revit 2022 improved rebar modeling and detailing for structural engineers and detailers, making it easier for these professionals to move from disconnected CAD workflows to BIM, and enabling them to model and detail faster and more accurately.

Structural engineers and detailers can now move or remove individual bars in rebar sets or area and path reinforcement systems to avoid clashes with other rebars, openings or other elements—while maintaining the logic of the rebar set or system.

- Move or remove individual bars in rebar sets or area and path reinforcement systems
- Maintain the logic of the rebar set or system
- Edit multiple sets or systems at the same time



Improved user efficiency in modeling accurate concrete reinforcement

There is no need to split a set into multiple sets or to remove path and area reinforcement systems—workflows that were complex and time-consuming.

Multiple sets or systems can be edited at the same time.

Bottom line: This new feature significantly improved user efficiency and productivity in modeling accurate reinforcement in cast-in-place and precast concrete structures.

Ranges of applicability (Revit 2022)

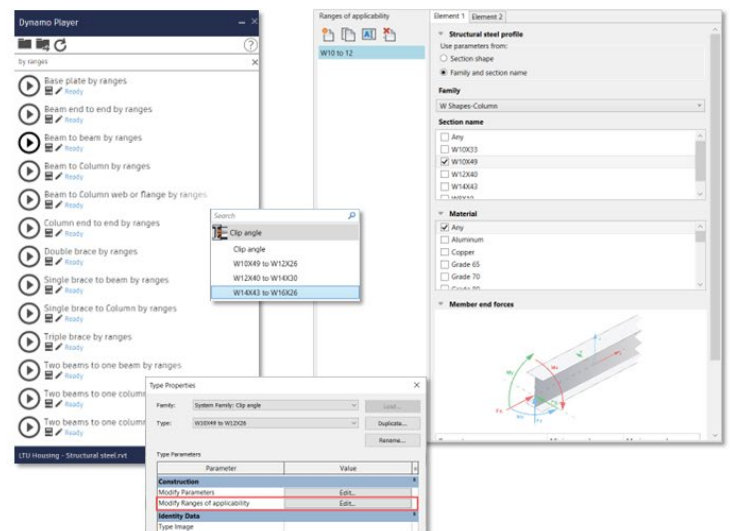
Starting in Revit 2022, structural engineers can automate the placement of steel connections following custom sizing rules by predefining connection libraries and associating connection types with profile size ranges applicable to them.

The first step is for you to create a library of steel connections. In this library, you can add a variety of connection types and specify ranges where they will be applicable. These ranges of applicability can be based on your local practices and standards, and they are intended to help you save time when placing simple steel connections.

Once you have configured your library, you can open your Revit project and begin using your predefined rules with Dynamo Player to place steel connections automatically.

- Associate steel connections with profile sizes
- Create a library of steel connections with predefined ranges of applicability
- Use Dynamo Player to create the steel connections
- Correct types are inserted in accordance with the ranges of applicability

Place steel connections using predefined ranges of applicability



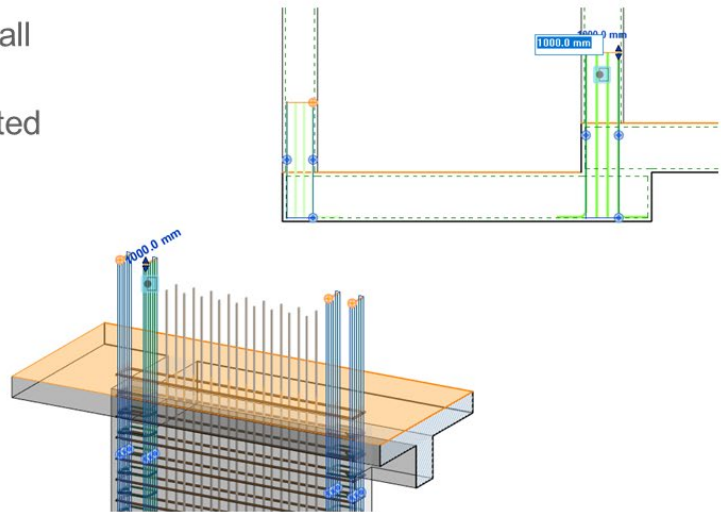
Single-plate connections, shear end plate connections, clip angles, base plates, column splices and many other connections that are typically predesigned and standardized can be placed faster and more accurately using this approach.

Bottom line: Revit 2022 helped structural engineers place steel connections quickly and accurately using automated tools and predefined ranges of applicability for profile sizes.

Edit multiple rebar sets (Revit 2022.1)

Revit 2022.1 improved rebar modeling and detailing for structural engineers and detailers, making it easier for you to move from disconnected CAD workflows to BIM, and enabling you to model and detail faster and more accurately.

- Change the constraint target for all selected handles
- Rebars no longer need to be edited individually
- Override options for the corresponding bar handles



Model and detail rebar sets in
Revit more efficiently

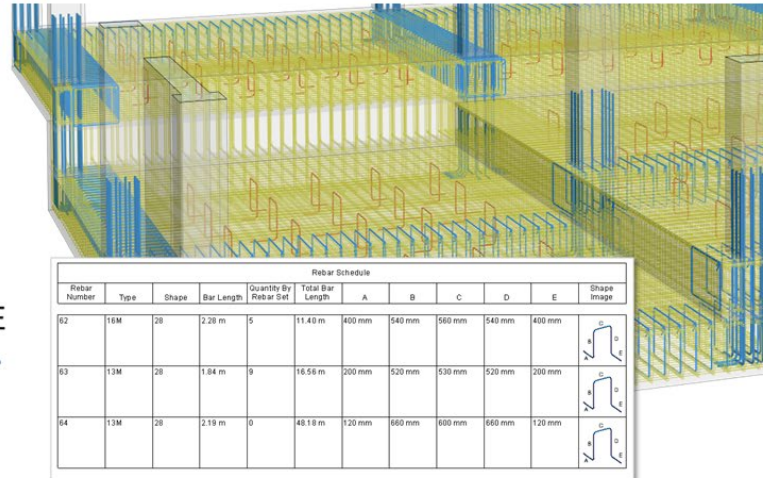
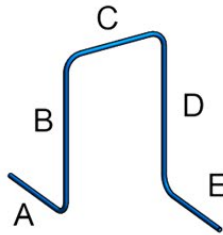
You can edit the rebar constraints to adjust the bar lengths or distances to the concrete faces of multiple rebar sets at the same time.

Bottom line: This new functionality speeds up design intent for similar reinforcement patterns and improves your rebar detailing productivity.

Create standard 3D rebar shapes (Revit 2021+)

Reinforcing bar assemblies, known as standees, are normally required for the support of top mats of reinforcing bars in thick concrete members, such as footings and slabs. These standees have a 3D rebar shape.

- Enable shape codes completeness
- Extract bending instructions
- Full fabrication instructions



Introduce new, intelligent
3D rebar shapes

Starting in Revit 2021, you can define such 3D rebar shapes by rotating the hooks at the ends of the bars and directly inputting the hook lengths for each rebar instance.

Hook rotation is considered when defining a rebar shape, if included in the rebar shape definition. Rebar numbering considers hook rotation along with the other segment length parameters.

You can also change hook lengths quickly for each bar in the project; this is accomplished by selecting the "Override Hook Lengths" option in the Properties Palette and inputting the new length in the respective rebar shape parameter field. This is applicable for any rebar with hooks and requires that the hook lengths be assigned to a rebar shape parameter.

You can also use rebar shapes with 3D hooks inside path reinforcement to distribute rebar standees in your structural project.

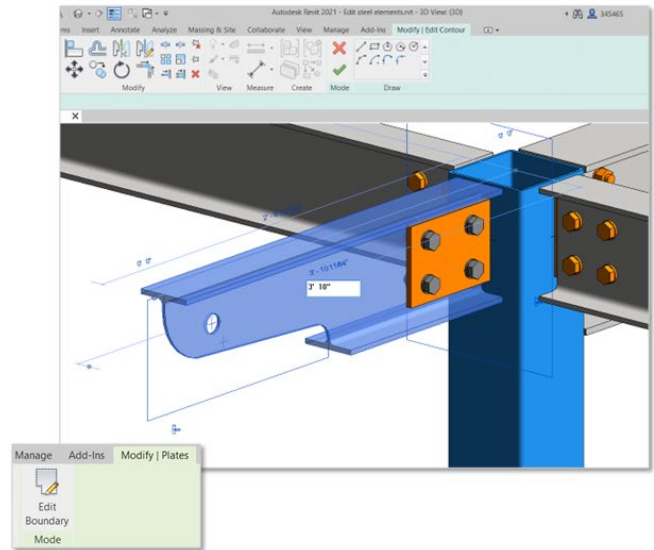
Bottom line: Thanks to this new functionality, structural engineers and detailers can now model standardized 3D rebar shapes, extract bending instructions, and provide full fabrication data for rebar.

Steel object editing enhancements (Revit 2021)

In Revit 2021, steel detailing capabilities were extended to allow more flexibility when modifying steel elements or connections.

- Edit Boundary or Edit Pattern button
- Editable steel objects:
 - Steel plates
 - Contour cuts on beams / plates
 - Bolts / anchors / shear stud patterns
- Use the editing tools to:
 - Adjust the sketch
 - Stretch a plate
 - Specify the circular opening diameter

Easily create and modify steel component shapes



To change the shape of a plate, simply select it, press the “Edit boundary” button, and stretch one of the plate’s edges to the desired location.

To edit simple and complex cuts easily, simply select the desired cut using the TAB key, press the “Edit boundary” button, and choose from several options to change the shape of the cut or add, for example, a radius to one of its corners.

The size of circular openings can now be adjusted in a similar fashion. Select the opening, press the “Edit boundary” button, and enter the desired diameter value.

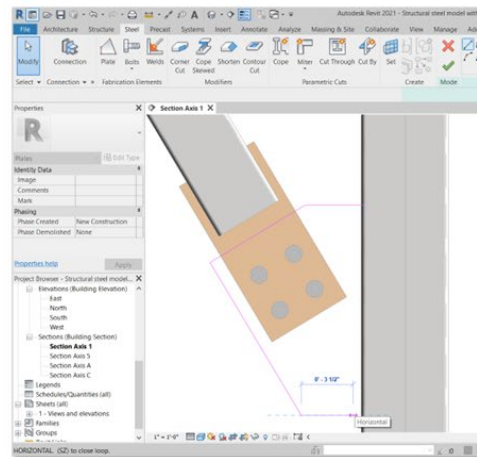
Bottom line: These improvements offer you more flexibility and efficiency when detailing steel in Revit.

Steel modeling improvements (Revit 2021)

Revit users were previously limited to inserting steel components in 3D views and 2D horizontal views, such as levels and floor plans.

In Revit 2021, this limitation was removed. Revit users may now place steel components in 2D vertical views. For example, a user may insert a steel plate in an elevation view or vertical section view.

- Model steel components in 2D and 3D views, such as sections and elevations
- Steel elements include:
 - Plates
 - Contour cuts on beams and plates
 - Bolts, anchors, shear studs, and holes



Model steel components in any
2D or 3D view

This new feature gives you the freedom to model steel components in any view—wherever you prefer to see, create and adjust them.

Bottom line: You can work with steel components simultaneously in any 2D and/or 3D view(s).

Structure, continued...

Other features introduced specifically (or at least primarily) for structure professionals in Revit 2021-'23 appear in the list below:

- Couplers for arc-shaped rebar (21)
- End treatments without couplers for rebar (21)
- 3D solid fabric sheets visualization (21)
- Override hook lengths by instance (21)
- Integrated precast automation (21)
- Integrated steel connection automation nodes in Dynamo for Revit (21)
- Integrated structural analysis results exploration (21)
- Create stiffeners on beams and columns (21)
- Dimensions snapping to steel plates (21)
- Quickly identify the rebar host (21.1)
- Model rebar using the real bar diameter (22)
- Select shape code for custom bent free form rebar (22)
- Remember settings when placing rebar (22)
- Rebar performance improvements (22)
- IFC4 certification for structure (22)
- Automatically match coupler size to rebar type (22.1)
- Align couplers to create post-tensioning anchors (23)
- Reinforced concrete non-bearing partition walls (23)
- Updated AISC shape type tables (23)
- British rebar shapes update (23)
- Cloud-hosted rebar display performance (23)
- Structural analytical modeling in BIM context (23)
- Structural analytical modeling automation (23)
- Rebar cover in schedules and tags (23)
- Displaced rebar representation (23)
- Effective solid rebar visualization in 3D views (23)

Top Features for MEP

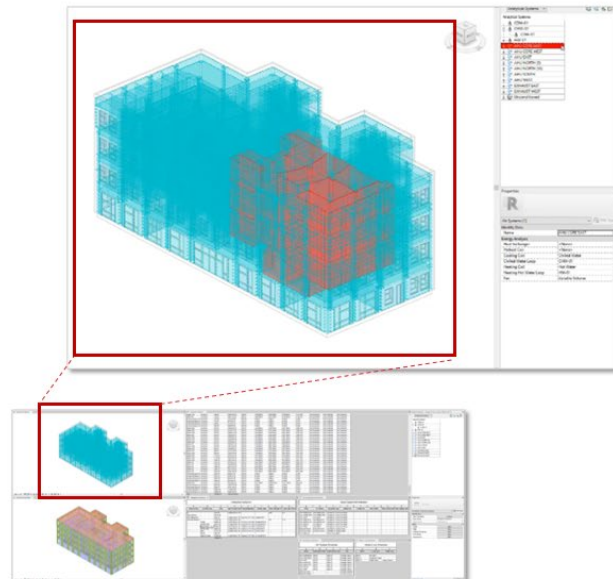
MEP Systems Analysis (Revit 2021+)

The Systems Analysis feature in Revit, which extends on the capabilities of Autodesk Insight that leverages location and climate data to perform whole building performance analyses, addresses this challenge by giving HVAC designers the ability to use architectural models in Revit, at any level of completeness.

