AS501164

Document Workflows in Autodesk Construction Cloud

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Learning Objectives

- Learn the document control features and approval workflows available in Autodesk Docs
- Learn how to manage sheets, RFI's and Submittals inside Autodesk Build
- See Workflows between Revit, Civil 3D, and AutoCAD Plant 3D in the cloud
- Learn how to use ACC Connect to transfer data between cloud platforms

Description

With Autodesk's acquisition of PlanGrid and release of the Autodesk Construction Cloud there are several tools that assist in the flow of project information. This class will show various workflows not only with the supported software tools like Revit, Civil 3D, and AutoCAD Plant 3D, but also with approval workflows, RFIs, submittals, the way sheets flow through a project, and ways you can use Autodesk Construction Cloud Connect to transfer data across different cloud platforms. This class will inspire you to expand your use of the Autodesk Construction Cloud.

Speaker(s)

Philip Russo

Head of Digital Design and BIM - Americas, Ramboll
I have been in this industry since 1986 working primarily with Autodesk software solutions. I currently work as the Head of Digital Design and BIM for the Americas with Ramboll. My primary focus is to guide our technology and workflow efforts across all disciplines and business units.

David Cusano

Head of Visualization - Americas, Ramboll
I have been working in the AEC industry since 2001. In my current position at Ramboll I split time between visualization and innovative delivery solutions to meet our client needs and managing/supporting a variety of Autodesk engineering packages such as AutoCAD MEP, AutoCAD Plant 3D, and Autodesk Inventor/Vault.

AUTODESK UNIVERSITY

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Document Control

We first need to lay the groundwork for the Autodesk Construction Cloud. Understanding the role of the Account Admin vs. The Project Admin and the tasks each perform are essential in setting up a project and defining your workflows.

Account Admin

Create, archive and restore projects
Add and remove members from main ACC Account
Add and remove partner companies
Define Roles
Define business Units
Create project templates and template contributors
Activate apps

Project Admin

Manage project members
Add companies to project
Project Settings and add locations
Set up notice frequencies

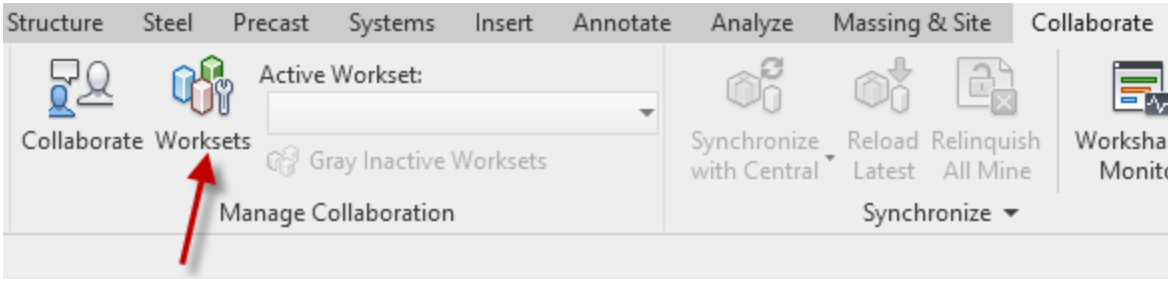
Revit Model Workflows

When working with Revit models in the Autodesk Construction Cloud (ACC) we will look at Direct model linking, sharing using Teams with Design Collaboration and the new bridge function to share files between projects

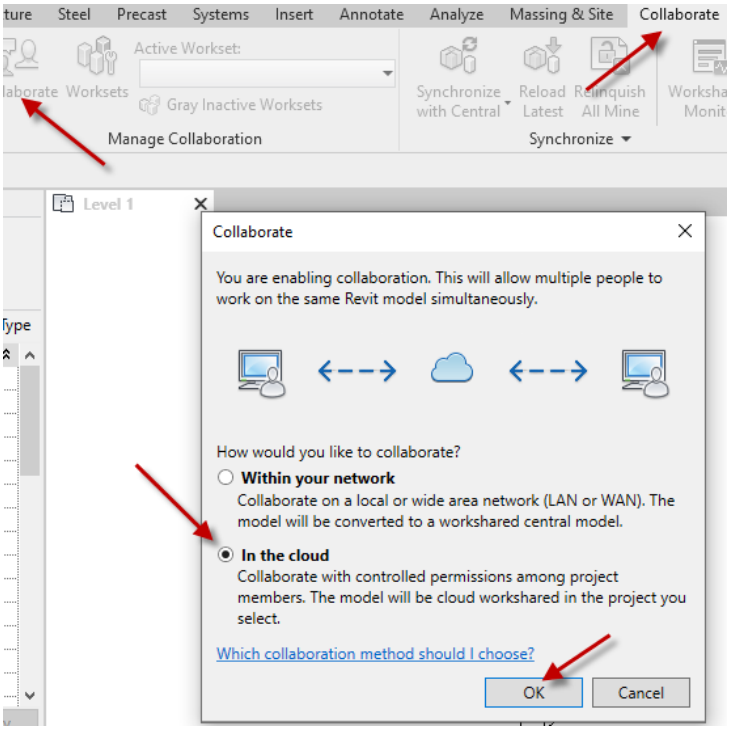
Direct Model Linking

To collaborate on a Revit model, you must activate work sharing and publish your model to the Autodesk Construction Cloud

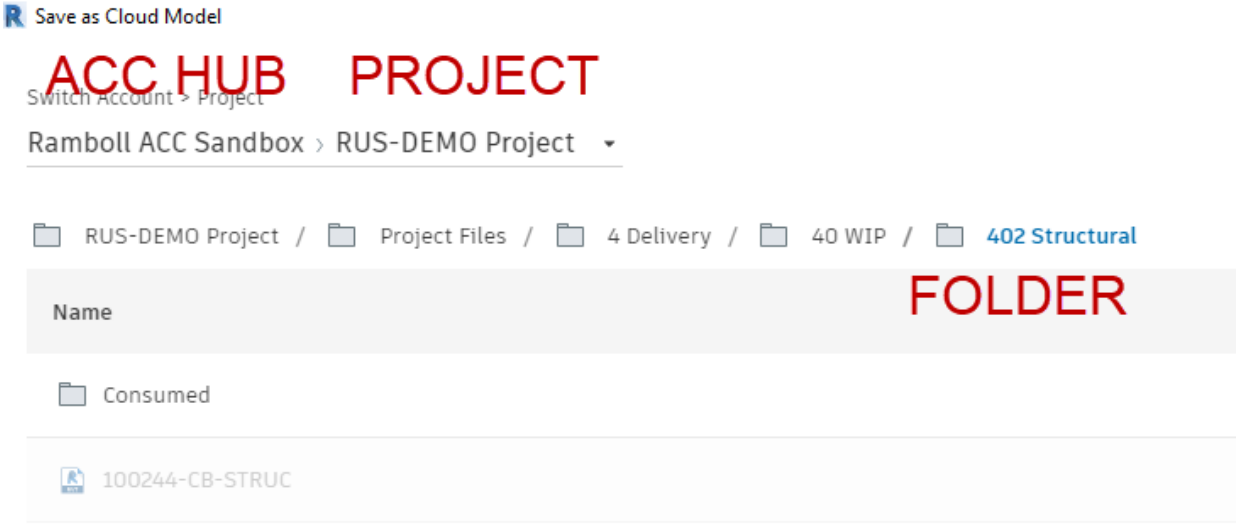
If your model has not been saved when you select Collaborate. Keep in mind that your Revit model will get published to the cloud and be available for the team members with the correct permissions and the ability to work in the model. But in the case of Revit you must activate work sets if you wish for more than one person at a time to be actively working in the model. Without work sets activated the document will be locked down to one person at a time editing capabilities.



Once work sets are activated and your model is saved you can select Collaborate to push your model to the project in the Autodesk Construction Cloud. Keep in mind you must be invited to the project and have editing permissions to the folder the Revit model is being pushed to.

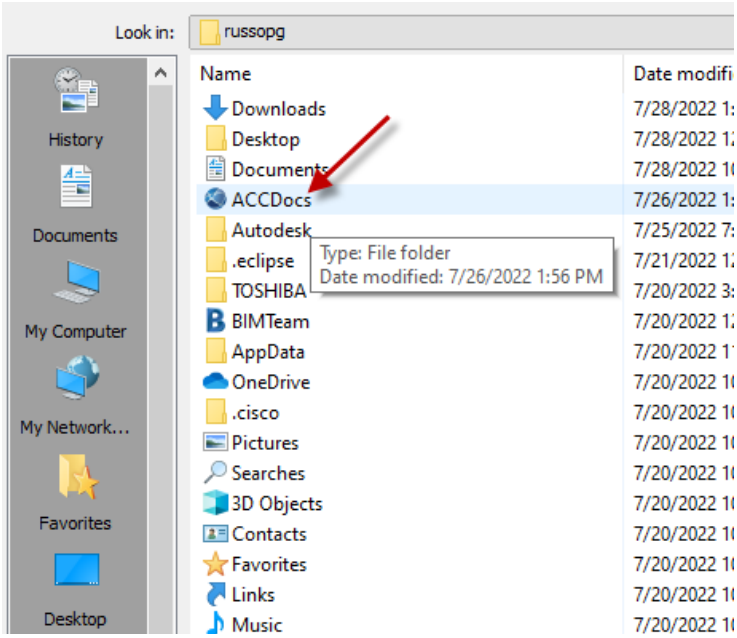


When you select “OK” you need to browse to the correct, HUB, Project and folder the Revit model will be saved to.

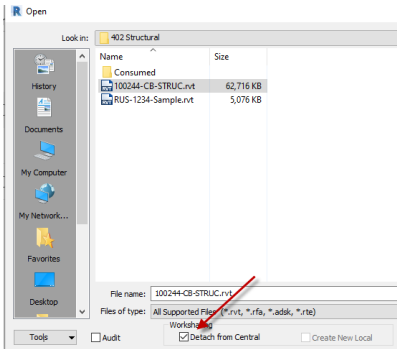


Once a Revit model exists in the Construction Cloud it will be accessed through Autodesk docs where the user has access to all projects they belong to. A couple things to understand:

1. Your version of Revit will determine the projects that are displayed. So if you open Revit 2022 you will only see projects that have Revit 2022 models in them. If the project has Revit 2020 models the project will not be displayed.
2. If you need to detach a copy of the model from the central cloud hosted model you must open the model using the Autodesk Desktop Connector.



ACCDocs is the link to the construction cloud using the Autodesk Desktop Connector. When you browse to your project this way you will have the option to detach a copy from the central cloud model.



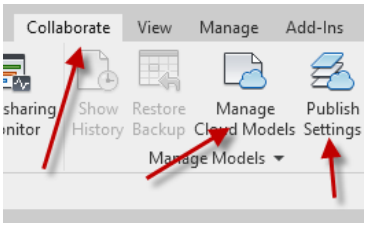
When opening a Revit model from the Autodesk Construction Cloud a local copy is created. The local copy is located :

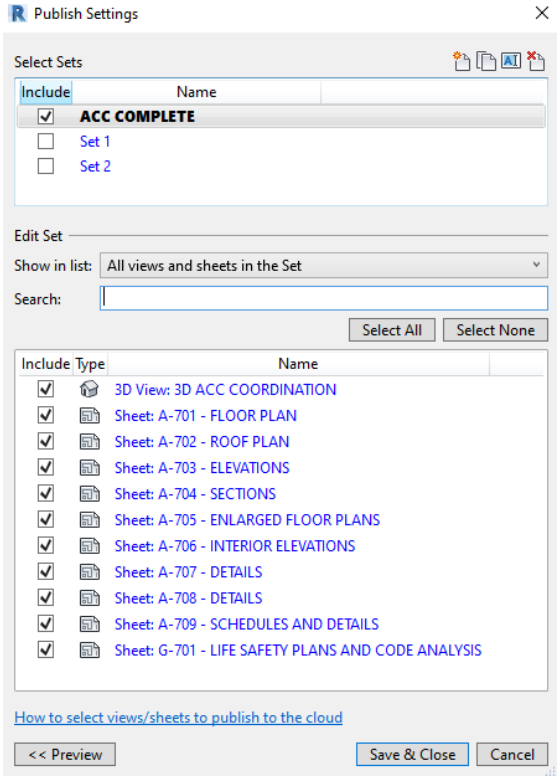
C:\Users\%USERNAME%\AppData\Local\Autodesk\Revit\<Autodesk Revit Version>\CollaborationCache

This local copy can be opened and pushed to the cloud if for some reason the Cloud model is corrupt, and the backups are not current enough.

Revit in the Construction Cloud

The model in the Construction cloud viewable from a web browser will be the most current "Published" version of the model. Within Revit you must establish your publish settings and publish your model to update the viewable web version.





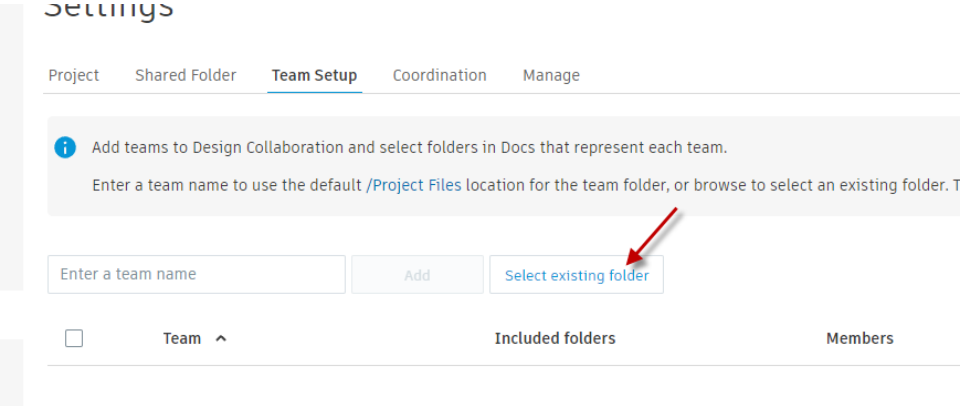
Once you have your model in the cloud you have 3 different workflows to choose from when linking Revit models.

Method 1 - Live linking

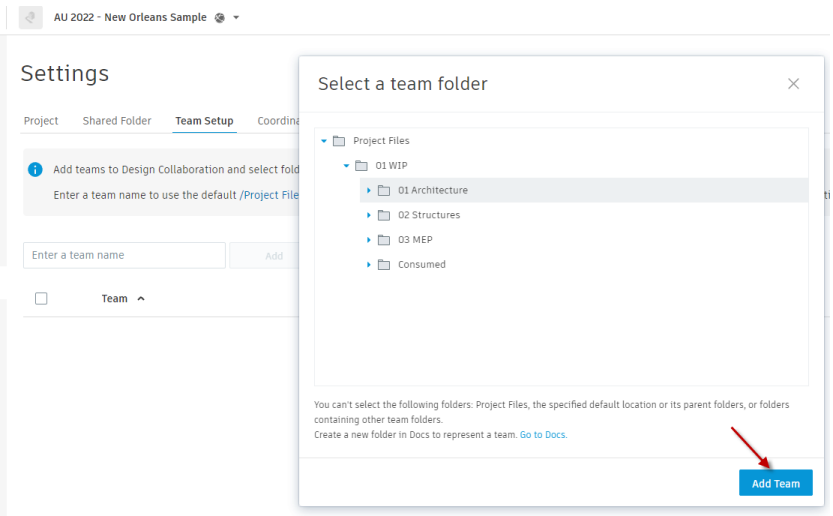
If folder permissions are correct others can link your model into theirs directly from your working folder. To have more control over model sharing you may choose one of the other 2 methods.

Method 2 – Link from Shared Folder

Use design collaboratrion and publish a version of your model which will be coped to a shared location you specify. This gives you more control for sharing your data when you're ready.

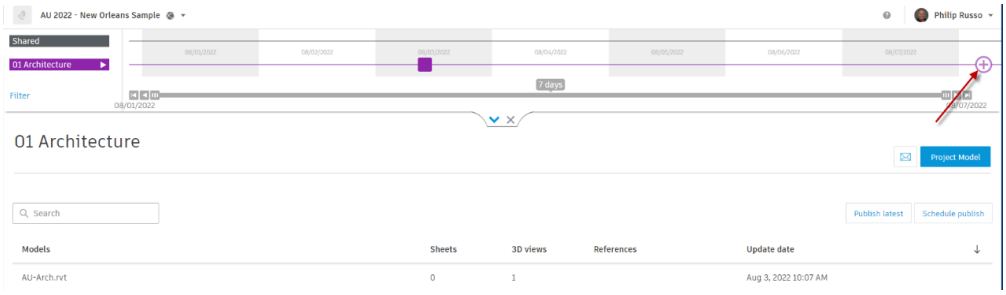


To setup your Collaboration Teams Goto the Design Collaboration module, then you need to select the folder that your model resides in. Select the link called “Select existing folder” as shown in image above to browse to that location.

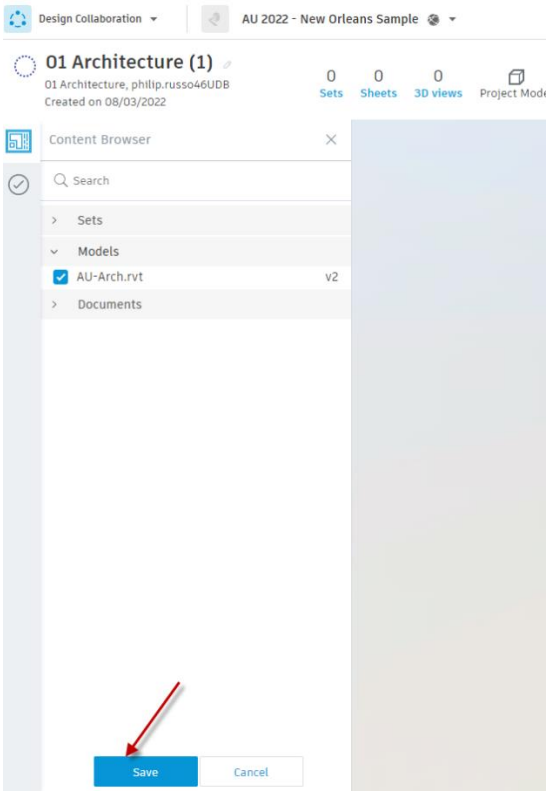


Once you select the folder and pick “Add Team” the Design Collaboration module will recognize the Revit model in the folder to create the team.

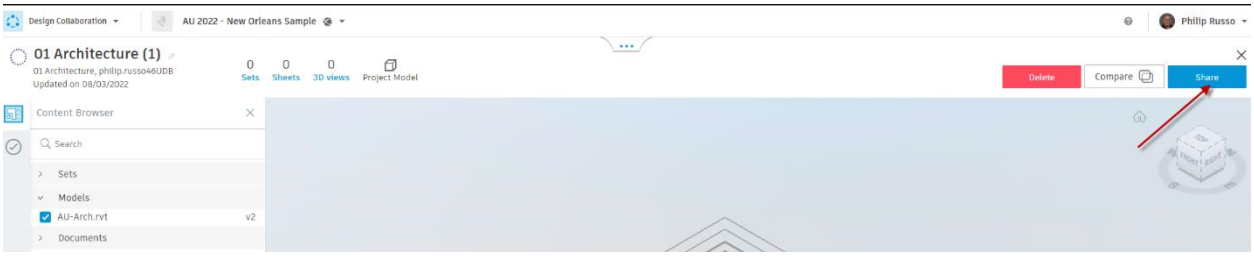
Now that the Team has been created, in the Home page of the Design Collaboration you can select the 3 dots shown in image to access the publish timeline. This will display all the Teams that have been setup and allow you to publsih a package.



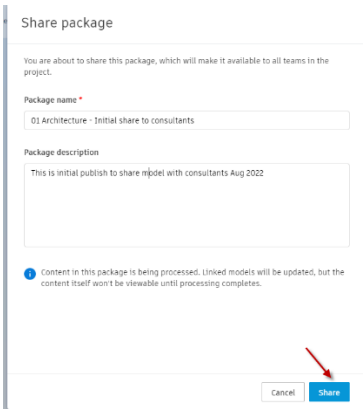
Notice at the end of the Architecture Team is a plus sign. This is the link that allows you to publish your model to the shared folder mentioned previously.



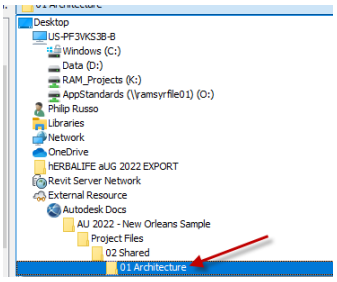
A content browser will be displayed allowing you the ability to select what you are publishing to be shared,. In this case we are just publishing the 3D model so the other Teams on the project can link the published model into their discipline specific model. Once the 3D model is selected hit “Save”.



The last step in this process is to select “Share”. This will publish the selected Teams model to the shared folder for others to reference.



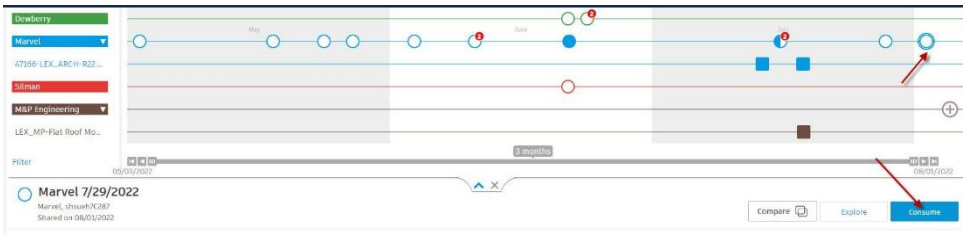
Once you hit Share you can name your package and provide a description. Be specific because there will be a maintained history of the packages publsihed and what the reason was for the publish.



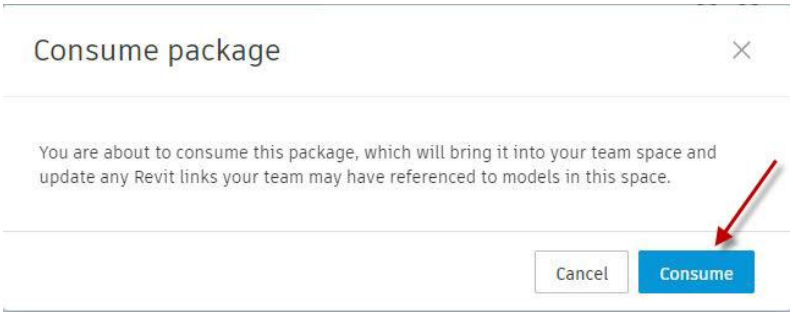
The model can now be linked into other disciplines for reference. The image above shows the location browsed to in Revit through Autodesk Docs..

Method 3 – Consume Package

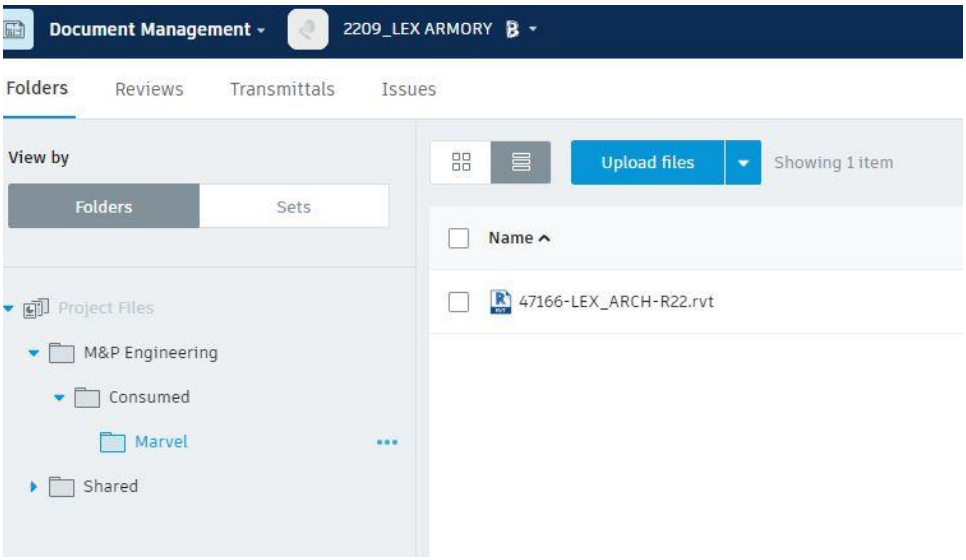
An alternative option and an increased level of control over permissions for file linking is for a Team to consume a published package which brings the model into there own section of the project where there permisiosn are defined for access.



In the Design collaboration module you can select the latest published package and then pick consume.



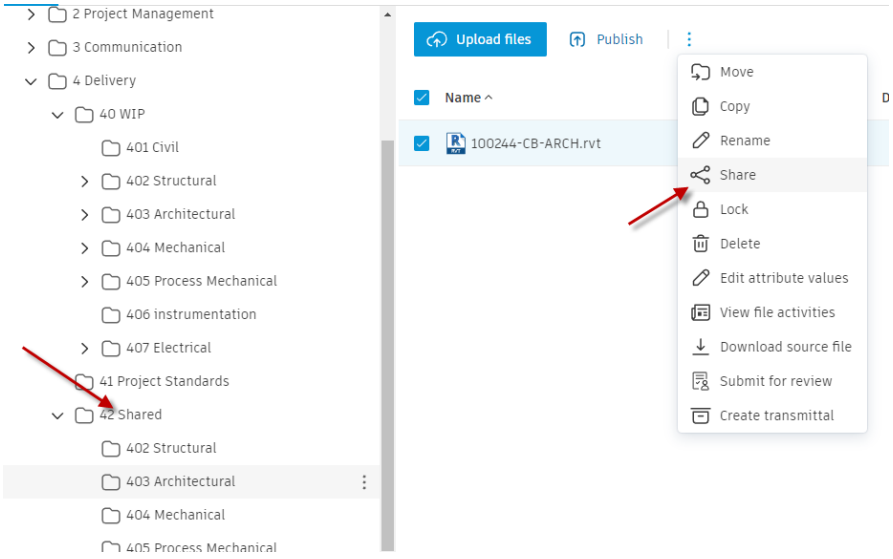
This will bring up a message telling you that this package will be brought into your Teams space so you can use it for linking in the published model. Select Consume to complete the process.



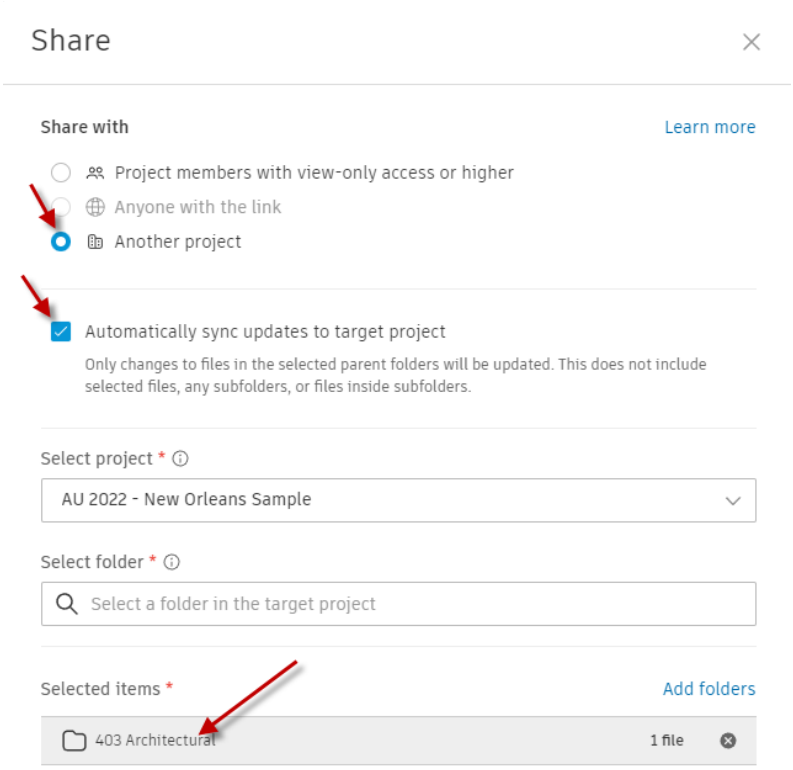
The image above shows the model that was brought into the consumed folder within your teams space. This would be your link location. This method has the most steps but the most control over permissions and project visibilty to outside teanms you bring into your Autodesk Construction Cloud Project.

ACC – Bridge

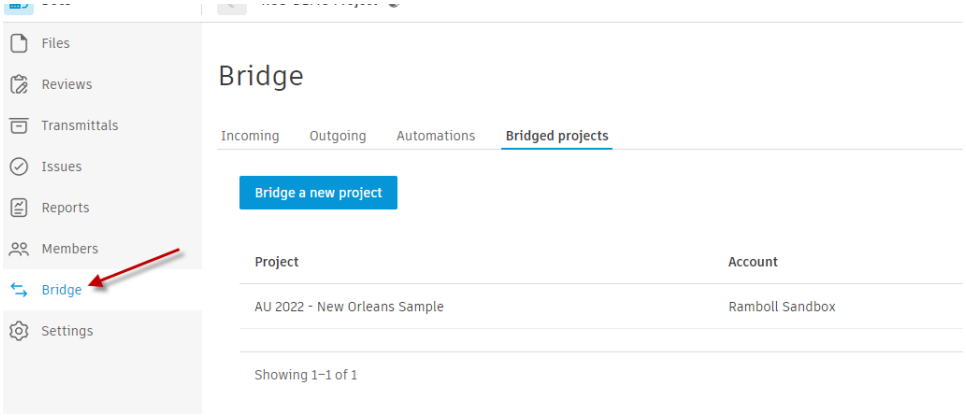
Sometimes we need to share our Revit models across projects within our ACC Hub or a consultants ACC hub. This can be done using the Bridge function. The one catch is that it will only work with shared cloud models and not your Work in progress central file.



In the image above you can see the model that will be shared across projects. Select the file, then select share.



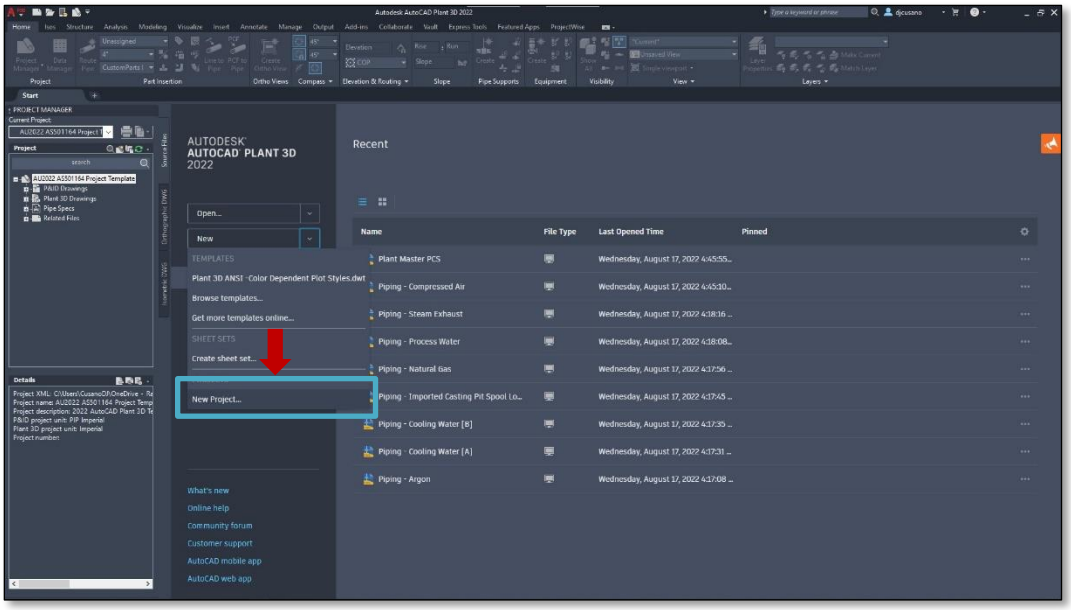
This will bring up a dialog box where you specify your share options. Share with another project is selected at the top section. Next it is important to select “Automatically sync updates to target project”. This will ensure that the next time the shared model is published it will sync the changes forward to your target project. Then finally specify your prject and project folder you want to make the brige connection too. Once this is completed the target project designers can link in this Revit model from the target folder spcifeid if they have the appropriate permissions to do so.



Returning back to the project the model was shared from you can see the Bridge function will display any incoming models, outgoing, automations and projects you are bridged to.

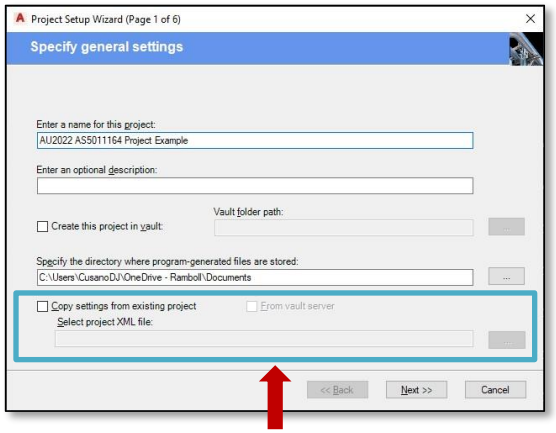
AutoCAD Plant 3D Project Startup

01. Open Plant 3D and click on **New** to start a new project.

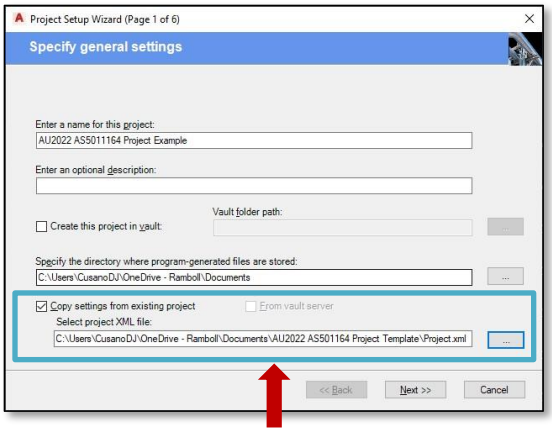


02. Fill out Project Setup Wizard.

- Enter project information and create a temporary folder to store project information before we upload to the Autodesk Construction Cloud.