With Systems Analysis, designers can quickly sketch their layouts, define zones, and even attach preliminary equipment that can be further refined as more detailed is added, and once systems and the zones they serve are defined, analytical models can be generated.

- Create analytical geometry from models
- Validate your model and review analysis
- Create custom analysis workflows
- HVAC systems sketch tool for spaces
- Extended zone equipment and plant loop types

Significantly more integrated
HVAC systems design analysis



Designers can then use Revit views and schedules to validate that their systems are properly defined and connected before the analysis begins by exploring their analytical systems in the System Browser. Powered by EnergyPlus, the System Analysis tool comes with two default analysis routines, one for annual building performance and one for calculating loads and sizing, but custom routines can be created as well, and when the analysis is completed, designers can explore their reports in graphical & tabular form.

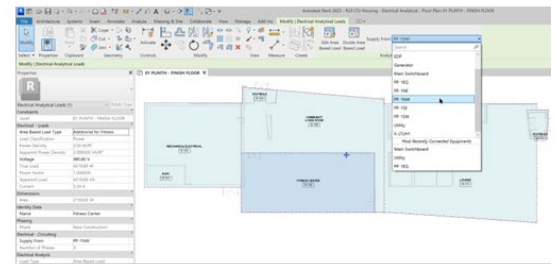
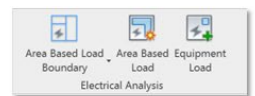
Bottom line: With Revit Systems Analysis, enjoy integrated HVAC analysis and modeling, better building design and performance.

Electrical load analysis (Revit 2023)

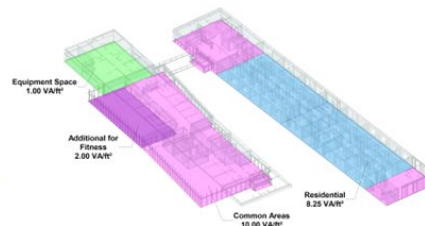
Revit 2023 introduces new features for Electrical Analysis. Electrical engineers and designers working in Revit can now leverage an architect's PDF, DWG, or Revit geometry to perform preliminary load calculations earlier in the design process—prior to modeling electrical equipment.

Revit's Electrical Analysis tools enable you to define boundary areas for Area Based Loads and Equipment Loads. These features help you capture the main loads, equipment, and distribution system requirements for your BIM projects in Revit.

- Perform preliminary load calculations in Revit
- Define Equipment Loads
- Define boundary areas for Area Based Loads
- Specify Power Density, Load Classification, Power Factor, and Apparent Power Density for Area Based Loads
- Create an analytical power distribution system with the System Browser



Estimate building loads prior to placement of Revit electrical families



Select an Area Based Load and specify the Electrical Analytical Load Type Settings that allow you to define Area Based Load Types with Power Density, Load Classification, Power Factor, and Apparent Power Density.

You can then estimate building loads throughout the distribution system without placing any physical Revit electrical families in the project, enabling a conceptual approach to electrical analysis and planning within Revit.

You can define Equipment Loads for your conceptual distribution systems using the new Analytical Power Distribution features in the Revit System Browser. Once you associate equipment loads with your analytical components, you can connect them to create an analytical electrical distribution system.

You can then use Revit schedules to list, group, and sum the conceptual loads for both Area Based Loads and Equipment Loads from your electrical analytical model.

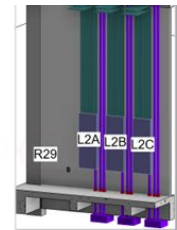
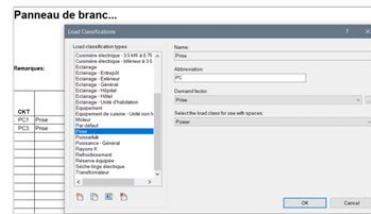
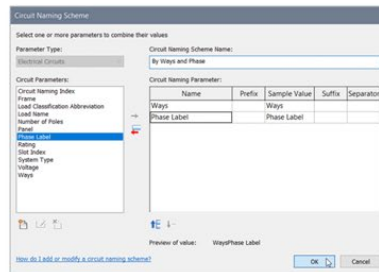
Bottom line: These new features for Electrical Analysis in Revit 2023 will allow engineers and designers to quickly perform preliminary electrical load calculations earlier in the design process—directly in Revit and prior to modeling any electrical equipment.

Electrical circuit naming (Revit 2021+)

In Electrical Settings, there is a new node called Circuit Naming. The circuit naming schemes created here show up as options in the Circuit Naming parameter list on each panel. You can select a scheme for the project that is used for all panels that have their Circuit Naming value set to By Project Setting.

- Circuit naming schemes enabled in electrical settings
- Circuit identifier in panel schedules
- Circuit identifier on wire and device tags
- French and UK templates are preloaded with 'By Project' default settings

Better flexibility with circuit naming schemes



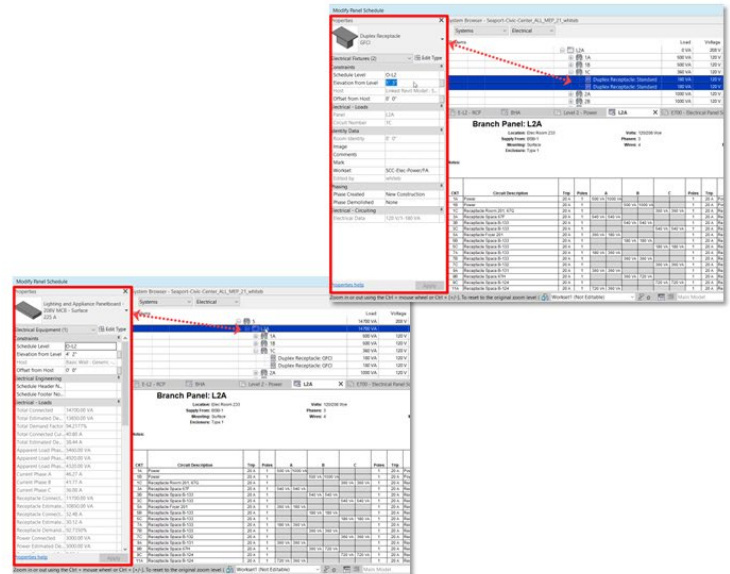
Bottom line: In order to make Revit more adaptable to a global market, we are providing a flexible method to define circuit naming schemes.

Panel schedule interaction (Revit 2021.1)

Now, when you select an element in the System Browser while in a panel schedule view, the Properties Palette displays the properties of the selected element, for instance the devices, circuits, and panels. This is similar to the behavior in plans, sections, and 3D views.

- Selecting elements from the System Browser while in a Panel Schedule view shows the element properties in the Properties Palette
- Selecting any MEP item in the System Browser will now refresh the Properties Palette

Improved ease-of-use for Revit panel schedules



Note: This change is not limited only to electrical elements, selecting any category in the System Browser will now refresh the Properties palette.

Bottom line: When you select an element in the System Browser while displaying a panel schedule or schedule view, the Properties palette displays the properties of the selected element, similar to the behavior in plans, sections, and 3D views.

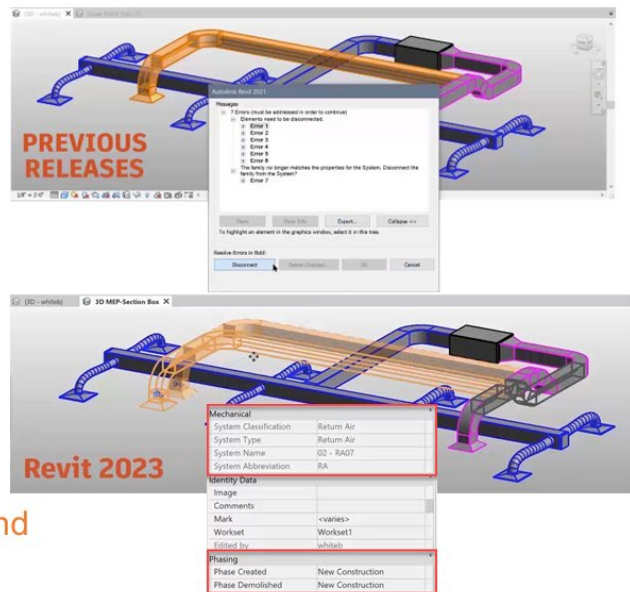
MEP demolition improvements (Revit 2023)

Revit 2023 improves the handling of demolished MEP elements and their systems. Elements now maintain their system connection and information on the Demolish phase.

In previous releases of Revit, MEP objects did not stay connected on the Demolish phase, and system information such as the system name, abbreviation, and classification parameters was discarded. Various workarounds were needed to properly control the visibility of demolished MEP elements.

- Demolished MEP elements maintain their system information
 - System name
 - Abbreviation
 - Classification parameters
- Demolished MEP elements maintain system connection
 - Connected system browser hierarchy
 - Able to move adjoining items

Maintain MEP system connections and information for demolished elements



In Revit 2023, your MEP elements will stay connected when assigned to the Demolish phase. These demolished objects will maintain their system name, abbreviation, and classification parameters. Your components will stay connected, allowing you to move adjoining items.

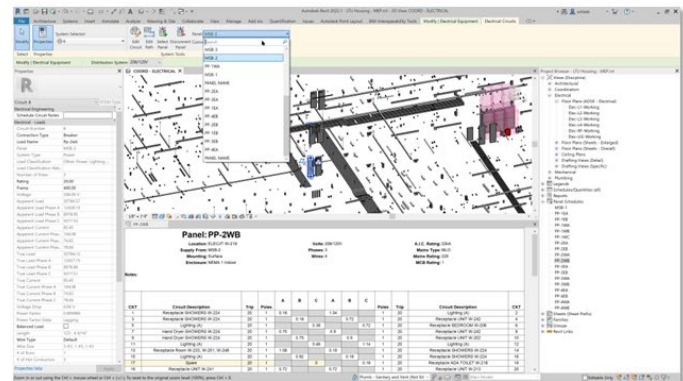
Bottom line: These improvements will give you better control over your MEP elements during demolition phases in Revit.

Electrical performance (Revit 2022.1)

On large and/or complex projects, response times when working with electrical content have been *dramatically* improved:

- Edit Circuit Performance – See performance gains of up to 30x when editing a circuit.
- Select Panel Performance – See performance gains of up to 20x when selecting a panel.
- Re-hosting Electrical Families Performance – See performance gains of up to 4x when selecting a new host for an electrical family.

- Up to 30x improvement in performance when editing a circuit
- Up to 20x improvement in performance when selecting a panel
- Up to 4x improvement in performance when rehosting an electrical family



See faster response times when working with electrical content

Bottom line: See much faster performance when working with electrical content in Revit 2022.1 and newer releases.

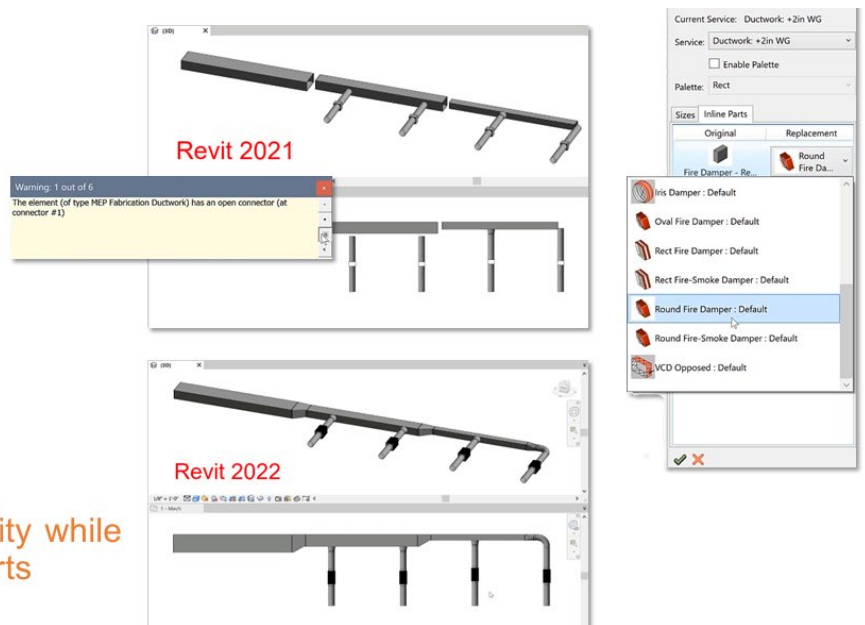
Fabrication improvements (Revit 2022+)

Several improvements have been introduced to add flexibility to fabrication workflows:

- Design to Fabrication Improvements – The Design to Fabrication tool is more flexible in Revit 2022, enabling mapping of solutions during the conversion process from Revit families to fabrication parts.
- Fabrication Modeling Improvements – Connect Fabrication elements together in canvas by dragging the connectors—as with Design parts—and fittings will be placed.
 - There is more consistency with layout tools (such as Quick Connect, Route and Fill, and Trim/Extend) in Revit by removing the Design Line logic and dependency from CADmep and ESTmep.
 - This creates better results for off-center taps, eccentric reducers, and transitions.
- Reload Configuration Performance Improvements – Configuration reload process has been optimized to reduce the number of elements checked out while work-sharing, which results in a reduction of the time to process.
- Reload Configuration Behavior Improvements – Resolved issues known to, on occasion, remove elements when reloading a configuration.

- Design to fabrication improvements
- Fabrication modeling improvements
- Reload configuration performance and behavior improvements

Revit provides more flexibility while working with fabrication parts



Bottom line: Revit 2022 provided more flexibility and reliability when working with fabrication parts.

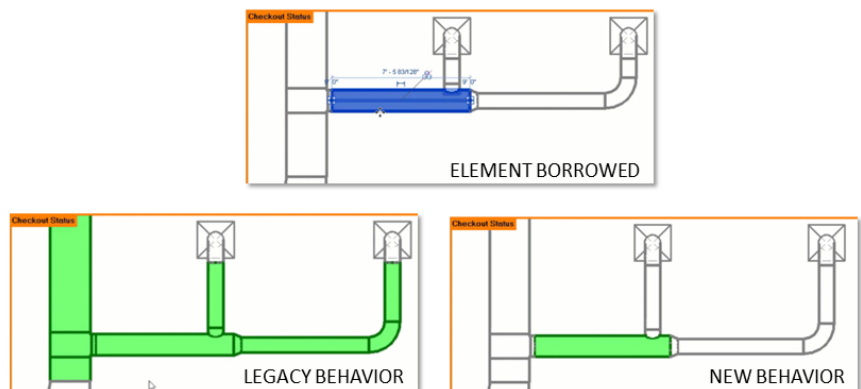
MEP worksharing enhancements (Revit 2021)

Using the worksharing display settings here to compare the legacy and new behavior:

- Previously, all indirectly modified elements are borrowed.
- Now, it's only the directly modified element that are borrowed.

To resolve worksharing issues, the auto-heal behavior for in-line elements has been disabled; this trade-off in functionality vs. performance was seen as a net benefit.

- Only directly-modified elements are borrowed
- Elements borrowed upon opening files resolved
- Circular syncing requests resolved



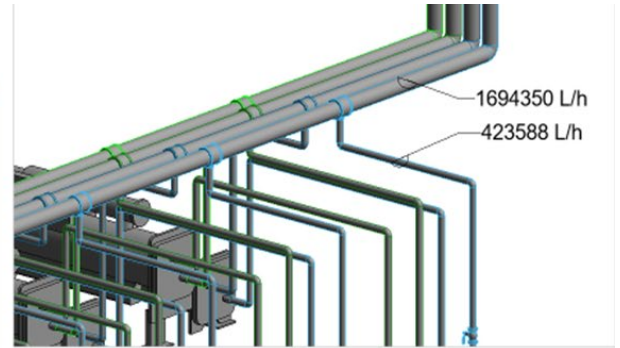
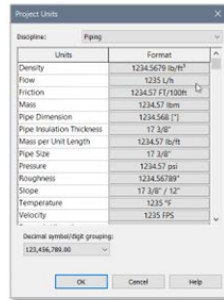
Worksharing enhancements
facilitate better collaboration

Bottom line: These improvements will enable MEP professionals to collaborate more effectively when using Revit worksharing.

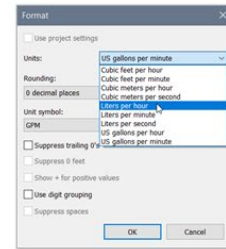
New pipe flow units (Revit 2021)

Revit now supports cubic feet per hour, cubic feet per minute, and liters per hour as units for pipe flow. This addressed a popular customer request.

- New pipe flow units have been added: Cubic Feet per Hour, Cubic Feet per Minute, and Liters per Hour



Popular units have been added for mechanical design

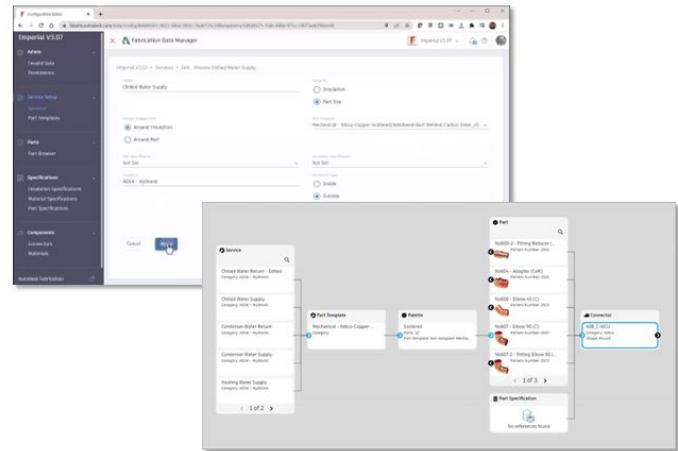


Bottom line: Popular pipe flow units have been added to better serve mechanical designers.

FDM tech preview (Revit 2023)

The Autodesk MEP Fabrication Data Manager Tech Preview is now available for Revit users. After you download and install the MEP Fabrication Data Manager Sync - Tech Preview (or FDM Sync), you can upload your fabrication configurations to the cloud—unlocking new collaboration workflows.

- Fabrication Data Manager available for Revit 2022-'23
- Upload fabrication configuration to the cloud
- Built on Autodesk Forge
- Manage data relationships
- Easily share and manage content across project stakeholders



Powerful new features for hosting and managing fabrication parts in the cloud

The Fabrication Data Manager Tech Preview introduces unique features to address the complex relationships between fabrication parts and provide an intuitive view into your data. Built on the Autodesk Forge platform, the Relationship Browser is an enhanced navigation system that allows you to view, understand, and manage the relationships between various types of data.

After selecting a service in FDM you will see options appear that enable you to copy, edit, remove, and view the service's data relationships. FDM allows you to invite collaborators and add permissions, assigning a contributor or viewer permission level in each configuration. This enables you to easily share and manage content across project stakeholders. You can detail in Revit using FDM managed configurations in the same way as with local configuration data.

Bottom line: The Autodesk MEP Fabrication Data Manager Tech Preview, built on Autodesk Forge, introduces powerful new features for hosting, managing, and collaborating Revit fabrication data in the cloud.

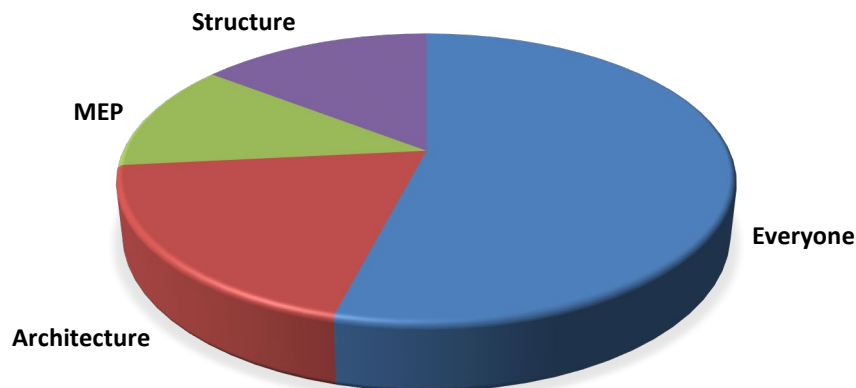
MEP, continued...

Other features introduced specifically (or at least primarily) for MEP professionals in Revit 2021-'23 appear in the list below:

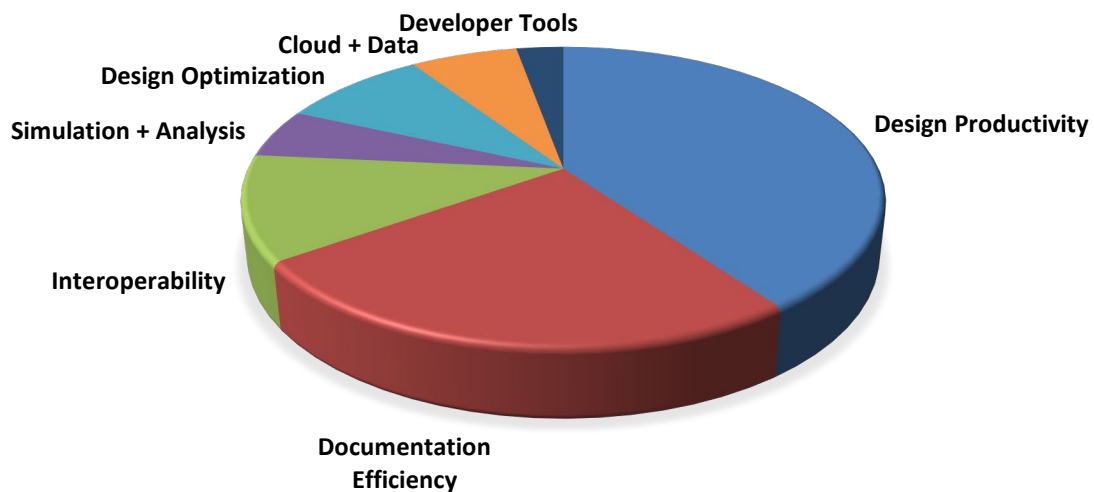
- Single phase L-N panelboards (21)
- Switchboard circuit quantity (21)
- Switchboard circuit phase selection (21)
- Panel schedule nodes listed under sheets in Project Browser (21)
- P&ID Modeler on BIM 360 Docs (21)
- MEP Fabrication extension integration (21)
- MEP systems analysis (21)
- EU region support for P&ID Modeler (21.1)
- Improved panel schedule view and system browser interaction (21.1)
- Reload configuration behavior improvements (22)
- Reload configuration performance improvements (22)
- Enable room or space mode for systems analysis (22)
- Systems analysis load and psychrometric reports (22)
- Fabrication modeling improvements (22)
- New family categories for equipment and building elements (22)
- Fixes to key MEP documentation (22)
- Auto-shading in two-column panel schedules (22)
- Adjust slope (22.1)
- Sloped layout improvements (22.1)
- Flip controls for fabrication parts (23)
- Elevation controls for fabrication parts (23)
- Circuit number info for electrical equipment (23)

Features by Category

Recall that the majority of new and enhanced features are actually beneficial to everyone, i.e. what we call “platform” features:



Let’s look at the same features in a different way—by category instead of by discipline:



When we consider these categories, features labeled as *Design Productivity* and *Documentation Efficiency* clearly rise to the top.

With that in mind, let’s filter down to “platform” features only (i.e. the ones for “Everyone”), and we’ll organize them into three groups:

- Design Productivity
- Documentation Efficiency
- “Best of the Rest!”

Top Features for Platform: Design Productivity

Measure in 3D (Revit 2023)

The Measure tool in Revit is used to quickly check distances in Revit between model elements or other references in your projects.

In previous releases, the Measure Between Two References tool was enabled for 2D views only. Revit 2023 adds support for both orthographic and perspective 3D views.

You can now snap to any position in 3D without work plane restrictions.

- Snap to any position in 3D without work plane restrictions
- Works in orthographic and perspective 3D views
- New hotkey (CTRL) to lock the measurement perpendicular to the start face
- Activate Perpendicular snap to measure the shortest distance



Fast and convenient measurements in any 2D or 3D view

Using a new hotkey (CTRL), you may lock the measurement such that it remains perpendicular to the start face in 3D views. This might be useful when measuring the distance between two walls.

You can also measure the shortest distance to a target plane or line by activating Perpendicular Snap through the contextual menu or using the SP (Snap Perpendicular) keyboard shortcut in 3D views. You might use this to measure the vertical height between two points that are not located directly above each other.

Bottom line: This enhancement to the Measure tool in Revit will improve your design productivity by enabling fast, convenient measurements in any 2D or 3D view.

Duplicate sheets (Revit 2022.1)

Revit 2022.1 introduced the ability to duplicate sheets.