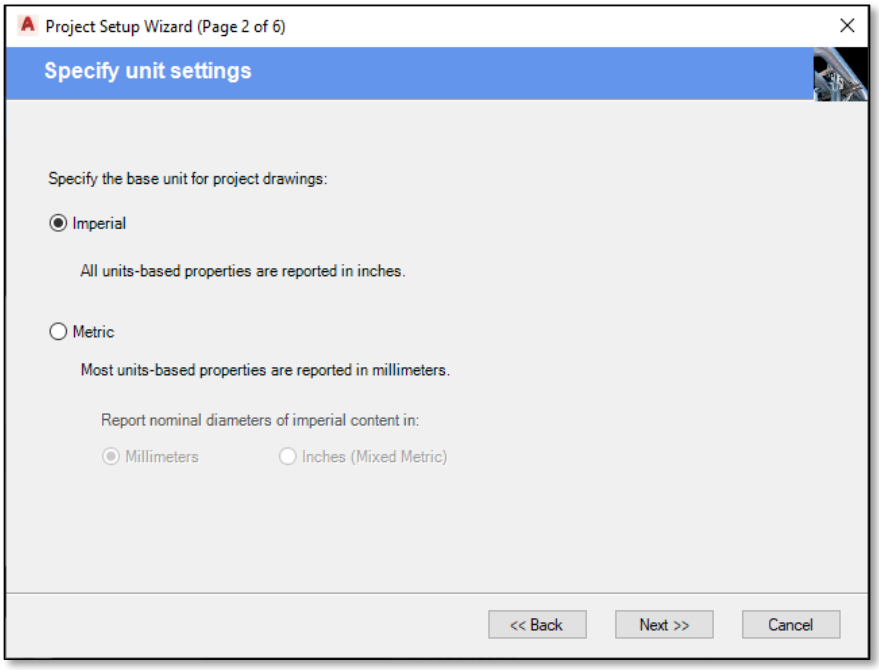


No Template Selected

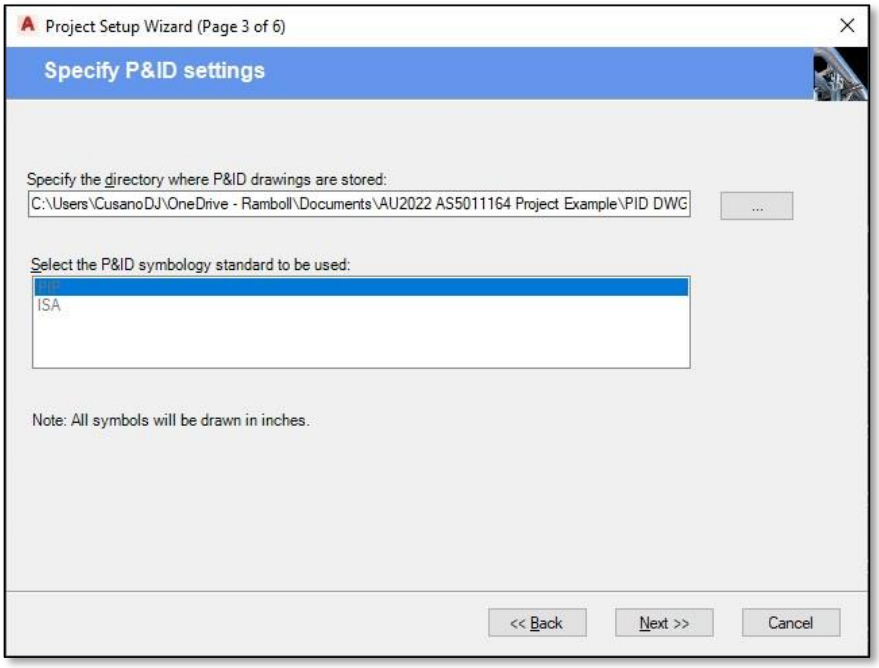


Template Selected

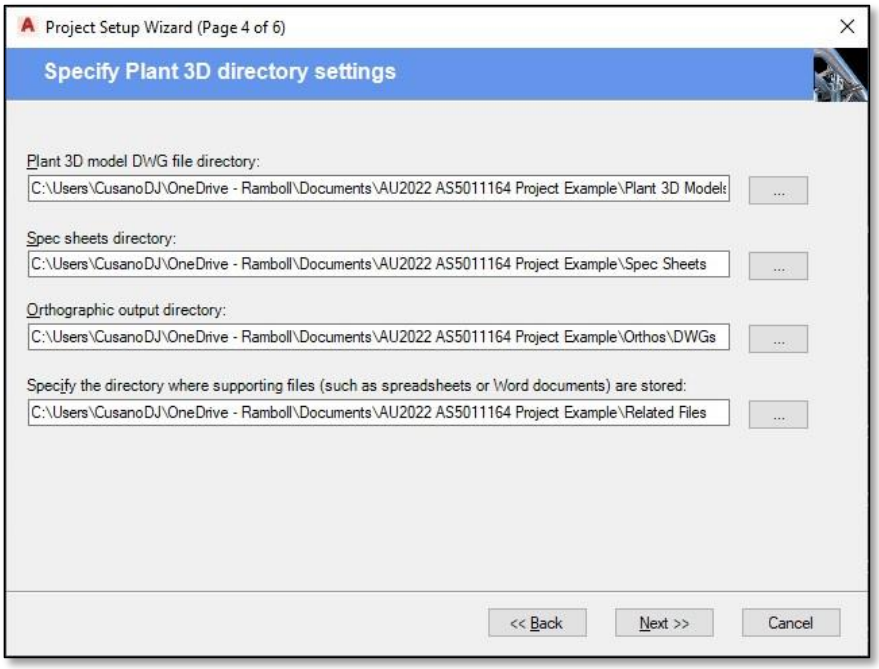
03. Select **Imperial** and then click **Next**.



04. Select **PIP** and click **Next**.

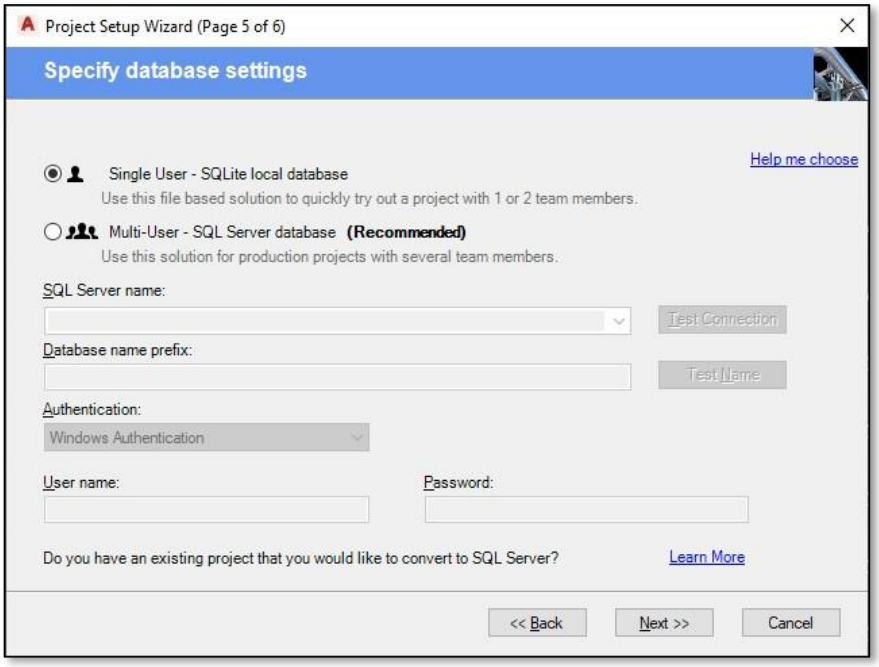


05. Click **Next**.

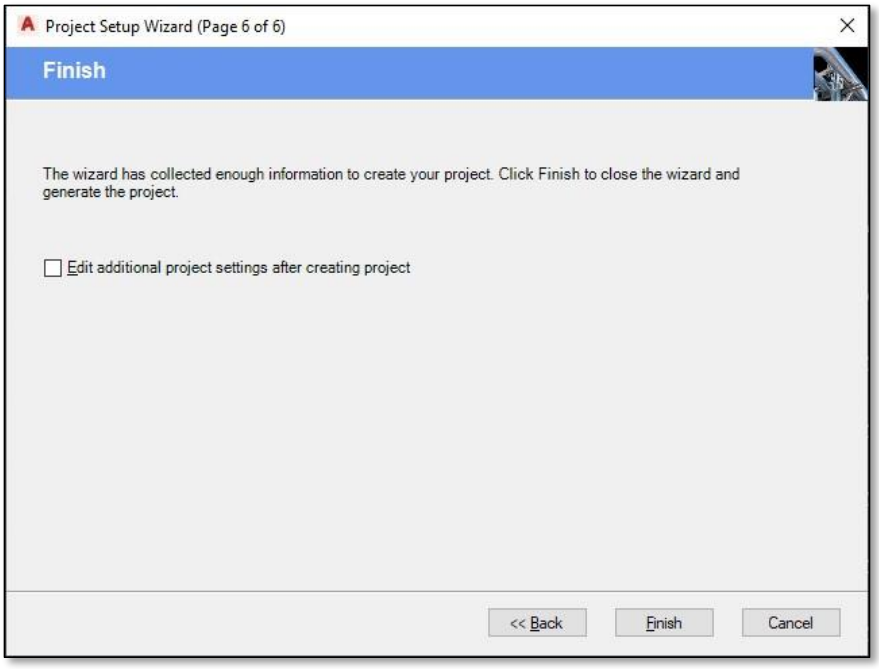


06. Select **Single User – SQLite Local Database**.

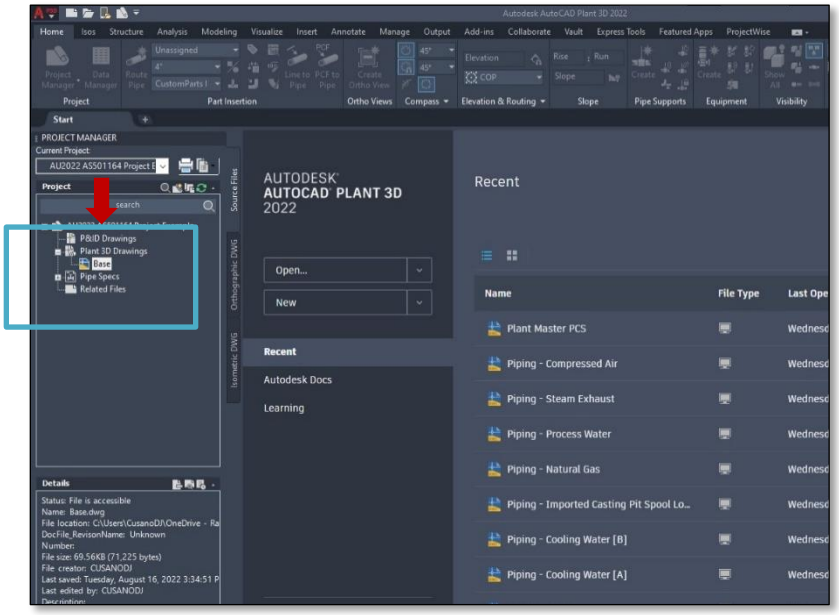
- This choice is somewhat irrelevant as we will be uploading this project to the ACC.



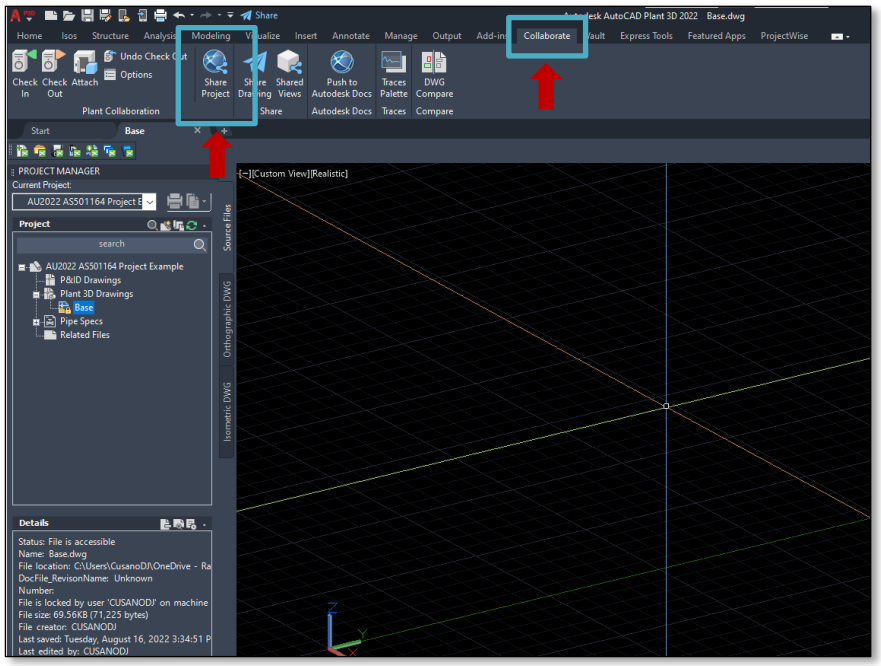
07. Click **Finish** after you have all your information filled out.



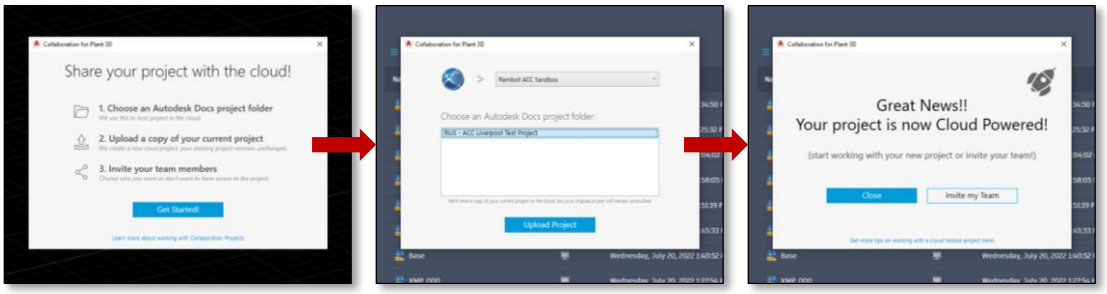
08. The project has now been created. Open **Project Manager** and make sure the current project is set to the one you created. Right click on **Plant 3D Drawings** and select **New Drawing**. Now that we havea drawing created we can upload the project to the ACC.



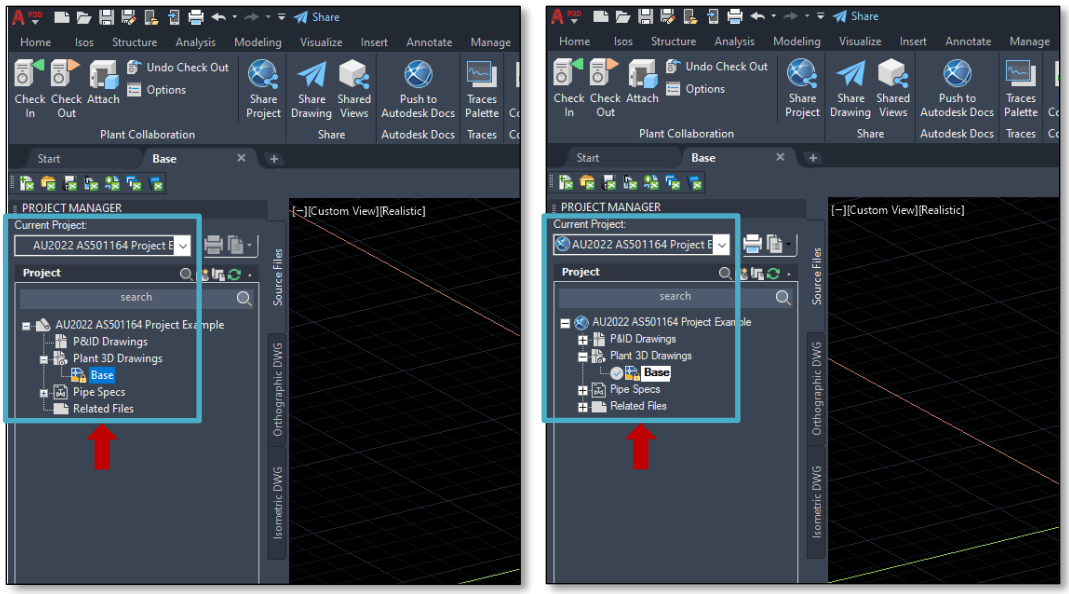
09. Now that we have a drawing created we can now upload the project to the ACC.



10. Follow the onscreen prompts and input the required information.



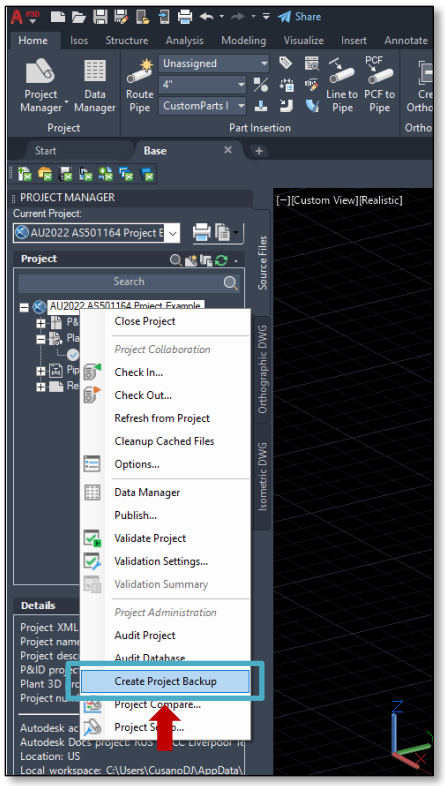
11. Notice the icons next to the project name and files in the Project Manager changes.