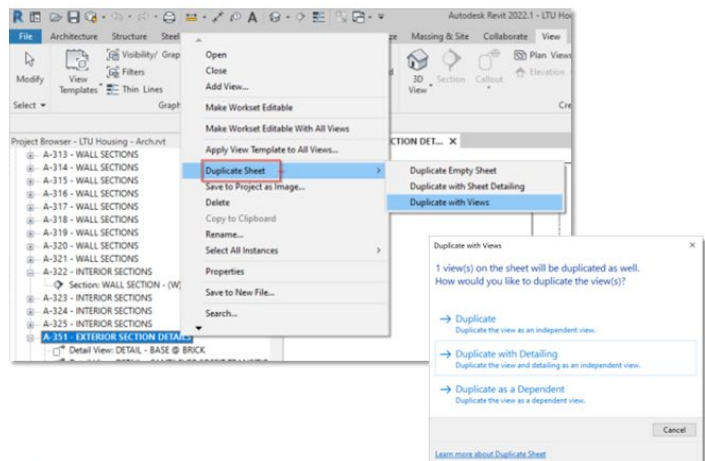
In the Project Browser, right-click any sheet and select Duplicate Sheet in the context menu. You have three options:

- Duplicate a sheet as a new empty sheet using the same titleblock;
- Duplicate a sheet and any detail elements on the sheet, such as legends, schedules, key plans, and sheet-specific linework; or
- Duplicate a sheet with views.

Here, you can choose to duplicate all placed views as independent copies, include view-specific elements in the copied views, or create dependent copies.

Note that this option will be disabled for view types that do not support dependent copies.

- Duplicate Empty Sheet
- Duplicate with Sheet Detailing
- Duplicate with Views
 - Independent views
 - Independent views + view-specific elements
 - Dependent views



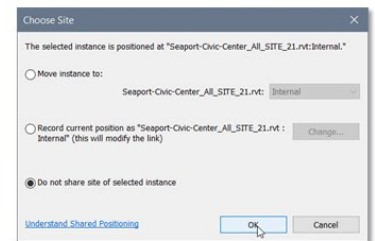
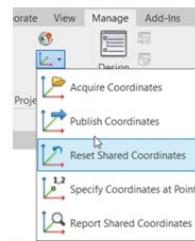
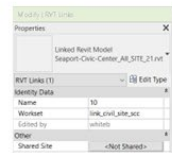
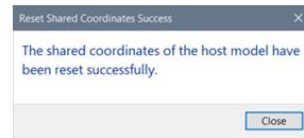
Easier and faster documentation with
the ability to duplicate sheets

Bottom line: Project documentation became even easier and faster with the ability to duplicate sheets in Revit 2022.1.

Reset shared coordinates (Revit 2021.1)

You can now eliminate the shared coordinates relationship with all linked files. Erase the GIS Coordinate System, set links in the properties palette to <Not Shared> and avoid unexpected change to the links. Reset the survey point to back to internal origin, set shared coordinates to 0,0,0, and set the angle between true north and project north to 0.

- Eliminate the shared coordinates relationship with all linked files
- Erase the GIS Coordinate System
- Set links in the properties palette to Not Shared
- Reset survey point back to internal origin, set shared coordinates to 0,0,0, and set True North and Project North to 0



Reset shared coordinates in one click

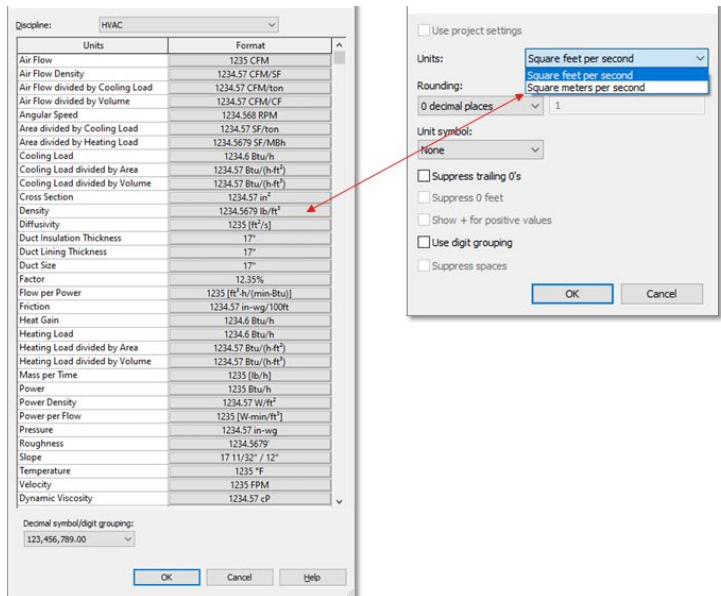
Bottom line: This new Revit feature enables users to set up shared coordinates again by one click of the Reset Shared Coordinates.

New units (Revit 2021.1)

In Revit 2021.1, 47 new units across 24 parameter categories, e.g. air flow, cost, diffusivity, friction, mass, power, etc. were added to support architectural and engineering workflows.

- Support new architectural and engineering workflows
- 47 new units for 24 parameter categories

Better flexibility to support integrated workflows



The list of units is as follows:

- Air Flow Density – Cubic Meters per Hour Square Meter
- Air Flow Divided By Volume – Cubic Meters Per Hour Cubic Meter
- Air Flow, Flow – Cubic Feet Per Hour, Liters Per Hour
- Angular Speed – Revolutions Per Minute, Revolutions per Second
- Cost Per Area – Cost per Square Foot, Cost per Square Meter
- Cost Rate Energy – Cost per British Thermal Unit, Cost per Watt Hour
- Cost Rate Power – Cost per British Thermal Unit Per Hour, Cost per Watt
- Density – Kilograms Per Cubic Centimeter
- Diffusivity – Square Feet per Second, Square Meters per Second
- Distance, Length, Stationing, Stationing Interval – US Survey Feet
- Flow Per Power – Cubic Feet Per Minute Per British Thermal Unit Per Hour, Cubic Meters Per Watt Second
- Force Scale, Linear Moment Scale – Feet Per Kip, Meters Per Kilonewton
- Friction – Meters of Water Column Per Meter, Millimeters of Water Column Per Meter
- Isothermal Moisture Capacity – Cubic Feet Per Pound Mass, Cubic Meters Per Kilogram
- Luminance – Candelas Per Square Foot
- Mass Per Time – Kilograms Per Hour, Kilograms Per Minute, Kilograms Per Second, Pounds Mass Per Hour, Pounds Mass Per Minute, Pounds Mass Per Second
- Moment Scale – Inverse Kilonewtons, Inverse Kips
- Power – Thousand British Thermal Units Per Hour

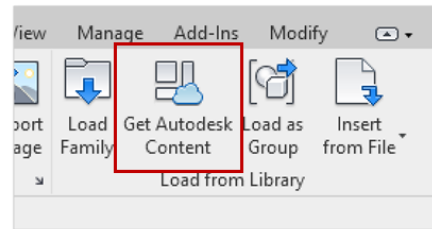
- Power Per Flow – Watts per Cubic Foot Per Minute, Watts per Cubic Meter Per Second
- Power Per Length – Watts Per Foot, Watts Per Meter
- Pressure – Meters of Water Column, Millimeters of Water Column
- Rotation Angle – Multiples of Pi
- Thermal Gradient Coefficient For Moisture Capacity – Kilograms Per Kilogram Kelvin, Pounds Mass Per Pound Degree Fahrenheit
- Viscosity – Kilograms Per Meter Hour, Kilograms Per Meter Second, Newton Seconds Per Square Meter, Pound Force Seconds Per Square Foot

Bottom line: These new units in Revit help architects and engineers deliver better buildings through integrated design analysis to fabrication workflows.

Get Autodesk content (Revit 2021)

To lighten the Revit installer, most sample content is no longer installed with Revit. A new “Get Autodesk Content” button has been added to ensure that customers who do use the sample content have quick and easy access to download this information.

- Access Autodesk sample content quickly and easily
- Lightens the Revit installer significantly



Revit 2021 features many small user productivity enhancements

Bottom line: This was one of many small enhancements in Revit 2021 that were intended to address customer requests and improve productivity.

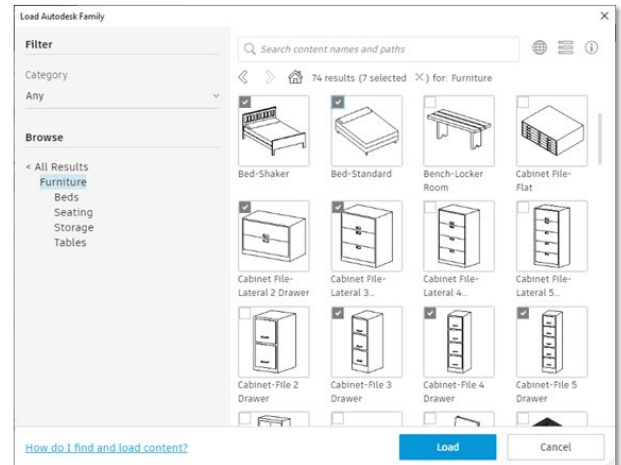
Load multiple Autodesk families (Revit 2022.1)

The Load Autodesk Family tool now allows you to load more than one family at a time into your model.

Click each family individually or use Shift+click to select multiple adjacent families.

- Shift + Select to select multiple adjacent families
- Display of number of selected families
- Checkbox displays to include/exclude families from selection
- Progress bar dialog while downloading families

Load the right family content more quickly



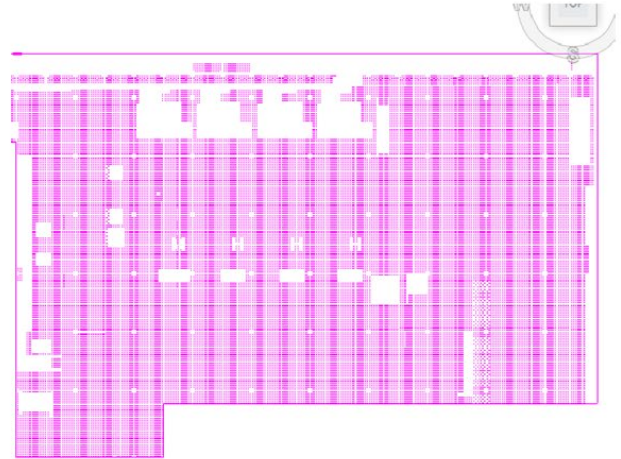
Bottom line: This new functionality allows you to load the right family content more quickly.

Sketch copying performance (Revit 2023)

Revit users have reported challenges when copying large numbers of sketch-based elements.

Revit 2023 improves performance when copying large numbers of sketch-based elements (e.g. floors, roofs, and ceilings) by up to 6X, depending on quantity.

- Up to 6x performance boost when copying large numbers of sketch-based elements (floors, roofs, ceilings)



Performance improvements to
boost design productivity

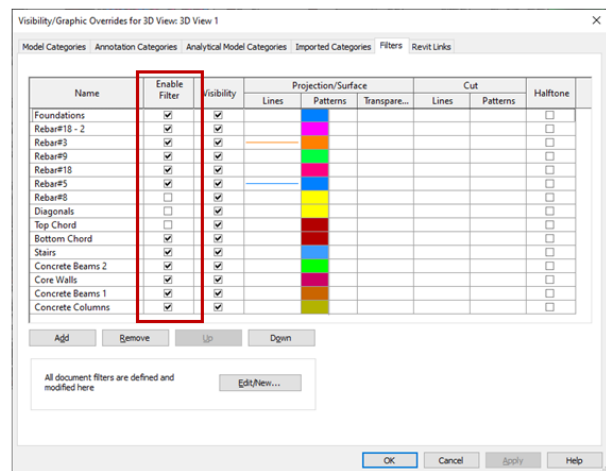
Enable view filters in view (Revit 2021)

Revit offers users the ability to create view filters that control the visibility or graphic display of elements. Using the Filters tab in the Visibility/Graphics dialog, these filters may be applied to one or more views in a Revit project.

In Revit 2021, a new “Enable Filter” column was added to that dialog. This gives you the ability to quickly turn on/off the overrides of a view filter without having to remove that filter from the view.

- New column "Enable in View" added to the Filters tab of the Visibility Graphics dialog
- Quickly disable a view filter without having to remove the filter from the view
- Continue to view the elements that fit the criteria of the filter
- Enabled by default when a new view filter is applied to the view

Easily toggle view filter graphic overrides



Bottom line: This new feature in Revit 2021 gives users the ability to quickly apply or remove view filter graphic overrides from elements in a view.

Family category improvements (Revit 2022)

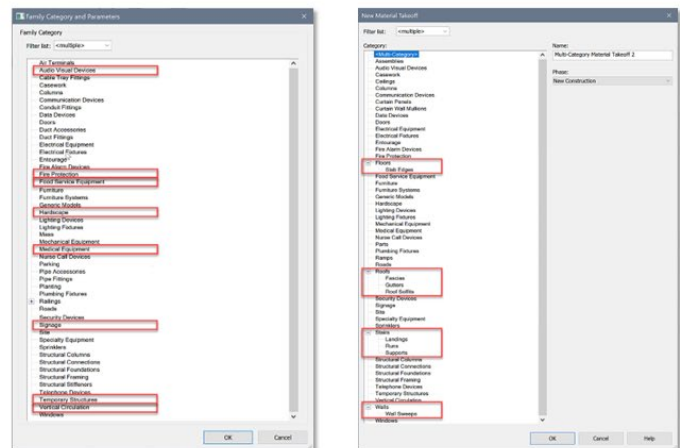
Revit 2022 introduced new family categories for equipment and building elements.

These new categories include Audio Visual Devices, Fire Protection, Food Service Equipment, Hardscape, Medical Equipment, Signage, Temporary Structures, and Vertical Circulation.

These categories have the same functionality as existing Revit categories. Families assigned to these categories can be defined as cuttable in views. They can be scheduled, tagged, and exported.

Users can assign customized Generic Models to these categories and control their visual display as needed.

- New family categories for equipment and building elements
 - Assign generic models to specific categories to control visual display
- Expanded category list for multi-category schedules and material takeoffs
 - Enhance the ability to schedule system categories



Optimize the visibility and scheduling of your Revit families

Revit 2022 also introduced expanded category lists for multi-category schedules and material takeoffs.

When creating multi-category schedules you will find more categories and sub-categories are available in the table.

This improvement enhances the ability to schedule system categories.

Bottom Line: These improvements help you optimize the visibility and scheduling of your Revit families.

Additional cuttable categories (Revit 2023)

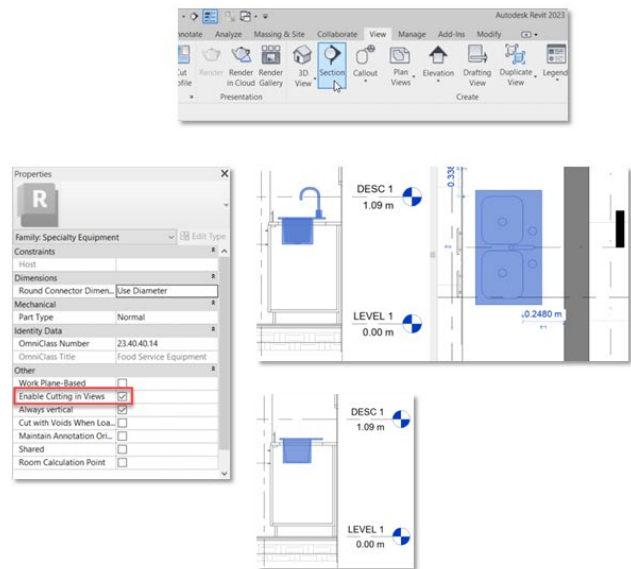
When creating section views in Revit, objects are generally cut automatically when the section plane passes through solid geometry.

However, a few Revit categories have not been cuttable in previous releases; these include Furniture, Furniture System, Casework, Specialty Equipment, and Plumbing Fixtures.

In Revit 2023, cutting has been enabled for these categories.

- Additional family types cuttable in section views
- Can be activated for each family
- Added to several categories: Furniture, Furniture System, Casework, Specialty Equipment, and Plumbing Fixtures

Better control the display of your families in Revit views



Simply select an object belonging to one of these categories, click the Edit Family button, and ensure the Enable Cutting in Views parameter is checked in the Properties Palette.

Save the modified family and exit the family editor to return to your Revit project.

Now, when moving a section view line, you will see that the family is cut automatically.

Bottom line: This enhancement to Revit 2023 gives users better control over the display of their families in views.

Design Productivity, continued...

And here are quite a few more features in the Design Productivity bucket that apply to 'everyone':

- Customized Revit workspace (21)
- Voids cut family geometry type and instance parameters (21)
- Resizable shared parameters dialog (21.1)
- User profile enhancements (21.1)
- Notification after successful acquire coordinates (21.1)
- View switching improvements (21.1)
- Rename default shared site (22)
- Category lists sorting improvement (22)
- Remember modify tools settings across Revit sessions (22)
- Zoom to fit work plane viewer (22.1)
- Compatible shared parameters (22.1)
- Family load error message (22.1)
- Performance with complex sketches (22.1)
- Small UI enhancements (22.1)
- Pick a work plane (23)
- Save placement for work plane-based families (23)
- Duplicate material and its assets (23)
- Server path to material textures and decals (23)
- Revit Home loading performance improvement (22)
- Remember last used tab in material browser (22)
- Improved parameter identification UI (22)
- Load Autodesk Family resize view filter panels (22)
- Resize transfer project standards dialog (22)
- Resize edit multiline text dialog (22)
- Resize warning dialogs (22)
- Resize wall sweeps dialog (22)
- View reference search (23)
- Temporary dimensions for shared nested families (23)
- Performance with large selections (23)
- Optimized room performance (23)
- View performance (23)
- Performance for shape edited slabs (23)
- Performance when linking DWG files (23)
- Performance when loading items in Type Selector (23)
- Resize purge unused dialog (22)
- Resize sync with central (with comments) dialog (22)
- Category name search (22.1)
- Duplicate existing family parameter (22.1)
- Import or link CAD formats at any level (22.1)

Top Features for Platform: Documentation Efficiency

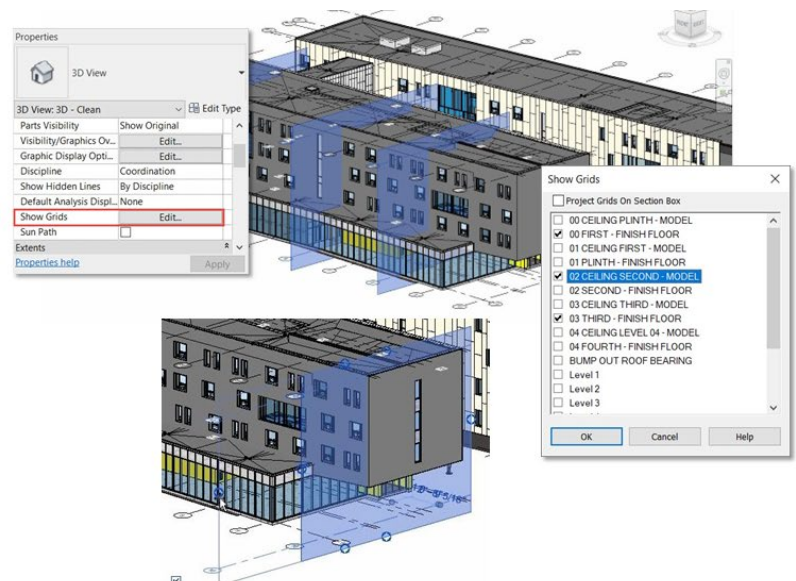
Grids in 3D views (Revit 2022)

Starting in Revit 2022, you can choose to display grid lines in your 3D views.

Go to the *Show Grids* parameter in the Properties Palette to access a list of levels for your project and select the levels for which you want grid lines to display.

When you hover over a grid, its plane highlights as a blue planar vertical surface. If you select the grid, in-canvas controls will appear, and its properties will display in the Properties palette.

- Display grid lines in your 3D views
- Show grids parameter in the properties palette
- Only grids that intersect selected levels appear in the view
- Grid planes are available on hover or selection



Work with grids in 3D views

In a 3D view, you can treat grids in many of the same ways as in a 2D view.

- You can hide grids by element, category, or filter, or by using the Visibility/Graphics Overrides dialog.
- You can display grids using halftone.
- You can copy, cut and paste, or delete grids from the model.
- You can snap to grids when placing other elements.
- You can change grid instance and type properties.

If you want to hide part of your model, you can create a 3D section box. As you can see, the grid lines do not extend beyond the bounding box, making it easier to navigate this portion of your model.

Bottom line: With Revit 2022 and newer releases, you can display and utilize grids in 3D views to help you orient yourself and navigate your model.

Page order in PDFs (Revit 2023)

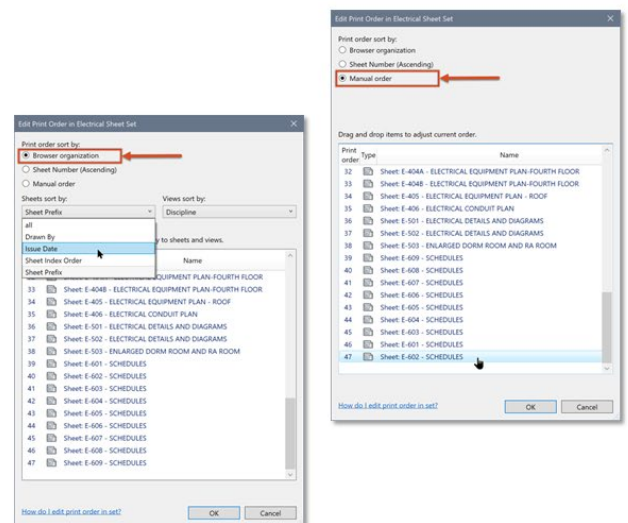
Revit 2023 offers the ability to choose which order you would like the page order to be for PDF export and print output.

Customize your page orders by predefined browser organization, ascending sheet numbers, or your own manual order. Manual order allows you to drag and drop sheets into whichever order you choose.

Save the set you created for expedited printing.

- Customizable page orders
 - Browser organization
 - Sheet Number (Ascending)
 - Manual order
- Save your set to how you want it to print
- Drag and drop sheets into whichever order you choose

Choose the order in which you export PDFs and print sheets from Revit



Bottom line: Revit 2023 enables you to choose the order of PDF export and sheet print output.

Views on sheets icon (Revit 2023)

The Project Browser helps you navigate the views, schedules, sheets, groups and families comprising your current project.

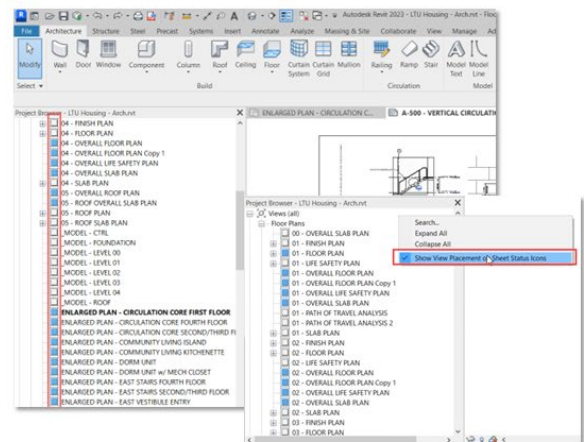
Revit 2023 introduces a new feature that makes it easy for you to see which views have been placed on sheets.

If you expand the Project Browser, you will see a square icon to the left of each view name.

- A solid-filled icon indicates that the view is currently placed on a sheet.
- An empty icon means that the view is not currently placed on a sheet.
- A half-filled icon appears when a schedule has been split and some—but not all—segments of that schedule are currently placed on a sheet.

This icon is displayed for all items listed in the Project Browser, including views, legends, schedules, graphical column schedules, and panel schedules.

- New Project Browser icon located to the left of each view
- Displayed for all items including views, legend and schedules
 - Solid-filled icon = view placed on a sheet
 - Empty icon = view not placed on a sheet
 - Half-filled icon = schedule is partially on a sheet



Check the sheet status of a view with a new icon in the Project Browser

You can deactivate this behavior by right-clicking on the Project Browser and deselecting the *Show View Placement on Sheet Status Icons* option.

Bottom line: This new feature will improve your documentation efficiency by helping you quickly identify views needing placement on sheets.

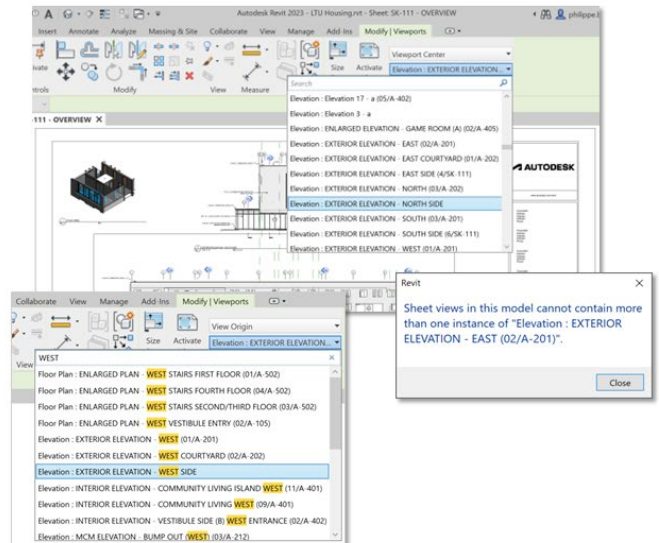
Swap views on a sheet (Revit 2023)

In previous releases of Revit, replacing a view on a sheet required you to first delete the existing placed view and then drag and drop a new view onto the sheet.