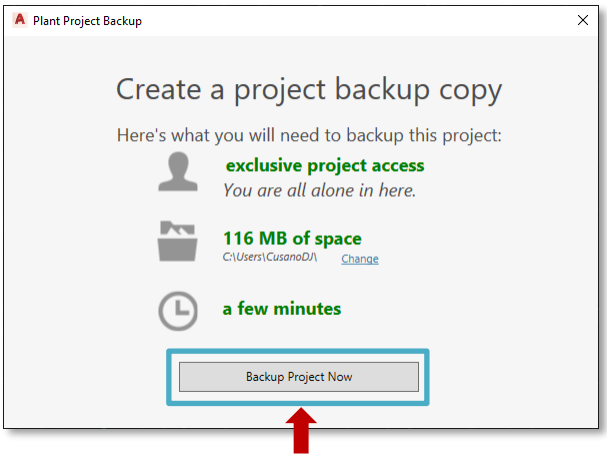


AutoCAD Plant 3D Project Backup

01. To create a backup of your project, right-click on the project name and choose **Create Project Backup**.
    - This process can be used to archive and/or move a project.

02. Define the location for the backup by clicking the **Change** link located beneath the prompt indicated how large the backup will be.

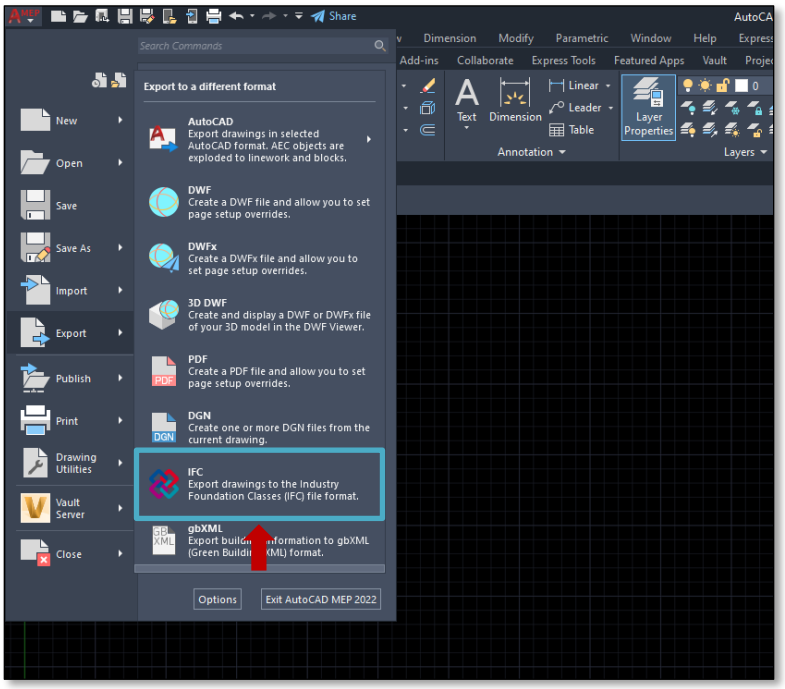




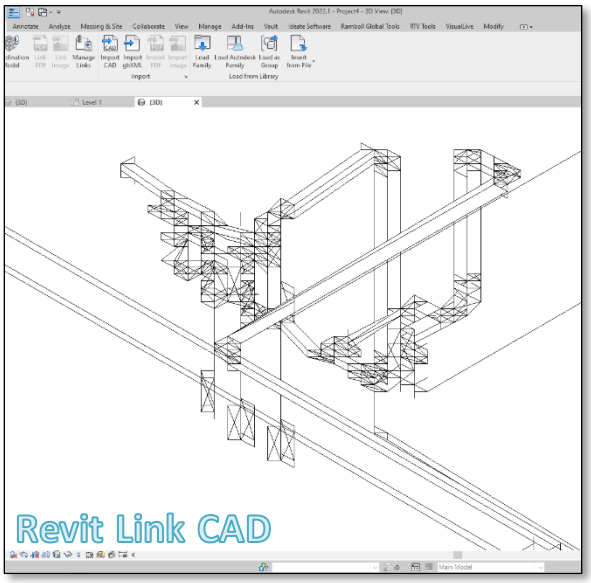
AutoCAD Plant 3D IFC Export

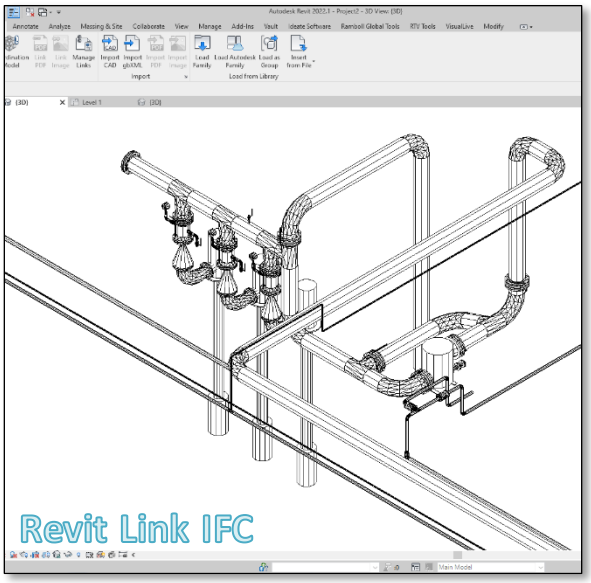
01. To collaborate with our Revit team on ACC projects, we determined the use of an IFC export provided the most stable representation of the AutoCAD Plant 3D geometry within Revit.

02. Since there is no IFC export capability within AutoCAD Plant 3D, we instead use AutoCAD MEP instead to achieve this result.
    - Open youe AutoCAD Plant 3D process model in AutoCAD MEP and use the export to IFC function as shown below.



03. Here you can see examples of linking the AutoCAD Plant 3D DWG directly into Revit (on right). The IFC model provides a much richer representation of our process models.

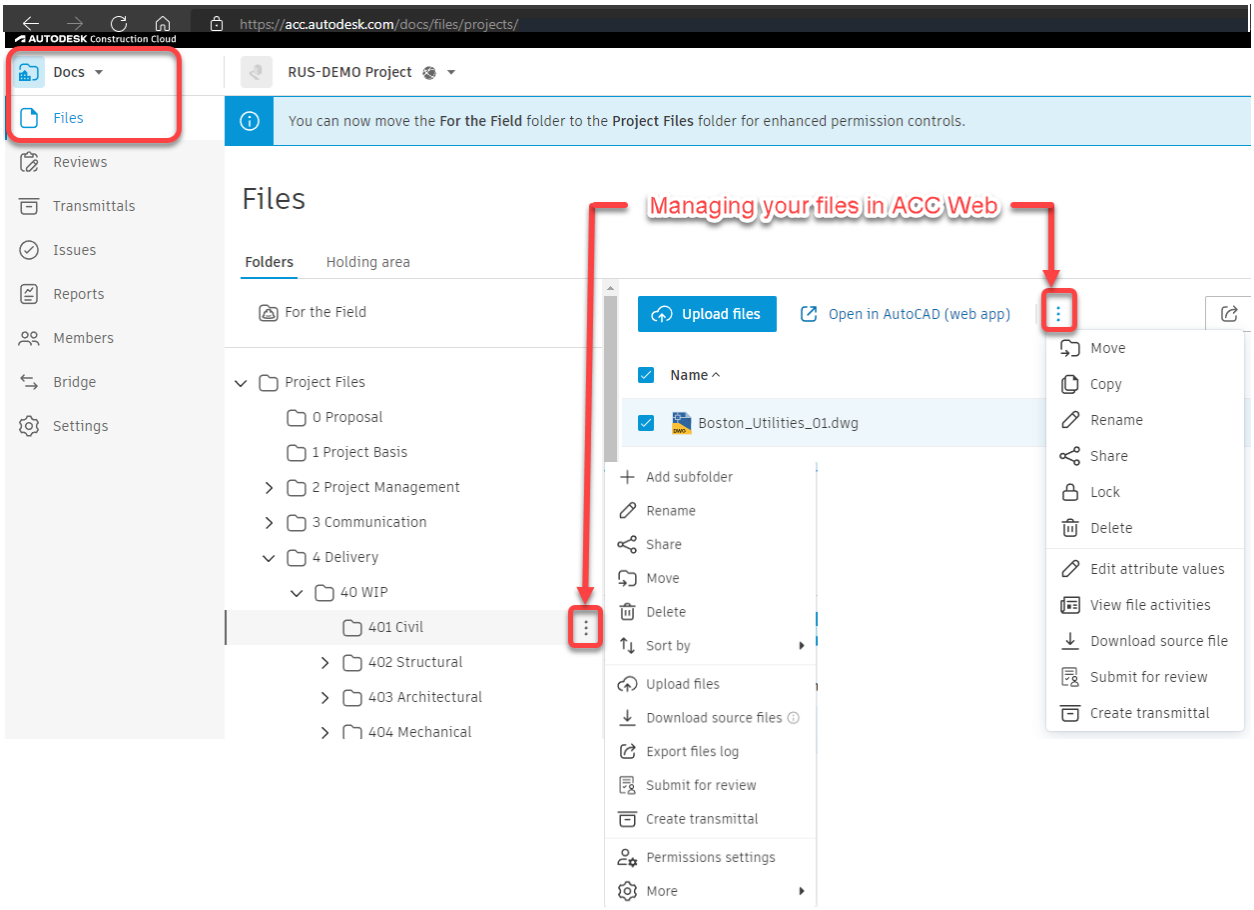




Working in ACC Docs for Civil 3D

Project files including Civil 3D drawings and references are managed in ACC Docs Web online. Civil 3D Drawings are worked on locally in a synchronized Autodesk Docs project folder cache. In Civil 3D you can select open and browse to your drawings using windows file explorer or you can access and browse dircly in Civil 3D through Autodesk Docs located in the Start tab. When you work on files locally in your Autodesk Docs project, there is no change in workflow. You will link to reference files using the same traditional XRef & DRef methods you're use too and ACC will dynamically maintain your links.
Note! You can only work on files that have been added to your ACC project. Never link to files outside of your ACC Project or erroneous foldrs and files will be pulled into your project automatically as "related data". If this happens, you will have to relocate any files that are needed in the project and clear out the "related data" folders.

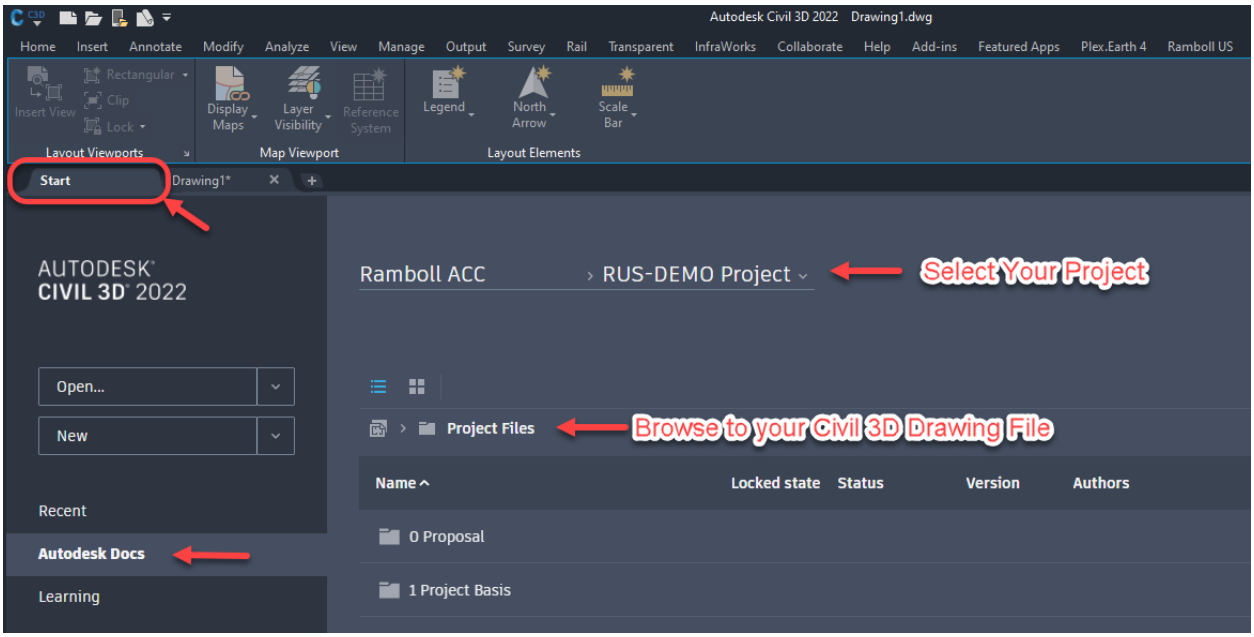
Project files including Civil 3D drawings and references are managed in ACC Docs Web



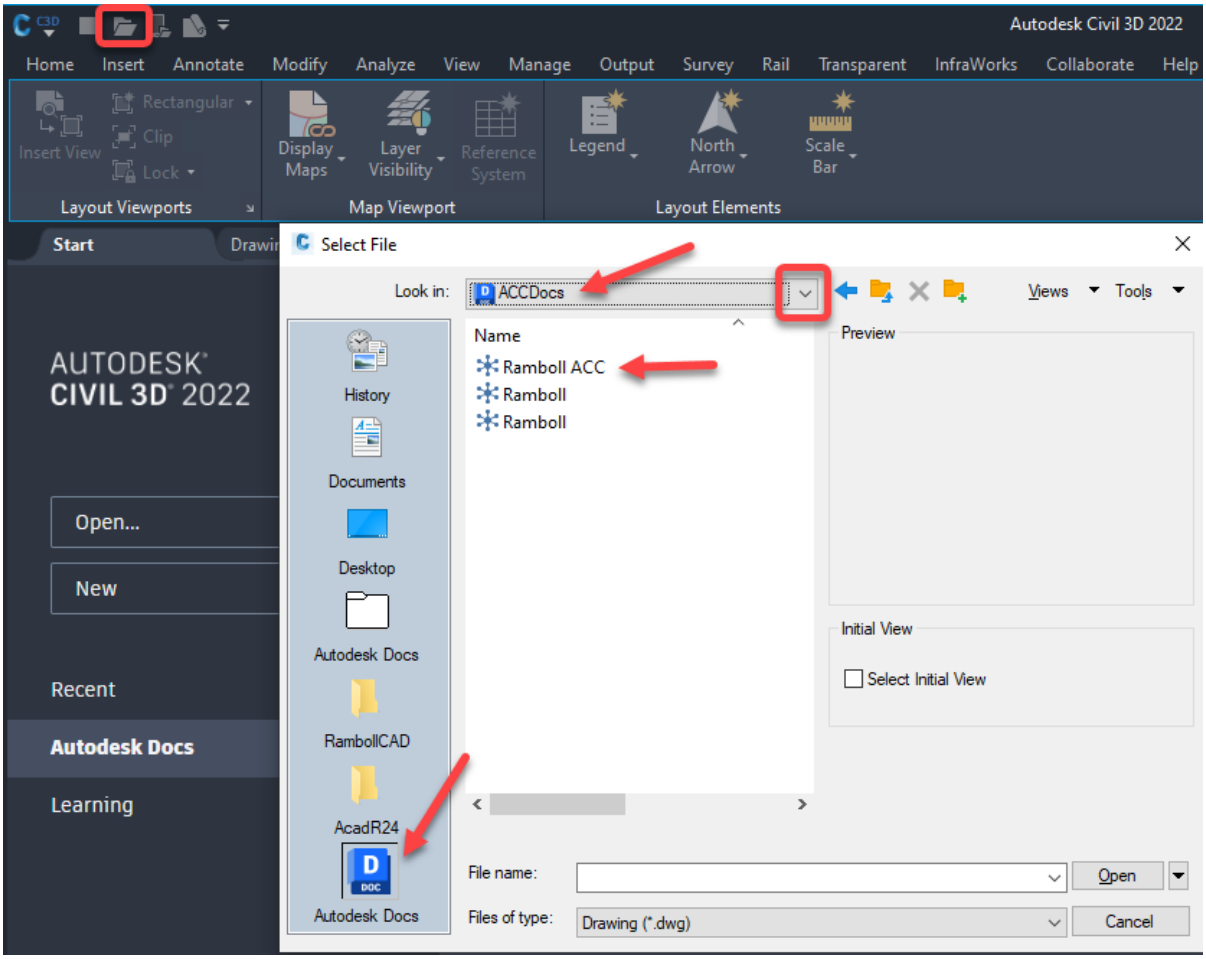
Managing your files in ACC Web

- You can only share links to files and folders from within ACC Docs Web online, however, when collaborating with others who are utilizing desktop connector, it can be easier to guide those on your team to file cached on their system by sending them a partial project path.
  E.g., See updates in \RUS-Project\Project Files\4 Delivery\40 WIP\401 Civil\
- Saved files are automatically versioned (backed up) and can be restored at any time through ACC Web. When restoring versions, your active version is saved as an old version and the restored version becomes your latest active version.
- Deleted files are permanently preserved and can be restored at any time through ACC Web online.