Revit 2023 makes it easier to swap views on a sheet.

- New Positioning & View contextual panel
- View placement controlled with Viewport Positioning parameter
- View list is searchable and filters the list of all compatible views
- Alerts you if you attempt to place the same view on a sheet twice

Quickly reorganize sheets by easily swapping out views



To swap a view currently placed on a sheet with a compatible view, you can select the existing view and navigate to the Positioning & View contextual panel on the ribbon.

The Viewport Positioning parameter is saved for each viewport and determines how the view is positioned when swapped.

You can select Viewport Center to use the center of the viewport as a reference or View Origin to use the origin of the view itself.

The View list is searchable and filters the list of all compatible views. Views already placed on a sheet are appended with their detail and sheet numbers for clarity.

If you attempt to replace a view with another view already placed on the same sheet, Revit will alert you with a popup dialog displaying the view's current detail and sheet number.

Bottom line: This new feature helps you quickly reorganize your sheets by easily swapping out views, making documentation in Revit even faster.

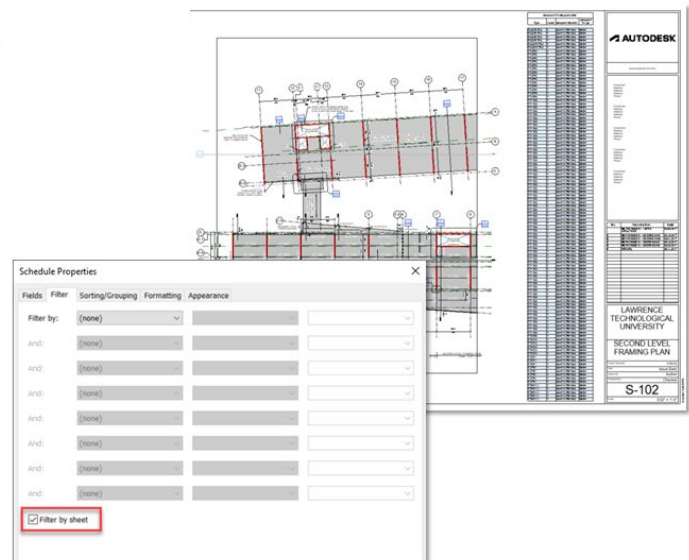
Filter by sheet in schedules (Revit 2023)

In Revit, a schedule is used to display a customized list of elements and their parameters that exist within your project. Schedules are powerful tools, in that they are live, non-graphical views of project data. As such, they automatically update as elements are added, removed, or modified in the project.

Schedules can be dragged and dropped onto sheets, much like any other view. Revit 2023 adds a new capability to schedules that enables them to detect and display only those project elements relevant to the schedule that exist in other views placed on the same sheet.

- Automatic limit schedules to display elements visible on the same sheet
- Based on a new Filter by sheet option on the Filter tab of the schedule properties
- Automatic content update if view gets cropped on the sheet
- Dynamic sheet content behavior when placing the same schedule on other sheets

Improved flexibility in the use of schedules on sheets



You can enable this behavior by selecting the new *Filter by sheet* option available in the *Filter* tab of the schedule properties. This filters the contents of the schedule to display only those elements appearing on the same sheet.

The schedule is still live; if you crop a view on the sheet, the contents of the schedule will instantly update.

As this sheet filtering behavior is dynamic, you can place the same schedule onto multiple sheets, and each instance of the schedule will display the elements found on its respective sheet.

Bottom line: This enhancement gives users even more flexibility in the use of Revit schedules.

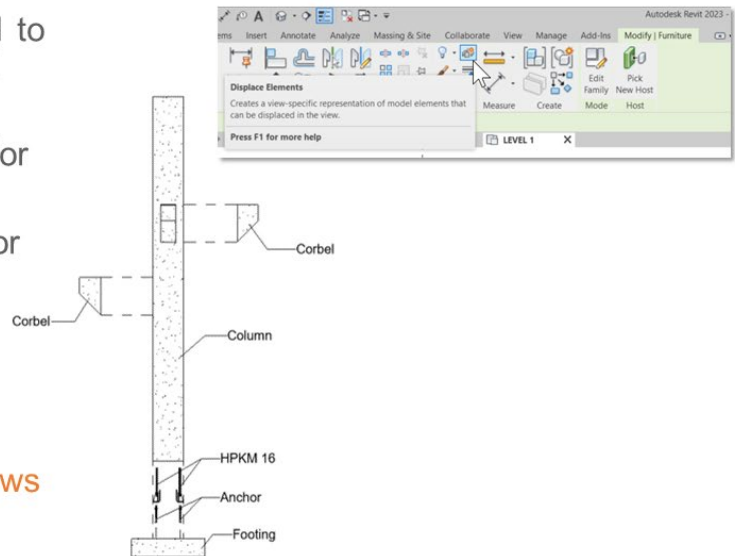
Displace elements in 2D views (Revit 2023)

In previous releases of Revit, the *Displace Elements* tool was offered for 3D views, making it possible to offset elements in specific views from their actual positions to improve visibility and documentation.

In Revit 2023, this feature has been enabled for 2D views, including callouts and section views.

- Displace elements tool extended to 2D views, including callouts and section views
- Adjust the position of elements for better clarity
- Element may be tagged before or after displacement

Adjust element positions in 2D views to improve documentation clarity



You can now adjust the position of an element or elements in a 2D view to help other project participants view them more clearly and better understand your design intent.

Displaced elements may still be tagged as usual.

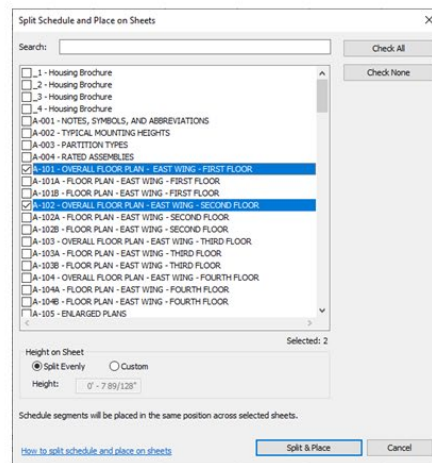
Bottom line: This enhancement will improve the clarity of 2D views in your Revit projects, helping you communicate your design intent more effectively.

Split schedules across sheets (Revit 2022+)

When working with a long schedule, it is helpful to split the schedule into segments. Prior to this release, these segments were not able to be placed on separate sheets.

Revit 2022 introduced *Split and Place* functionality for schedules, enabling users to split schedules and specify destination sheets for each of their segments.

- New *Split and Place* feature
- Split schedules and specify destination sheets for each segment
- Split into equal segments or user-defined heights



Better control over the display of schedules in your projects

Using this tool, the schedule may either be split into equal segments across the selected sheets or broken into segments of a user-defined height.

Bottom line: This enhancement gives you better control over the display of schedules in your Revit projects, helping you work more productively and efficiently.

Revision numbering flexibility (Revit 2022)

Create custom revision numbering sequences in your project to support multiple deliverable packages.

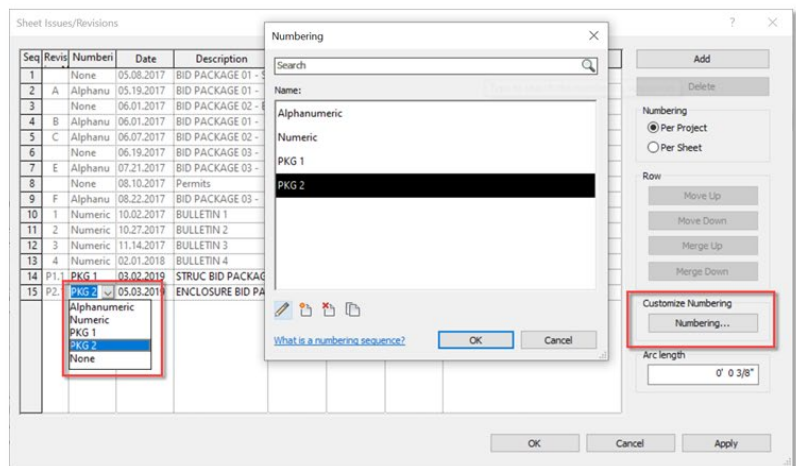
Specify the minimum number of digits to maintain a standardized length in alignment with ISO 19650, or other local or regional standards.

Use a custom prefix or suffix to denote a project stage or phase.

Customize the sequence characters to meet your project needs.

Share revision numbering sequences using the Transfer Project standards.

- Create custom revision numbering sequences
- Meet ISO 19650 and/or local standard requirements
- Add a prefix or suffix to denote a project stage
- Share using the Transfer Project Standards tools



Improve documentation with flexible revision numbering sequences

Bottom line: Improve your revision documentation with flexible revision numbering sequences.

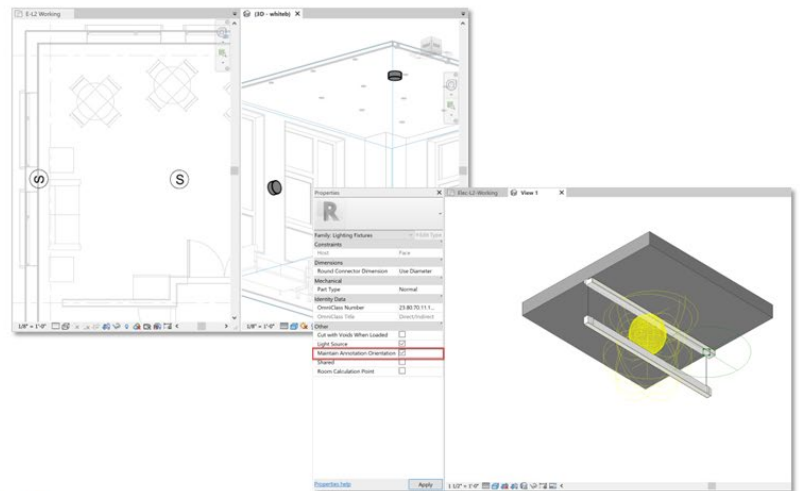
Maintain annotation orientation (Revit 2022)

More categories can now show an annotation symbol using the Maintain Annotation Orientation family parameter.

With this improvement, Maintain Annotation Orientation has been added to the following categories:

- Electrical Equipment
- Generic Model
- Lighting Fixtures
- Mechanical Equipment
- Plumbing Fixtures
- Specialty Equipment

- Added to new categories
 - Electrical Equipment
 - Generic Model
 - Lighting Fixtures
 - Mechanical Equipment
 - Plumbing Fixtures
 - Specialty Equipment
- Shared nested families



Improvements to annotation display
across additional categories

Bottom line: Revit 2022 provided improvements to annotation display across additional categories.

Documentation Efficiency, continued...

And here are quite a few more Documentation Efficiency features that apply to ‘everyone’:

- Row striping for schedules (21)
- Rotate tags with components improvements (21)
- Consistent linestyle naming (21)
- Enable scheduling of worksets (22)
- Filter schedules by family and type (22)
- Export schedules to CSV by default (22)
- Multiple values indication (22)
- Rotated tags (22)
- Multi-leader tags (22)
- Multi-category tag for all taggable categories (22)
- Multi-leader tag enhancements (23)
- Additional taggable categories (23)
- Improved orientation behavior for generic annotation families (23)
- Control filled region patterns with family parameters (23)
- View filter enhancements (23)
- Edit label dialog improvement (23)
- Common property for model group and RVT link (23)
- Performance in print, publish, and export functions (23)
- View/sheet API (23)
- Link tag re-hosting (22)
- Dimension prefix/suffix (22)
- Spot slopes and elevations on ramps (22)
- Phase parameters in view filters (22)
- Multi-select visibility/graphics overrides filters (22)
- Preserve callouts when deleting parent views (22)
- Maintain annotation orientation added to additional categories (22)
- Snap to the middle of two points (22.1)
- Select all instances enhancements (22.1)
- Find in Project Browser (22.1)
- Split schedule across sheets improvements (22.1)
- Automatic lock for Align tool (22.1)
- Performance with large numbers of views (22.1)
- Conditional formatting for family and type in schedules (23)
- Tag all displaced elements in 3D views (23)

Top Features for Platform: “Best of the Rest!”

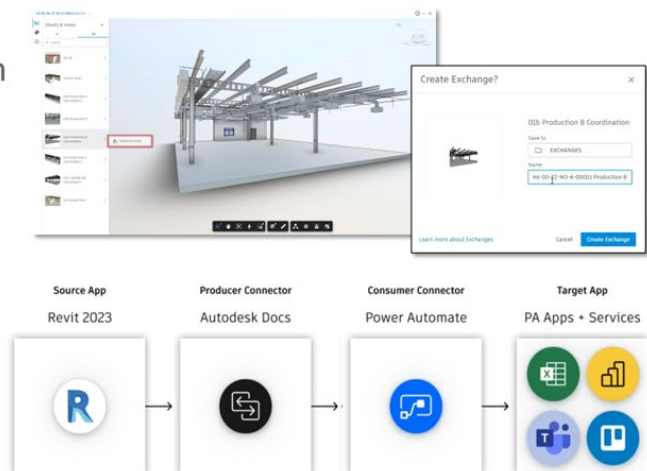
Data Exchanges (Revit 2023)

The ability to share relevant data with multiple stakeholders across multiple applications is one of the most significant challenges faced by our industry.