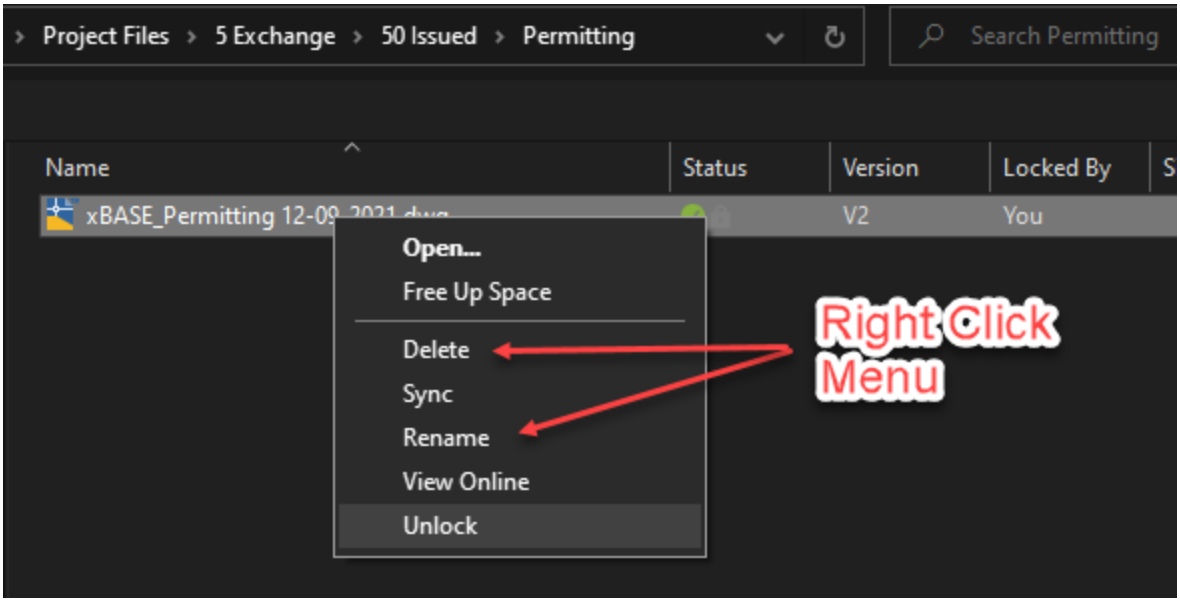
Civil 3D Drawings are cached and worked on locally in a synchronized Autodesk Docs project folder.



Opening Autodesk Docs drawings from within Civil 3D

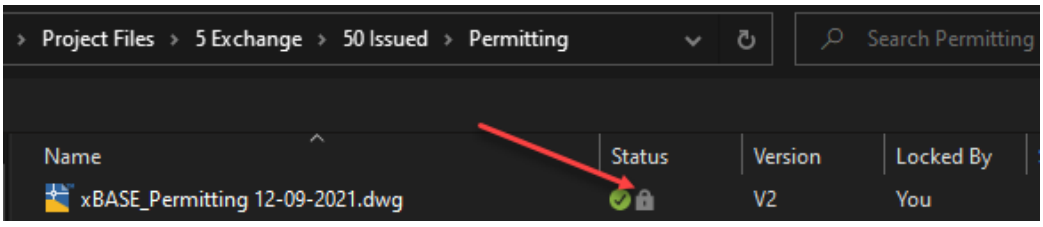


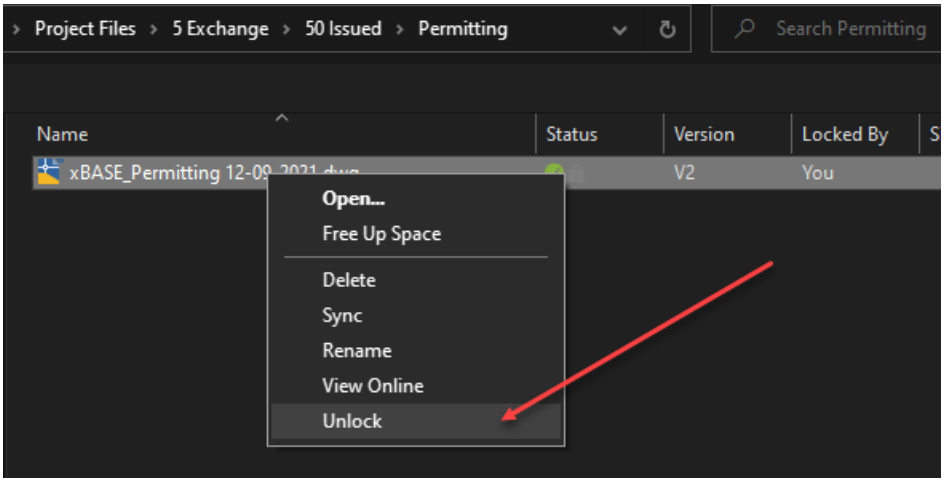
Opening Autodesk Docs drawings through windows file explorer.



Deleting & Renaming Project Files in your local cache through Windows File Explorer

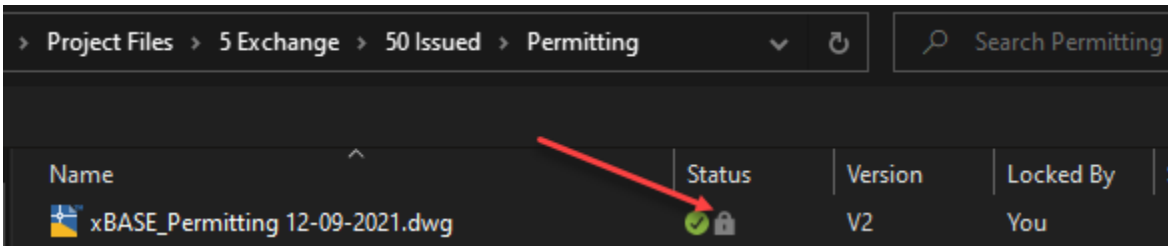
- When renaming files and folders in ACC, your reference paths (XRef and DRef paths) are dynamically update.
- All file changes are synchronized back to ACC Web through desktop connector
- At times, drawing files may fail to unlock remaing locked when you save and closes out of them. When this happens, you can manually unlock files through File Explorer or through ACC Web online. Use precaution when manually unlocking files to avoid status conflicts. If the file is not locked by you, always check with the designer who has a file locked if you feel it may be stuck in a locked state and they are not actively working on the file.



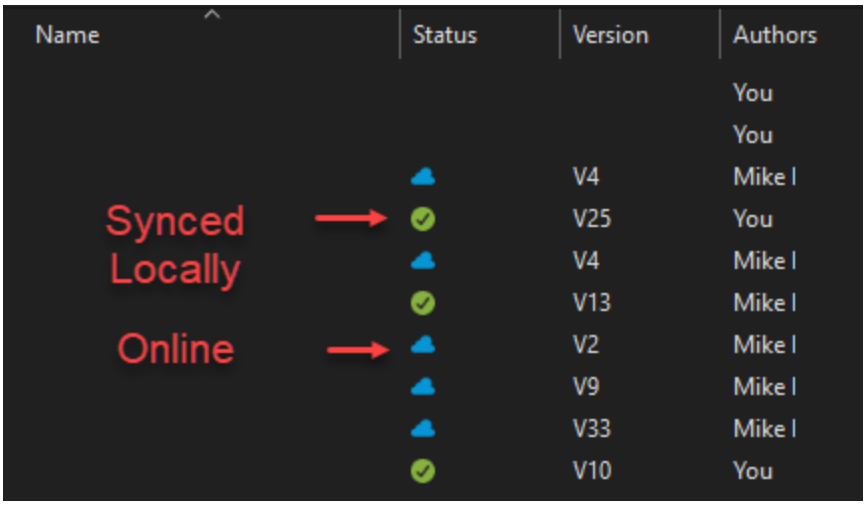


Unlocking files in your ACC project through file explorer.

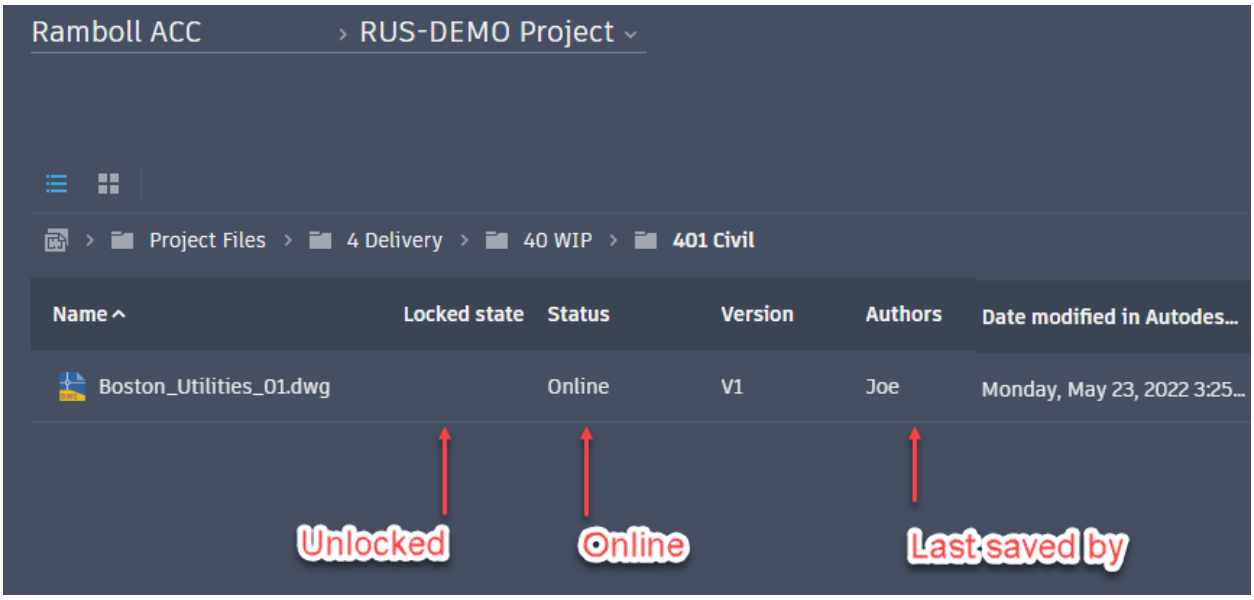
- Civil 3D Drawings are worked on locally and synchronized to your Autodesk Docs project folder cache. XRef and DRef files are automatically synchronized on open. Saved files are sync back to the construction cloud automatically.
- You can manually sync an individual file or folders if you'd like for your file cache to be pre-synced before you begin working.
- Files showing as online will automatically be downloaded if they are XRefed or DRefed in your drawing. You can view the status of your project files and folders to see who is working on a file and you can see if a file is locked for editing.



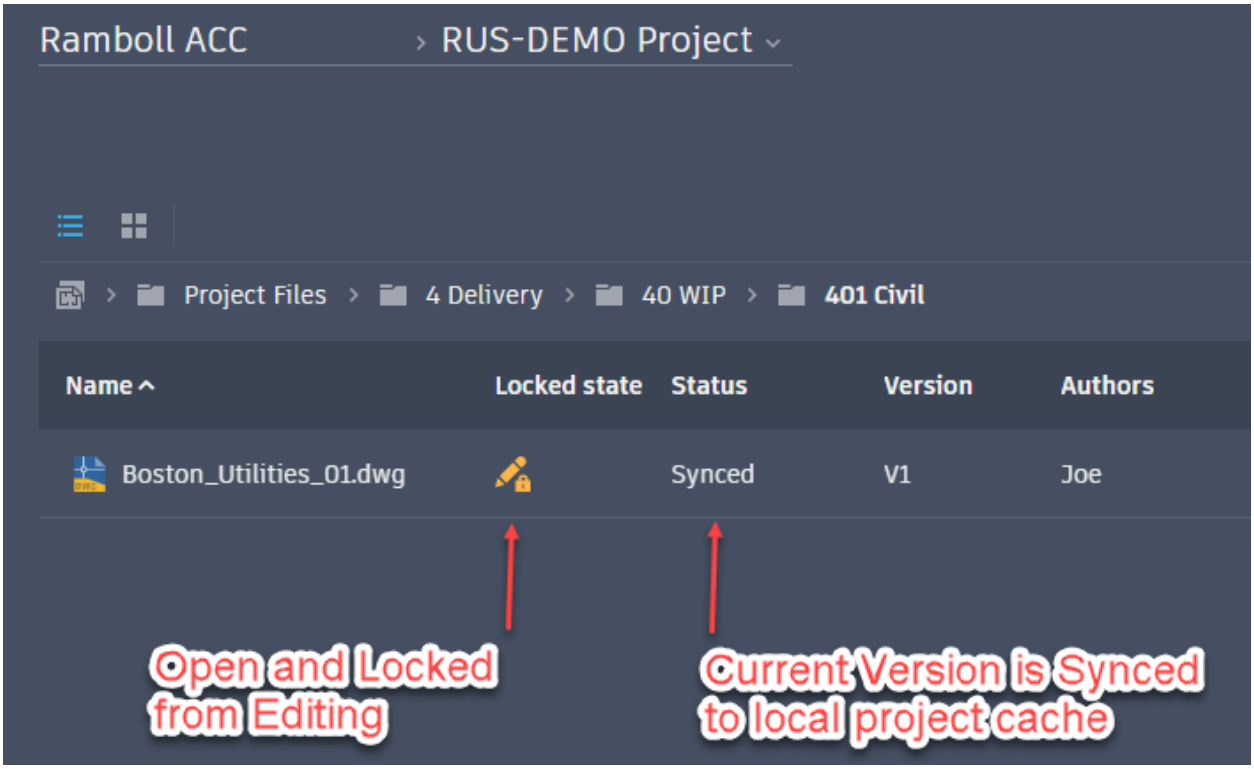
File shown as locked by you while you're working on it.



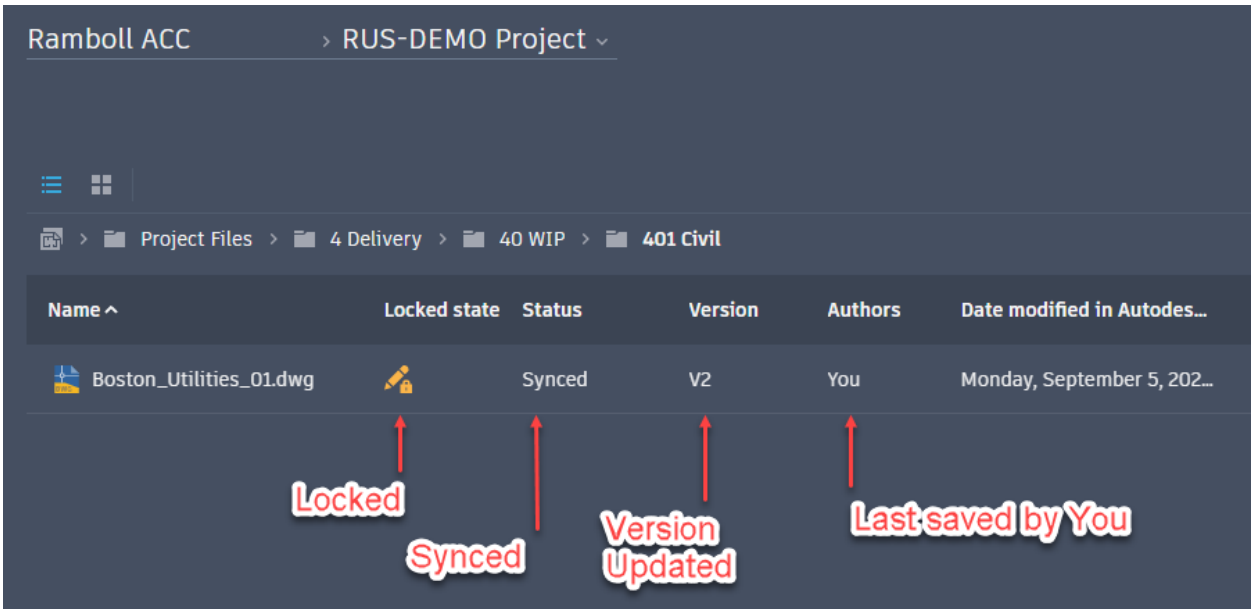
File Explorer view of drawing status showing green synced local file cache and ACC Web are current vs. blue cloud where only the ACC Web Online version is current.