Autodesk has developed Data Exchanges to help solve these challenges. A Data Exchange is a neutral, secure subset of model data that can be shared with many downstream apps, opening the door to streamlined automation workflows.

Revit 2023 allows you to create Data Exchanges by first publishing a Revit file, along with a set of 3D views, to Autodesk Docs. The data contained within each published 3D view can be tailored to the information needs of any specific discipline or trade. From here, you can create an exchange by selecting a published view and sharing it with a stakeholder in a neutral format that can then be plugged into an Autodesk or third-party application. The Data Exchange is automatically updated when the source file is republished.

- Share subset of model information across applications
- Automate information sharing processes
- New workflow examples:
 - DfMA - Revit to Inventor
 - Business Intelligence – Revit to Microsoft Power Automate
 - Database Connectors – Revit to Microsoft Excel



Connect information exchanges to automate data-driven workflows

DfMA – Revit to Inventor: Using Revit and Inventor, you can use Data Exchanges to enable a seamless design-to-manufacturing workflow. A view published from Revit can be shared as a Data Exchange from Autodesk Docs. Collaborators working in Inventor can load the exchange into an Inventor assembly and is used as a reference for a more detailed fabrication model. When the Revit model is republished, the Data Exchange associated with the view can be pulled into Inventor to ensure the design remains coordinated.

Business Intelligence – Revit to Microsoft Power Automate: You can also use Data Exchanges to build a connection between Revit and Microsoft Power Automate. Enable the connector for Power Automate in Autodesk Docs, and automated workflows that integrate data from the

exchange with other third-party apps. For example, you can automatically generate a bill of materials in Excel or send out a report to business executives using Power BI.

These examples illustrate the power of automation enabled by Data Exchanges. Still, we are just starting to unveil their potential for other tasks—such as construction quantity takeoffs, cost estimation, updating of external databases, etc.

Bottom line: Automate your information sharing processes and drive new workflows for project collaboration using Data Exchanges with Revit 2023.

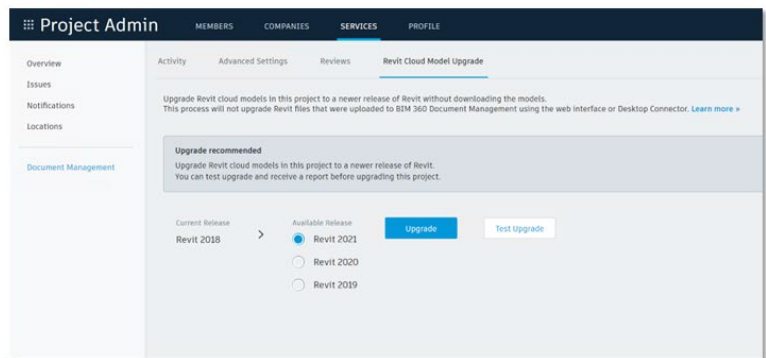
Revit Cloud Model upgrade (Revit 2022.1)

If you have Project Admin permissions in BIM 360, you can quickly and easily upgrade Revit cloud models to newer versions.

Sign in to BIM 360 Document Management and select the project containing the models you want to upgrade.

Switch to the *Project Admin* module. Select the *Services* tab at the top, and then select the *Revit Cloud Model Upgrade* tab.

- Quickly and easily upgrade Revit cloud models to newer versions – now including Revit 2021
- Revit Cloud Model upgrade tab available in BIM 360 Document Management
- Upgraded models appear in Revit Home



Easily upgrade Revit cloud models from previous versions

If your project contains Revit files which have been initiated for collaboration with a previous release of Revit, you will be given the option to upgrade your Revit cloud models without downloading them. If more than one release is available to upgrade, select the desired release.

Automated email notifications will be sent from BIM 360 to let you know the status of the upgrade process.

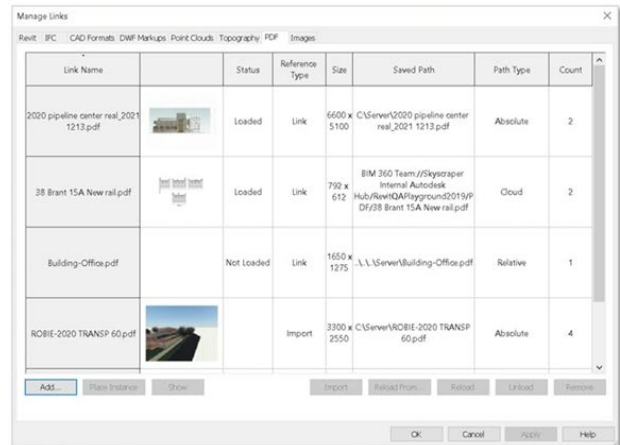
Your upgraded Revit cloud models will now appear in *Revit Home*.

Bottom line: This feature greatly simplified the Revit model upgrade process, making it easier for you to take advantage of the new and enhanced capabilities in Revit.

PDF and image linking (Revit 2021)

Link and unload images and PDFs in project models locally and from the cloud. Easily keep this information updated while also not increasing file size or embedding the image or PDF file for security or IP reasons.

- Link PDFs and images from local or cloud file locations
- Select multiple rows to reload or remove links
- Convert links to imports as needed
- Use the Show button to find a PDF or image in a project



Utilize and manage PDFs and images much more easily

This feature improves sorting, adds size reporting, adds multi-select for unload-reload-remove operations, adds the ability to convert links to imports, and adds the “Show” button to find a PDF or image in the model.

Bottom line: Utilize and manage images and PDFs much more easily with the new linking features introduced in Revit 2021.

Link Inventor to Revit (Revit 2022)

Maintain links between Revit and Inventor data for seamless BIM and MCAD interoperability.

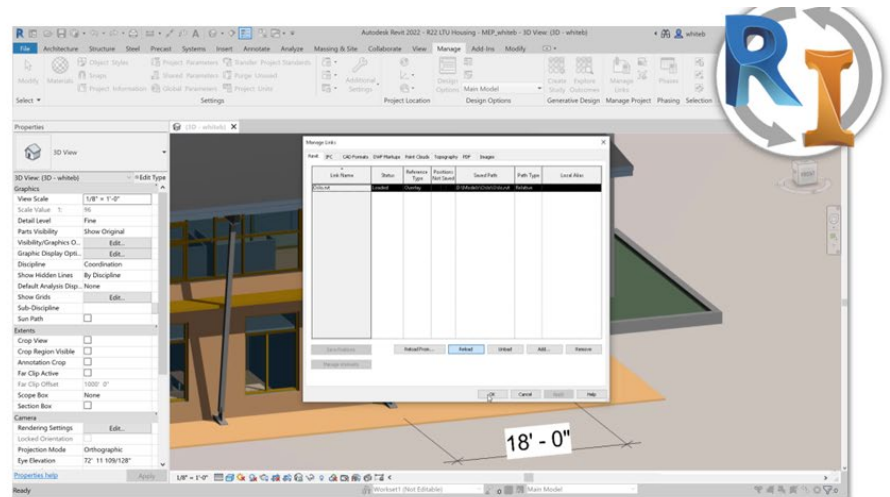
Link Revit Models Exported from Inventor

- Inventor incorporates the new Simplify command to produce an RVT model containing only the components and features needed for the Revit design.
- The Revit Export and Simplify command have been combined in Inventor and added to the property panel for a complete set of options in one easy-to-use interface.
- Link the resulting RVT files into Revit projects.

Link Revit into Inventor

- The Inventor user references the Revit project in order to keep the 'building design intent' model synchronized with the manufacturing data.
- This allows the mechanical engineering tasks to be performed in the context of the building model.
- When the manufacturing models are positioned and sized correctly, exporting the design as Native Revit data strengthens project coordination and review.

- Link Inventor assemblies as Revit models
- Nameable reference geometry
- Persistent tags for DirectShapes



Improved interoperability
between Revit and Inventor

Bottom line: Take advantage of improved interoperability between Revit and Inventor, starting with the 2022 releases.

Open any synced version (Revit 2022.1)

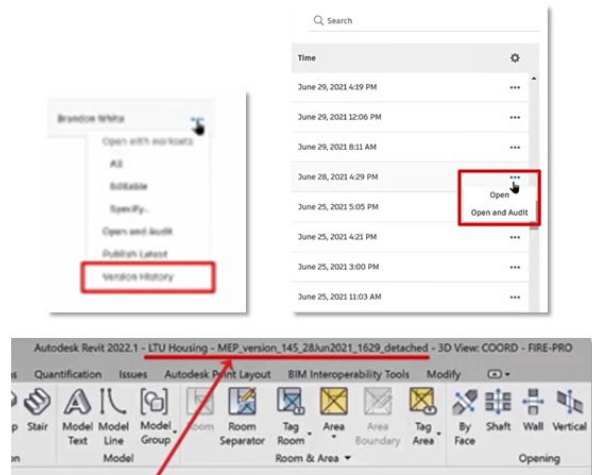
Revit 2022.1 enabled you to open any synchronized version of a Revit Cloud Model.

From Revit Home, locate the cloud model you are interested in and click on the ellipsis menu. You will see an option for Version History.

Selecting this option will open a list of all previous syncs for that cloud model. The version history panel displays the number of syncs, the name of the user that synced each version, and a timestamp for each version.

After finding the desired version, you can open (with or without auditing) that version of the file. The model will open as a detached copy of the project file with the version number and timestamp in the file name.

- Locate any synchronized version of a Revit Cloud Model from Revit Home
- Version history panel displays:
 - Number of syncs
 - Name of user
 - A timestamp for each version
- Open a detached copy with or without auditing



Easily access any synced version

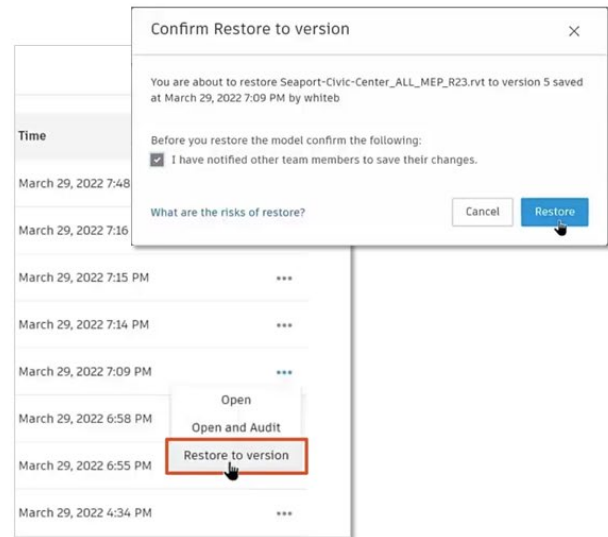
Bottom line: Easily access any synchronized version of a Revit Cloud Model with this new feature, first introduced in Revit 2022.1.

Non-destructive model rollback (Revit 2023)

In previous releases of Revit, rolling back a cloud model to a previous version was an irreversible process; all backup versions newer than the version selected for rollback would be permanently discarded.

- All backup versions are preserved in the online version history
- You can now roll back (or forward) to any existing backup

Easily roll back (or forward)
Revit Cloud Models



Revit 2023 introduces a non-destructive model rollback process. This means that all backup versions are preserved in the version history, and you can roll back (or forward) to any existing backup.

Bottom line: This means you can roll back your Revit cloud models easily—and reversibly—with Revit 2023.

Parameters Service tech preview (Revit 2023)

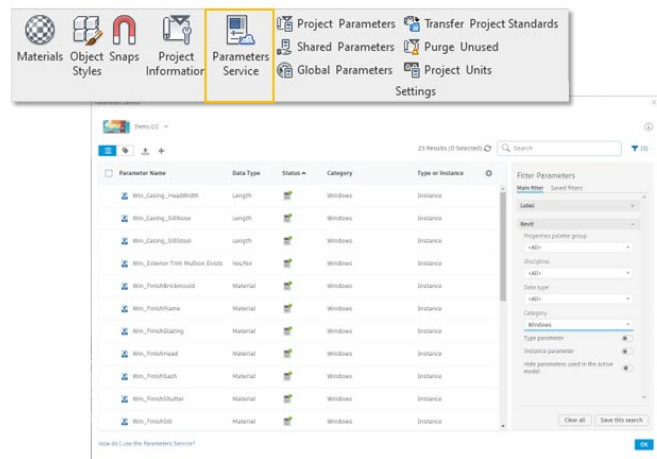
The Parameters Service is a technology preview that allows you to manage your parameters library using the Autodesk Construction Cloud.