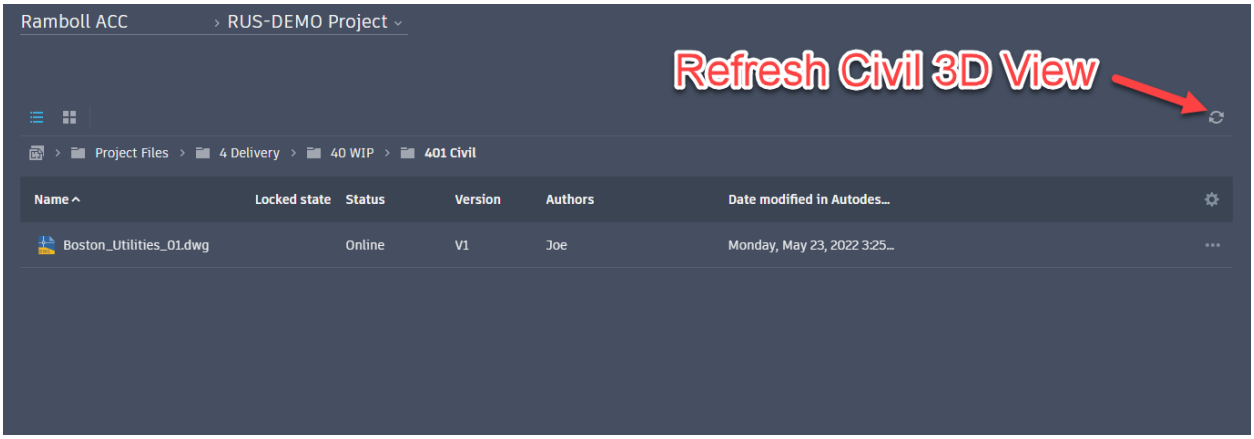
Civil 3D View of Drawing Status



Civil 3D View of Drawing Status



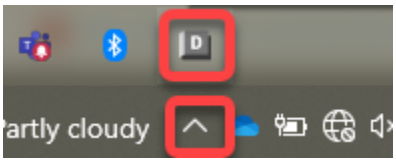
Civil 3D View of Drawing Status



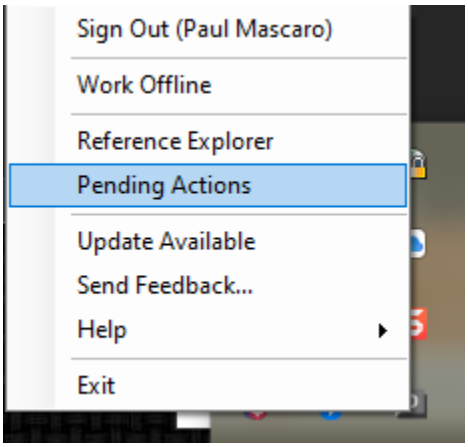
Refreshing your Civil 3D View

Autodesk Desktop Connector

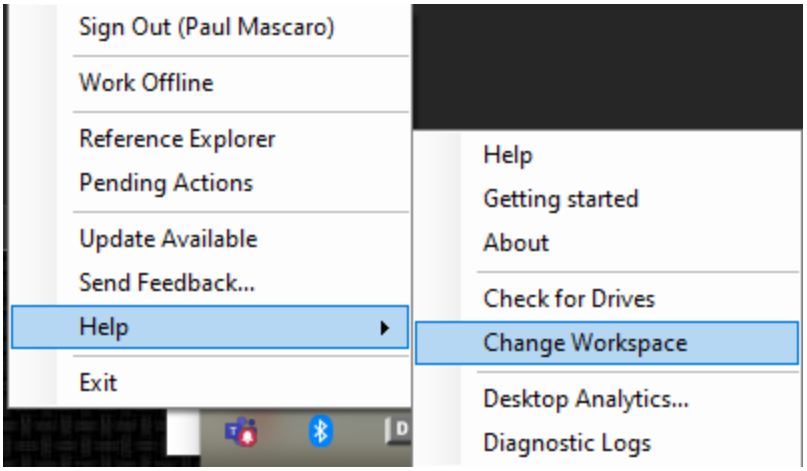
- Autodesk Desktop Connector has a built-in engine for Civil 3D which controls the synchronization for Civil 3D files.
- The latest version of Desktop Connector and Civil 3D 2022.1 or later are required
- At times, there may be an interruption in file save synchronization, you will see a pending action in desktop connector. In most cases, they will resolve themselves, but you can access your pending actions in desktop connector to check on and apply any actions that are pending.



Autodesk Desktop Connector Location in Windows Task Tray



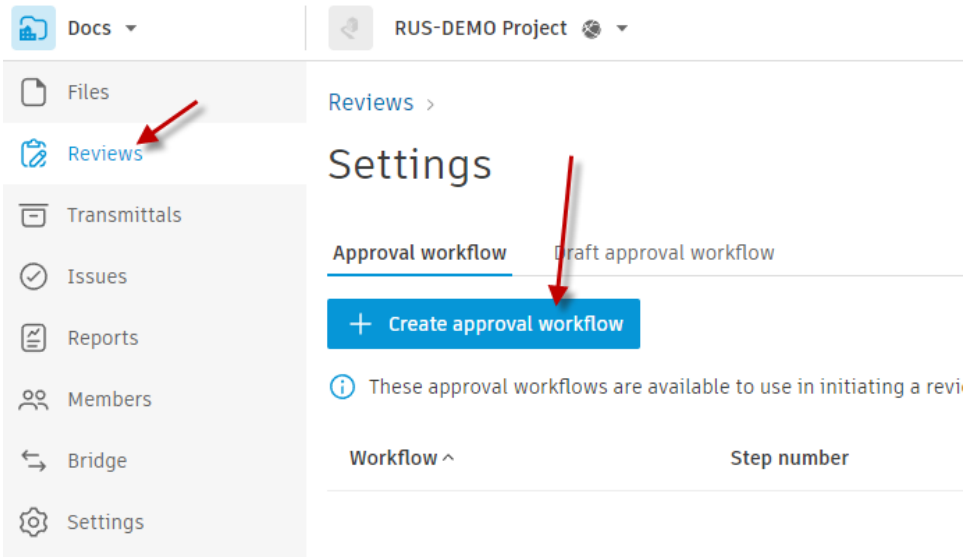
Accessing Pending Actions in Autodesk Desktop Connector



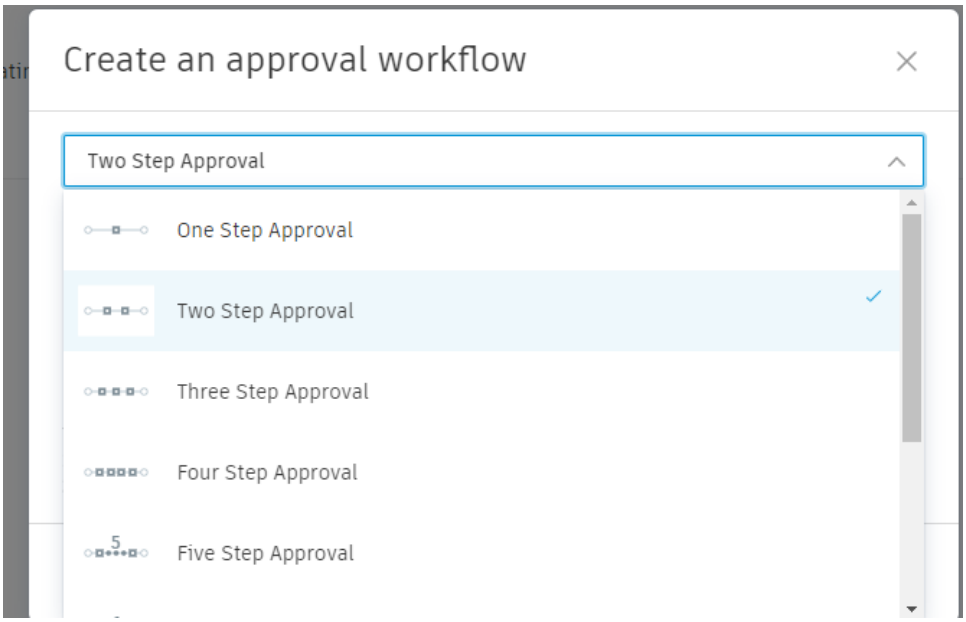
Changing your File Cache Workspace to reduce long file paths in Autodesk Desktop Connector 15.7.1 or later.

Document Approval Workflows

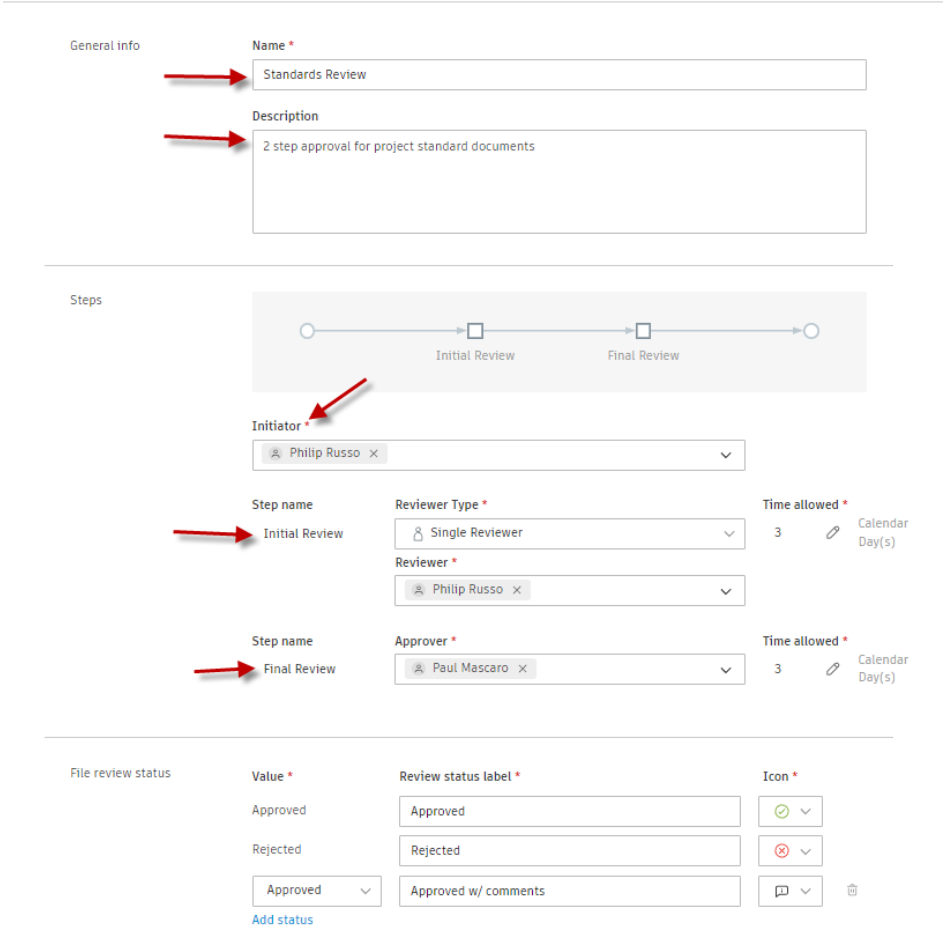
Autodesk Construction cloud has the ability to submit any document through an approval workflow. This can be a 1 step thru a 5 step approval process, and can be set up for individual or a group of people assigned to review.



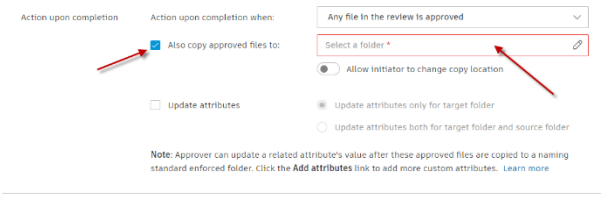
The project admin can create these approval workflow tempaltes to be assigned to documents in the project. The image above shows how to start this template creation process.

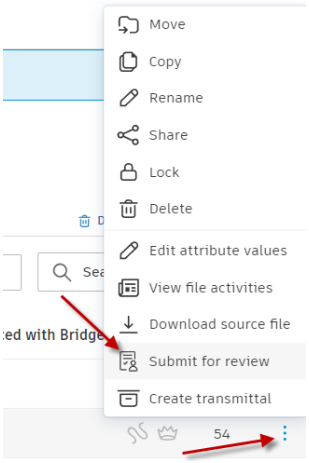


The first part of the process is to assign how many steps you want this approval to go through

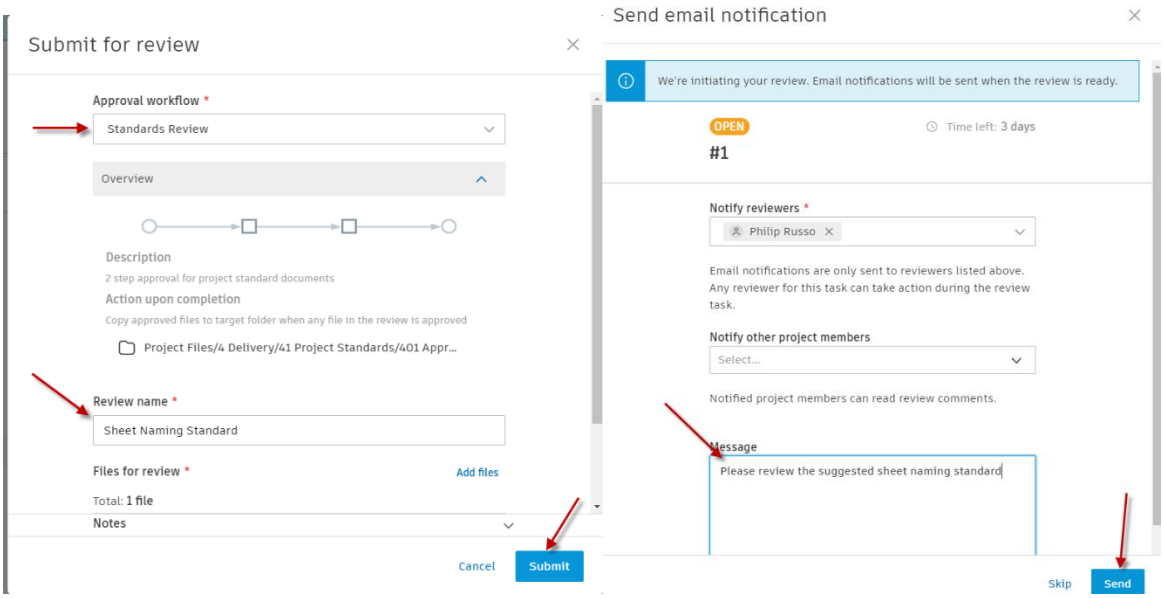


The image above shows the information needed to create the approval workflow. Once this is assigned to a document the process is automated and when complete you even have the option to copy the document to a different folder (shown in image below)

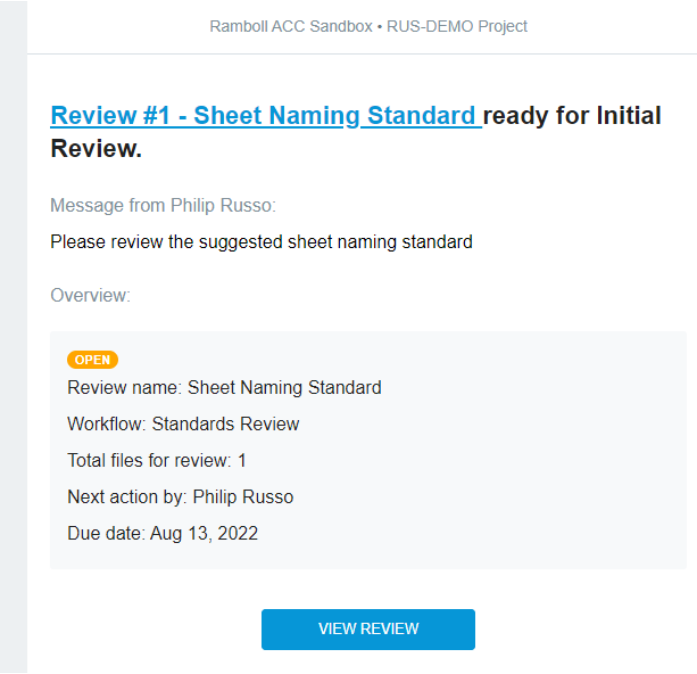




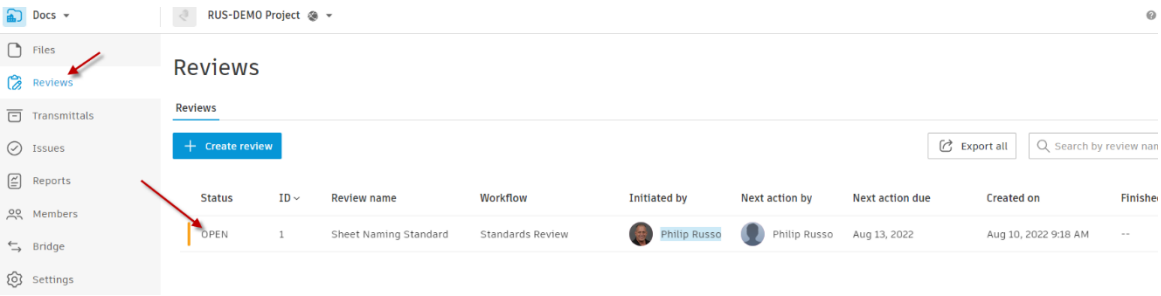
By selecting the 3 dots shown in the image above next to any document in your project you can select Submit for review and assign your defined approval workflow.



Once you assign your approval workflow you submit for review to begin the automation process as shown in the image above to the left. Then enter a message and send. Once that is sent the first person in the approval process will be notified by email. (See the image below)

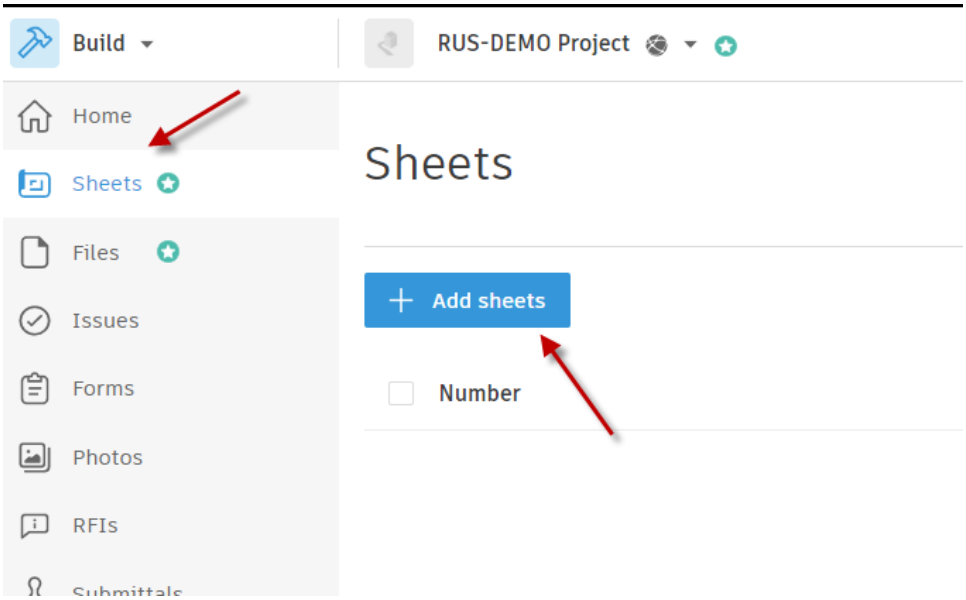


Back in the project under reviews you can see that status of all reviews that have been sent.

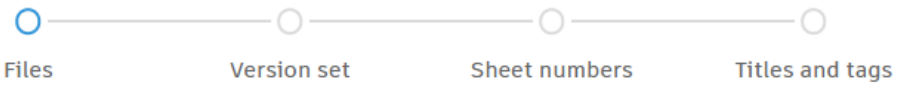


Sheets

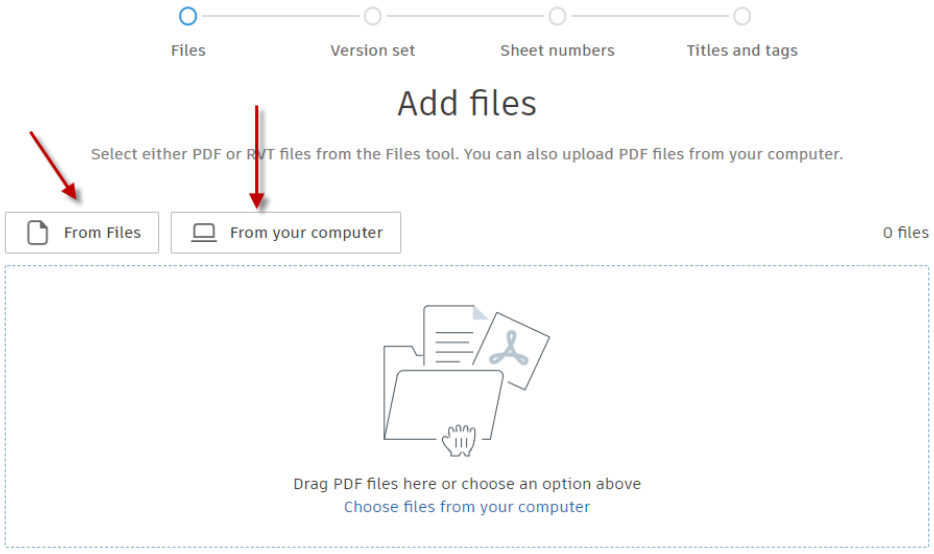
In the build module of the Autodesk Construction cloud PlanGrid has added the functionality to manage sheets, issued drawings sets and revisions to be accessible in the field as well using the PlanGrid Build mobile app.



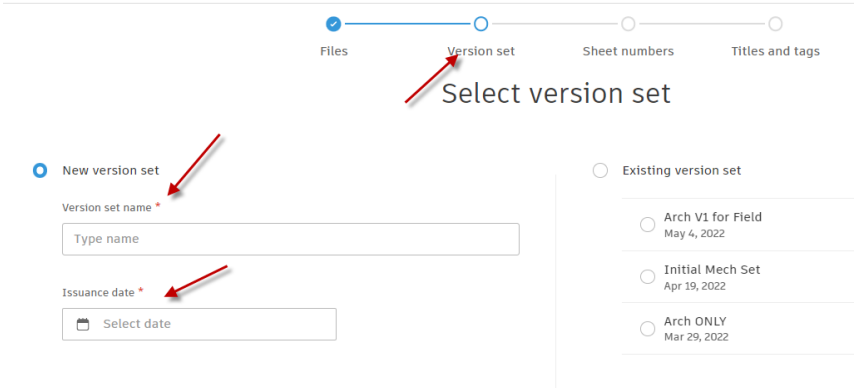
By selecting Add sheets from the Build module you will initiate a 4-step workflow process. The 4 steps are shown in the image below.



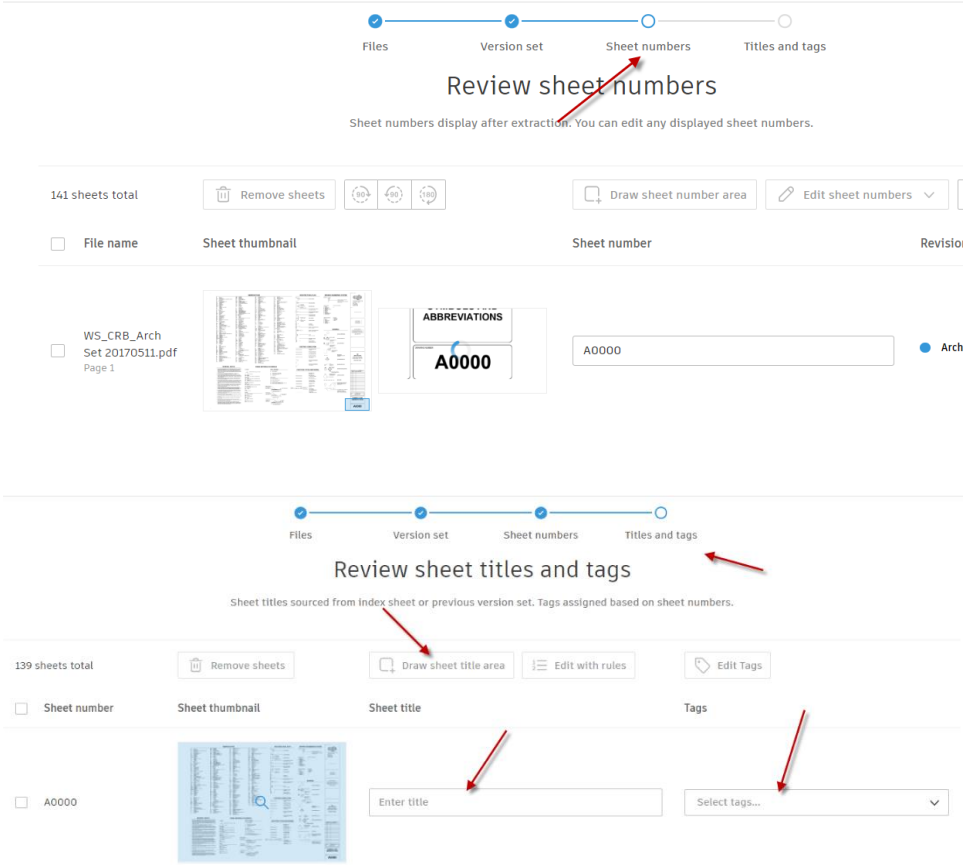
The files you add can be from a PDF document on your computer or from a file within the project folders.



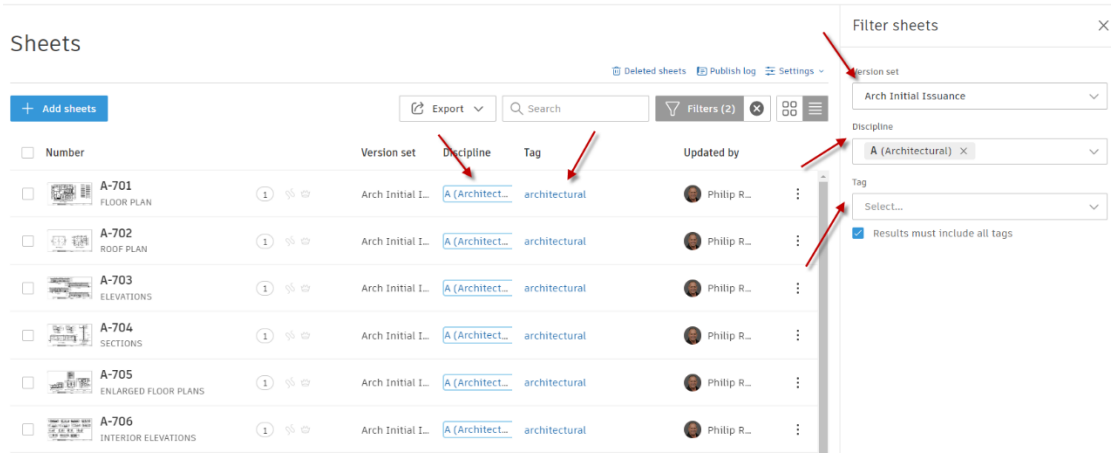
Once Step one is complete by selecting or dragging and dropping the files the second step will take place which is defining your version and issue date for the set of drawings(sheets).



Once you name your version set and your Issuance date step 3 will kick in to determine your sheet numbers. This step is automated, but you do have the opportunity to manually type in the sheet number if it cannot be determined by auto extraction.



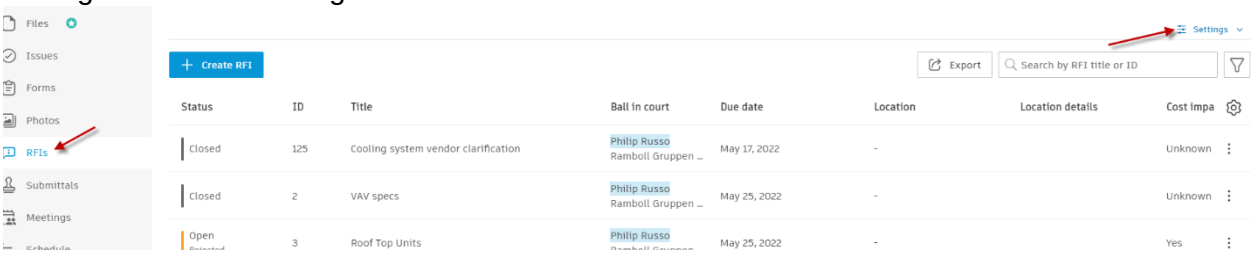
The last step is to define the sheet names. In this step of the workflow, you are presented with the option to define the area of the Title block that contains the sheet name. Build will add Discipline tag based on AIA standards by default. Sheets that start with the letter “A” will be assigned Architectural Discipline.



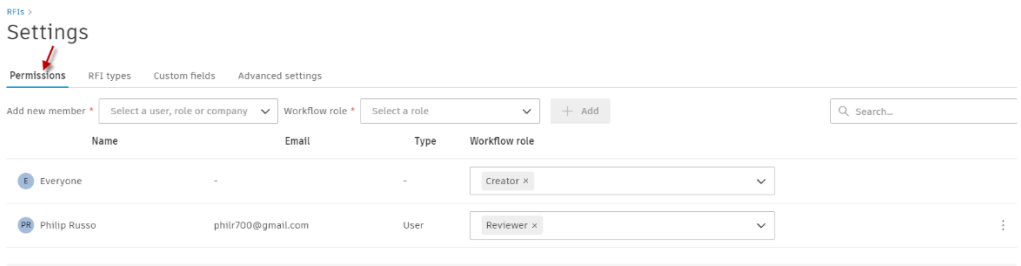
Once your sheets are published you can view them and filter the list to show the sheets you are interested in.

RFI's

Before RFI's can be created the project administrator needs to define the workflow and permissions. In the Build module the project admin selects RFI from the side menu then Settings as shown in image below.



From the settings drop the the project admin can select one of the 4 choices Permissions, RFI Types, Custom Fields or Advanced Settings. This will bring up the interface in a tabular format to adjust any of the 4 categories. See image below..

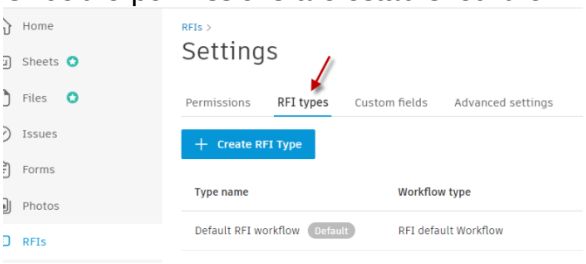


Starting with Permissions. There are 4 roles within the RFI tool you can be a Creator, Manager, Reviewer or Coordinator. The chart below shows the capabilities of each role.

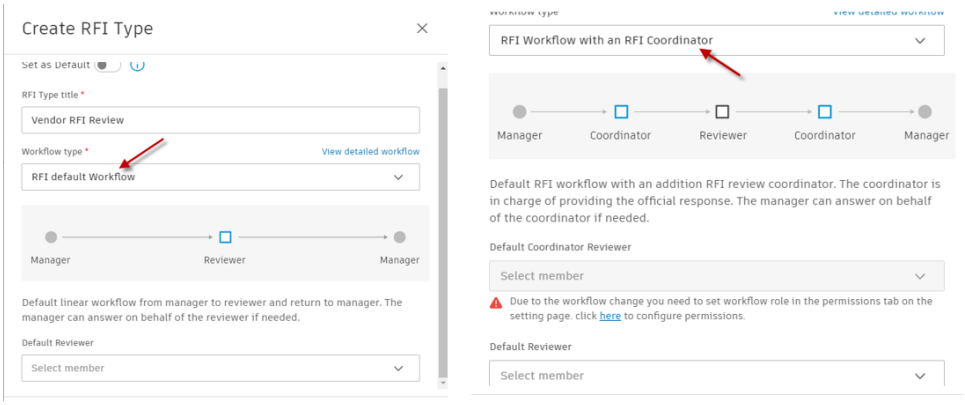
	Creator	Manager	Reviewer	Co-reviewer	Distribution List
Create RFI	✓	✓	⊘	⊘	⊘
Change Status to SUBMITTED	✓	⊘	⊘	⊘	⊘
Change Status to OPEN	⊘	✓	⊘	⊘	⊘
Change Status to ANSWERED	⊘	⊘	✓	⊘	⊘
Change Status to REJECTED	⊘	⊘	✓	⊘	⊘
Change Status to CLOSED	✓	✓	⊘	⊘	⊘
Add Attachments	✓	✓	✓	✓	✓
Add Comments	✓	✓	✓	✓	✓
Create Official Response	⊘	⊘	✓	⊘	⊘

Only a Creator or a manger can generate a new RFI so the project admin needs to identify those roles first and foremost. The Reviewer can answer or reject and generate an official answer for the RFI. All roles can comment or add attachments to the RFI and finally only the Creator or Manager can close the RFI.

Once the permissions are established the Project admin can create different RFI types.

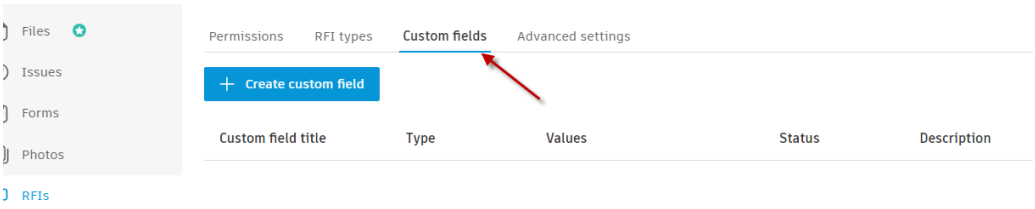


When creating an RFI type there are 2 choices RFI Default and then the addition of an RFI Coordinator.

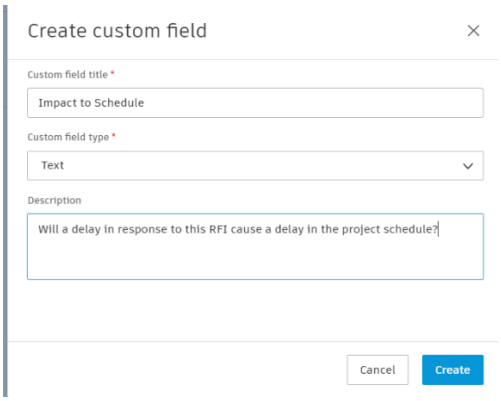


The RFI workflow with a Coordinator requires that role to be defined in permissions that is why you see the error warining because I have not yet defined a coordinator.

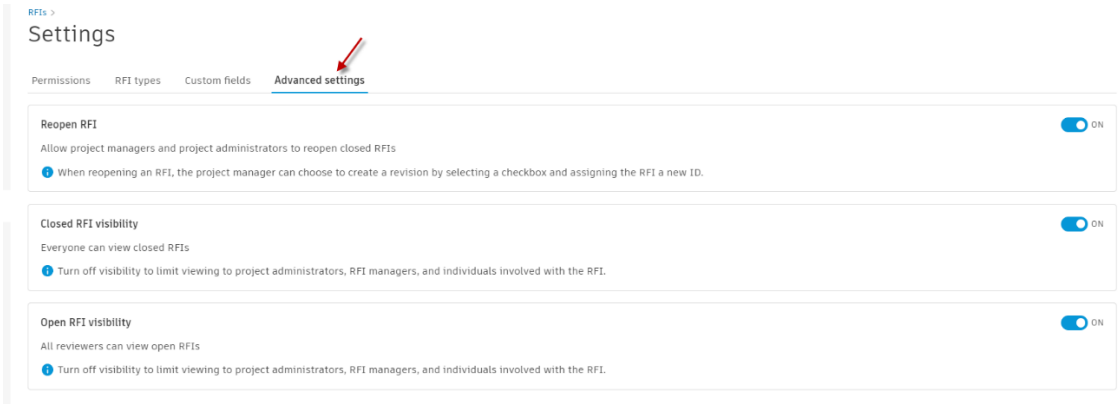
If there are some custom fields you need in your RFI to collect additional information the Project admin can create those fields.