Using the Parameters Service, you can search for parameters and pull them in bulk into your Revit model. All parameters are integrated directly into Autodesk Construction Cloud. Parameters can be created by selecting the *New Parameter* button. You are required to fill in the Name, Discipline, Value type, and Properties Palette group. Select at least one default category for the parameter and specify whether it should be a type or instance parameter.

You can also leverage your existing shared parameter files.

From Revit, you can launch the Parameters Service by navigating to Manage > Parameters Service in the Ribbon. Here, you can perform all parameter management activities. You can search for parameters, filter a view, and/or add parameters to your Revit model.

- Create a library of parameters on Autodesk Construction Cloud
- Add parameters from the Parameters Service anywhere shared parameters are used
- Search, filter, and label parameters



Work with parameters more efficiently

Parameters can be added to the service by uploading an existing shared parameters file—similarly to the cloud. You may also upload parameters from an active Revit file or create parameters manually.

Before you import parameters into a Revit project, you will need to set their category in the service. Click on a parameter to open its detail window, then change its category bindings and Properties Palette group.

In Revit, you can add parameters from the Parameters Service in any location where shared parameters can be used. Simply select *Add From Service* to launch the Parameters Service. Then select one or more parameters to use and click the *Add to Revit Model* button.

Parameters loaded from this service can be managed in the same way as any other shared parameter.

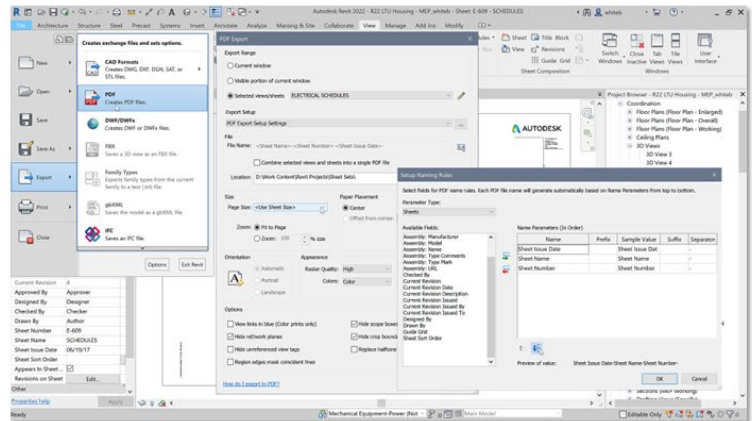
Bottom line: Manage your parameters library more efficiently across projects and locations using the unified Parameters Service with Revit 2023 and the Autodesk Construction Cloud.

Native 2D PDF export (Revit 2022)

Autodesk Revit 2022 included a native, configurable 2D PDF export feature to improve documentation efficiency.

The PDF Export dialog offers similar options to the Print dialog, such as the ability to export the visible portion of a view or a user-defined selection of views and sheets.

- Configurable 2D PDF export
- Set up PDF naming rules within the Export Setup
- Generate PDF file names automatically from project or shared parameters
- Detect output size and orientation automatically



Native Revit PDF exporter improves documentation efficiency

PDF naming rules may be set up within the Export Setup section of the dialog. You can use this feature to generate PDF file names automatically based on your project or shared name parameters.

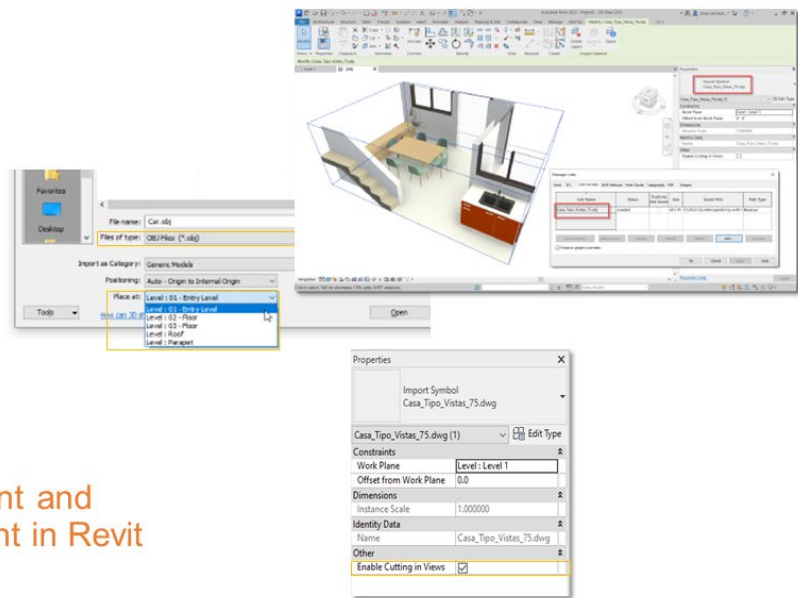
You can also choose to have the exporter detect output size and orientation automatically from the selected views and sheets.

Bottom Line: The new Revit native PDF exporter offers familiar and configurable features to improve documentation efficiency.

CAD file improvements (Revit 2023)

Revit 2023 offers improvements to CAD file format support, placement, and appearance. You may now link additional CAD file types (AXM, OBJ, and STL) into your Revit projects.

- Link AXM, OBJ, and STL files in Revit
- Position CAD imports on levels or named horizontal reference planes
- Enable cutting 3D CAD elements in views



Better control the placement and appearance of CAD content in Revit

All supported CAD file types can now be placed on levels or named horizontal reference planes as they are imported. In the Import dialog, use the "Place at" option and drop-down menu to select the base level of the CAD import.

A new instance parameter allows cutting of 3D elements in CAD files. When this parameter is enabled, 3D geometry is shown as cut when the cut plane of the view intersects the element. When the parameter is not enabled, the CAD geometry is shown as projected regardless of cut plane location.

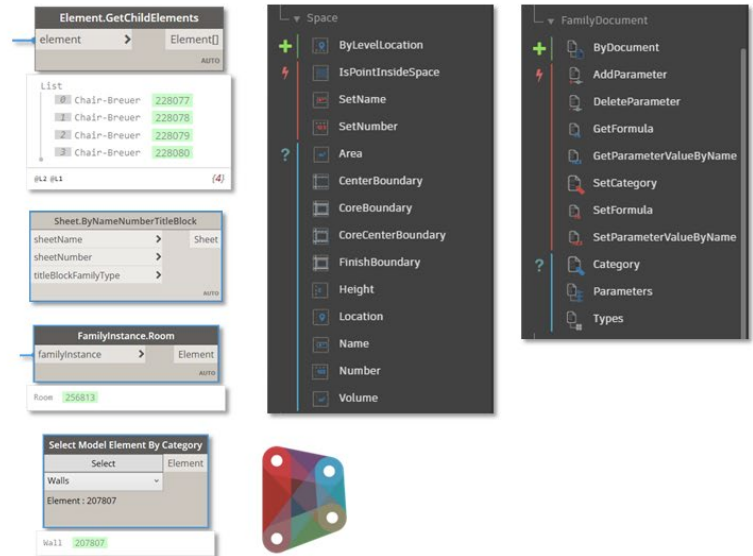
Bottom line: These new features will give you better control over the placement and appearance of CAD content in Revit.

New Dynamo Revit nodes (Revit 2021.1+)

In Revit 2021.1, 80+ new Dynamo Revit nodes were added to support the most commonly-requested conditions across 19 categories. This was a significant development effort in support of customer requests.

- 80+ new commonly-requested nodes across 19 categories
- Revit Element nodes that meet essential use cases
- Wide range of documentation-related categories
- New categories of nodes such as: Space, Warning, Family Document
- New Selection nodes

Improved capabilities for task automation



Bottom line: These nodes will help users work more productively through Dynamo-driven task automation.

“Best of the Rest”, continued...

Finally, here are additional features from the Interoperability, Simulation + Analysis, Design Optimization, Cloud + Data, and Developer Tools categories that apply to ‘everyone’:

- Cloud Model hosting in Europe (21)
- Improved BIM 360 project navigation in Revit Home (21)
- Dynamo 2.5 installed (21)
- New Dynamo Revit nodes (21)
- Improved Rhino and SAT files import (21.1)
- Built-in STL export (21.1)
- Shared views (3D) in Revit (21.1)
- Dynamo 2.6 installed (21.1)
- IFC performance and quality improvements (22)
- Nameable reference geometry (22)
- 2D shared views (22)
- Open cloud model from file menu (22)
- Update BIM 360 branding to new ACC branding (22)
- Unified cloud model initiate UI (22)
- Dynamo for Revit 2.10 (22)
- New Dynamo nodes for Revit documentation (22)
- Sketch API (22)
- Viewport label on sheet API (22)
- Color fill API (22)
- Cloud model initiate and link API (22)
- API for mapping cloud model with Docs URNs (22)
- Point cloud API (22)
- OBJ and STL file format support (22.1)
- IFC ODA toolkit update (22.1)
- Dynamo for Revit 2.12 (22.1)
- Dynamo for Revit updates (22.1)
- IFC parameters and export mapping dialog (23)
- Manage Cloud Models in Revit Home (23)
- Remember last account for Revit Cloud Models (23)

Wrapping Up

Let's close out with a quick review of the "top" features—as ranked by our Autodesk technical marketing experts for each discipline and (for platform features) the three categories covered previously.

Top Features by Discipline

Features for simulation and analysis (route analysis, systems analysis, electrical load analysis, structural analysis) and interoperability (FormIt Pro, Rhino, IFC, RPC) stand out among these discipline-specific rankings. ***What do you think?***

ARCHITECTURE

1. Generative Design (21+)
2. FormIt Pro interoperability (23+)
3. Link Rhino 3DM files (22+)
4. Real-time realistic views (21)
5. Tapered walls (22+)
6. Route analysis tools (22+)
7. RPCs in realistic views (22)
8. IFC4 certifications (22+)
9. Use RPC for furniture category (22)
10. Preserve values in key schedules (23)

MEP

1. MEP systems analysis (21+)
2. Electrical load analysis (23)
3. Electrical circuit naming (21+)
4. Panel schedule interaction (21.1)
5. MEP demolition improvements (23)
6. Electrical performance (22.1)
7. Fabrication improvements (22+)
8. MEP worksharing enhancements (21)
9. New pipe flow units (21)
10. FDM tech preview (23)

STRUCTURE

1. New structural analysis approach (23)
2. Adaptive propagation for rebar (23)
3. Connection automation libraries (23)
4. Rebar placement by two points (22)
5. Move rebar in a set (22)
6. Ranges of applicability (22)
7. Edit multiple rebar sets (22.1)
8. Create standard 3D rebar shapes (21+)
9. Steel object editing enhancements (21)
10. Steel modeling improvements (21)

Top Platform Features by Category

A wide variety of features made the cut here—and so many more didn't! From PDF interoperability to smarter document management, these across-the-board improvements should benefit every Revit user. ***Did your favorites make the list?***

DESIGN PRODUCTIVITY

1. Measure in 3D (23)
2. Duplicate sheets (22.1)
3. Reset shared coordinates (21.1)
4. New units (21.1)
5. Get Autodesk content (21)
6. Load multiple Autodesk families (22.1)
7. Sketch copying performance (23)
8. Enable view filters in view (21)
9. Family category improvements (22)
10. Additional cuttable categories (23)

DOCUMENTATION EFFICIENCY

1. Grids in 3D views (22)
2. Page order in PDFs (23)
3. Views on sheets icon (23)
4. Swap views on a sheet (23)
5. Filter by sheet in schedules (23)
6. Displace elements in 2D views (23)
7. Split schedules across sheets (22)
8. Key schedule shared parameters (22)
9. Revision numbering flexibility (22)
10. Maintain annotation orientation (22)

"BEST OF THE REST"

1. Data Exchanges (23)
2. Revit Cloud Model upgrade (21.1)
3. PDF and image linking (21)
4. Link Inventor to Revit (22)
5. Open any synced version (22.1)
6. Non-destructive model rollback (23)
7. Parameters Service tech preview (23)
8. Native 2D PDF export (22)
9. CAD file improvements (23)
10. New Dynamo Revit nodes (21.1)

Additional Resources

Want to learn more about the recent Revit releases? Check out the links below!

- [What's New in Revit 2021](#)
- [What's New in MEP for Revit 2021](#)
- [What's New in Revit 2021.1](#)
- [What's New for Architects in Revit 2021.1](#)
- [What's New in Revit 2022](#)
- [What's New for MEP in Revit 2022](#)
- [What's New for Architects in Revit 2022, Part 1 of 3: Modeling, Documentation, and Production](#)
- [What's New for Architects in Revit 2022, Part 2 of 3: Interoperability and Data Exchange](#)
- [What's New for Architects in Revit 2022, Part 3 of 3: Productivity and Ease of Use](#)
- [What's New in Revit 2022.1](#)
- [What's New in Autodesk Revit 2023](#)
- [What's New for MEP in Revit 2023](#)
- [What's New for Structures in AEC Collection 2023](#)
- [Top Five Community Ideas Implemented in Revit 2023](#)

Thank you for your interest in Autodesk Revit!