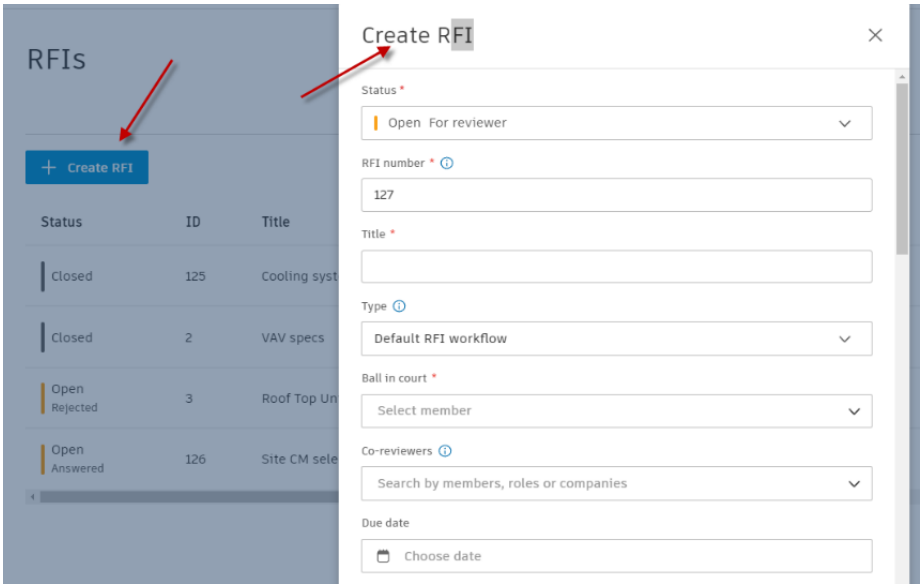
This is simple to create, just select Create Custom field and enter the appropriate values as shown below



The last settings for the Project admin Is found in the Advanced Settings Tab. Here the project admin can control the visibility of Open or Closed RFI's and also give the Project Managers and Project Administrators the ability to reopen an RFI after it has been closed.



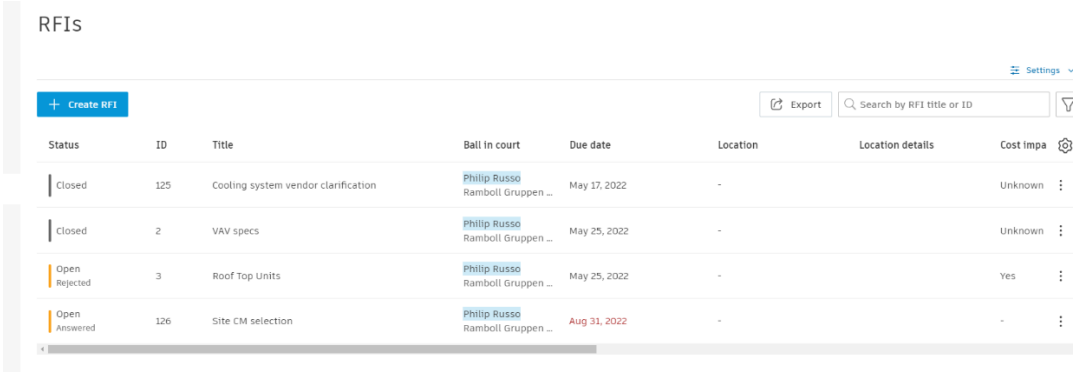
Once the permissions and settings are established by the Project Administrator the Creator or managers can create a new RFI.



The Create RFI form fields are:

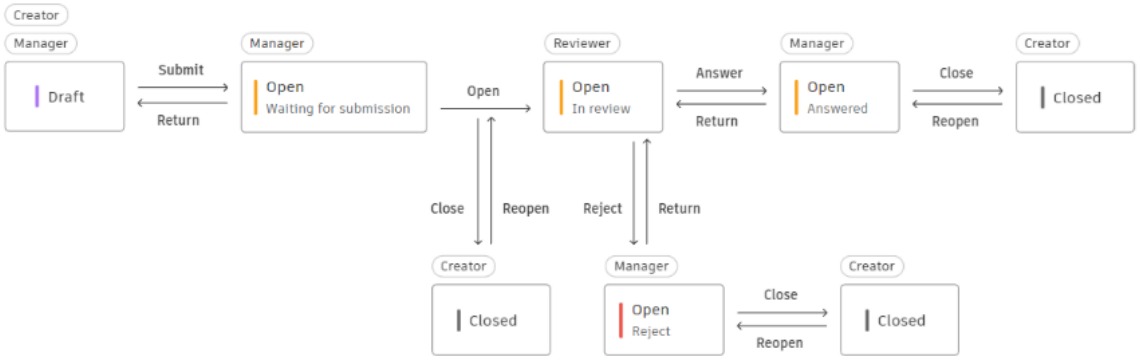
- Status
- RFI Number
- Title
- Type
- Ball in Court
- Co-Reviewers
- Due Date
- Location
- Location Details
- Question
- Suggested Answer
- References
- Cost Impact
- Schedule Impact
- Priority
- Discipline
- Category
- External ID
- Watchers

Once an RFI is created it will appear on the RFI main page amoungs all RFI's and there relative status



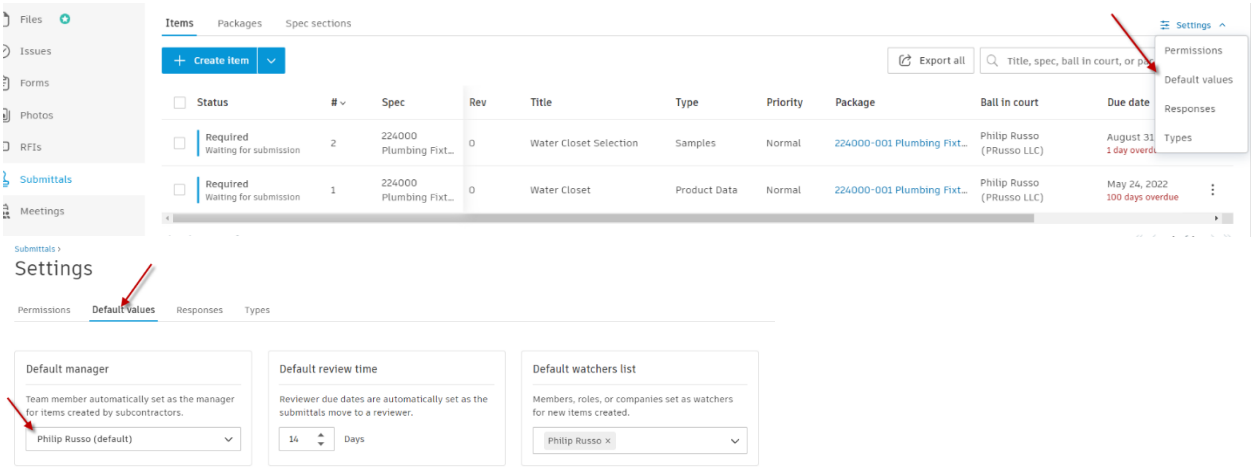
You can select on an open RFI and review, add information or export. Just remember the capabilities based on your role and controls what you can do. All roles can add attachments and/or comments. Image below shows a detailed workflow for the Default RFI type.

RFI default Workflow

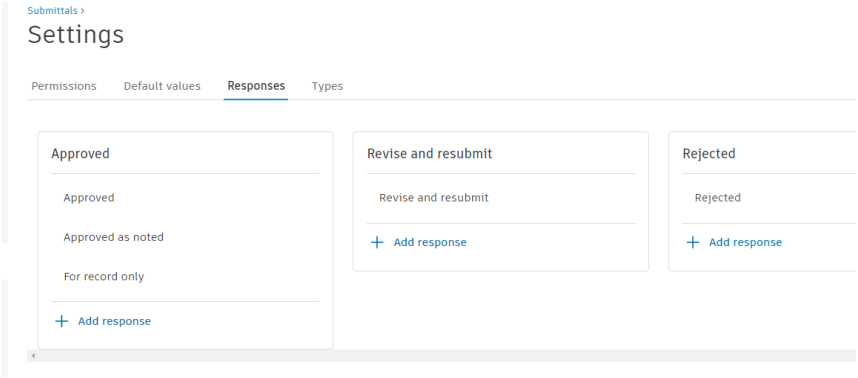


Submittals

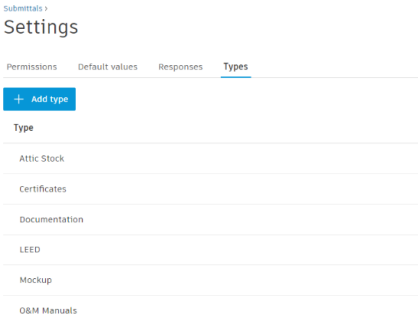
Before any submittals can be created the Project Administrator must select thesubmittal manager. To do this, simply select the Submittal module from the Build menu, then settings dropdown as shown in image below.



Select the default Values tab to specify who will be assigned the role of Default Submittal Manager. In this same tab you allocate a time frame to complete the submittal review and you can assign other Project Team members to the Watcher list. The Watcher list can see submittals as they come in.

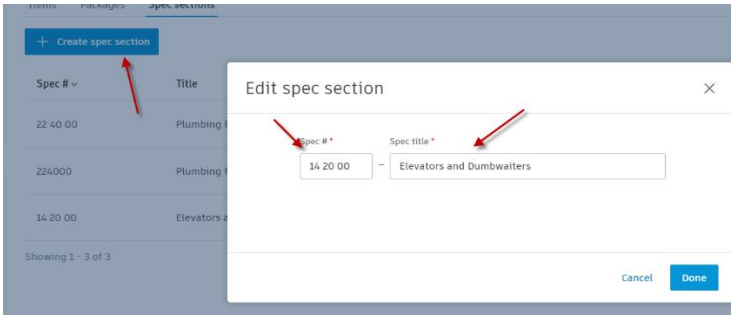


In the responses tab the Project admin can add other responses if needed above and beyond the ones that are setup by default in the Submittal module of Autodesk Build. Image above shows the default responses.



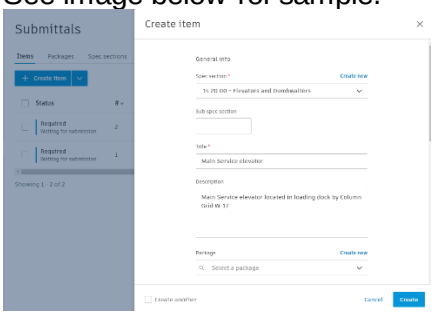
The last tab is where the project admin can add the different types of submittals for the project.

Once the Project admin establishes the submittal manager and the settings for the project, we can start to create submittal requests. In the main submittal page you will see 3 tabs- Items, Packages and spec sections. So basically, you enter your spec sections for your submittal, create your items and then package them together as submittal packages if needed. So first let's look at adding a spec section.

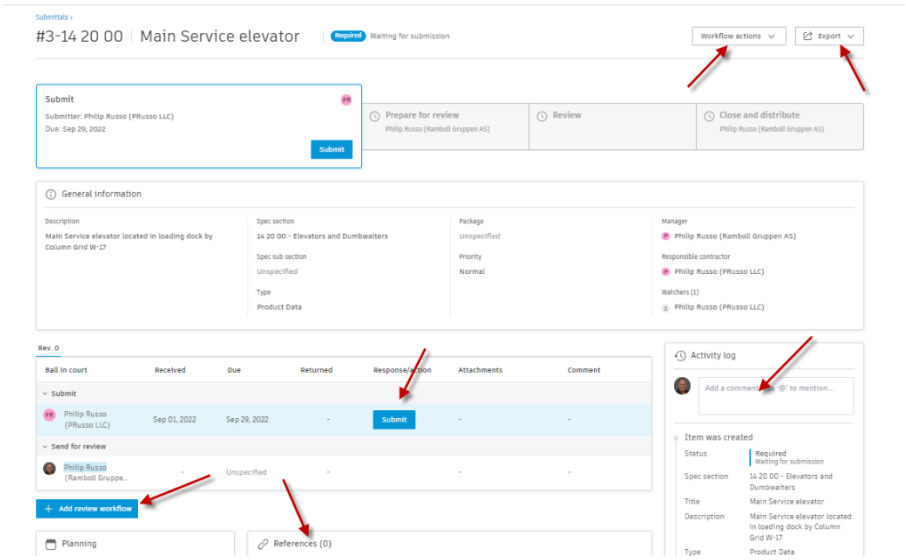


From the Spec sections tab select “Create Spec Section” then add your spec number and spec title. For example CSI spec number for Elevators would be 14 20 00 and the spec title would be Elevators and Dumbwaiters.

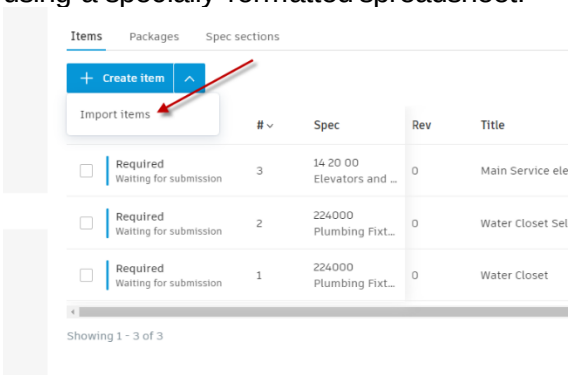
Once we have a spec section we can enter an item for submittal. The required information is the Spec Section, Title, Type of Submittal, Submitter, Responsible contractor and Due Date. See image below for sample.



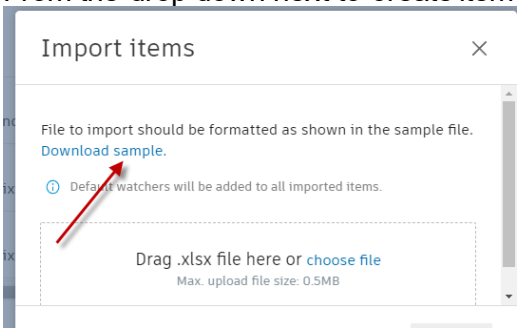
Once the Submittal is created the Responsible contractor will be notified. They can select the Submittal from the Submittal module in Autodesk Build. From there they can add reference attachments, enter information in the activity log, add review workflow, take workflow actions, export the submittal with or without attachemnts and submit the item. Image below highlights these areas.



More than likely you will have multiple submittal items to create. They can be bulk imported by using a specially formatted spreadsheet.

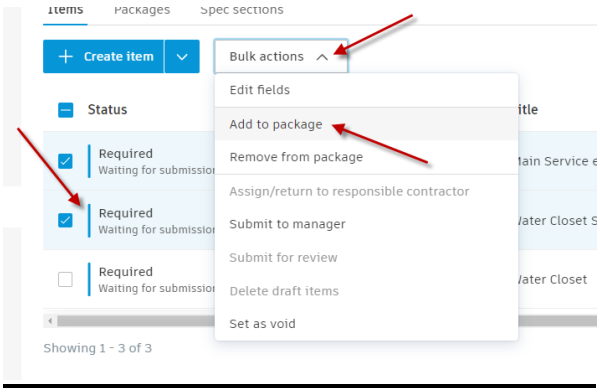


From the drop down next to create item select “Import Items”

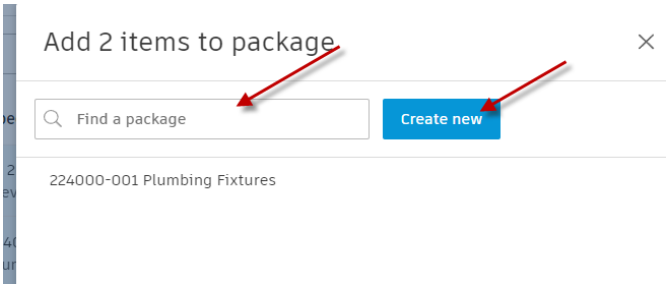


Then select “Download sample” which will download the sample spreadsheet. The mandatory values needed are in the green highlight columns. Once thid spreadsheet is filled out it can be loaded to bulk import items.

Once your submittal items are created you may want to package them to send out to the responsible contractors. From the item list select the items you wish to package together.



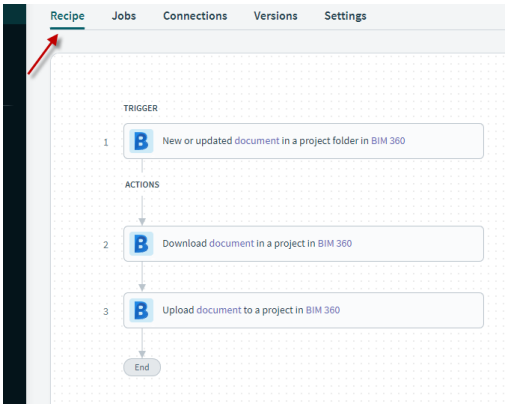
After you select the items to add to a package select the package or create a new one.



ACC Connect

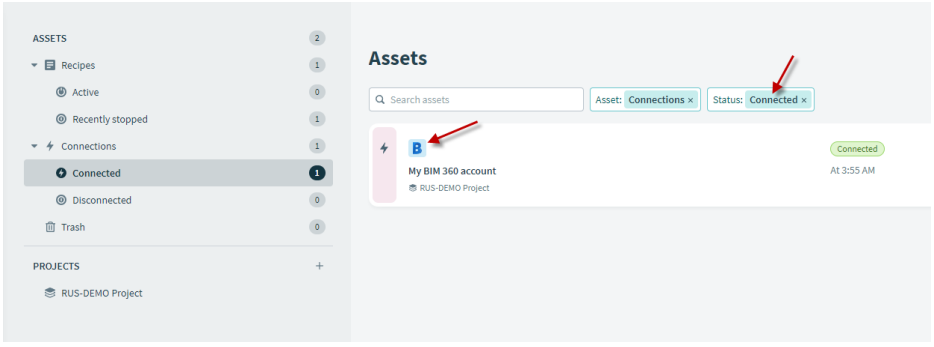
Autodesk Construction Cloud™ Connect is a no-code platform for building workflows (recipes) that allow you to manage and transfer your data between Autodesk Construction Cloud applications, and other cloud based tools such as cloud storage, Smartsheet, Asana, Salesforce and more. It is powered by Workato, our integrations platform partner, and managed and licensed to customers by Autodesk.

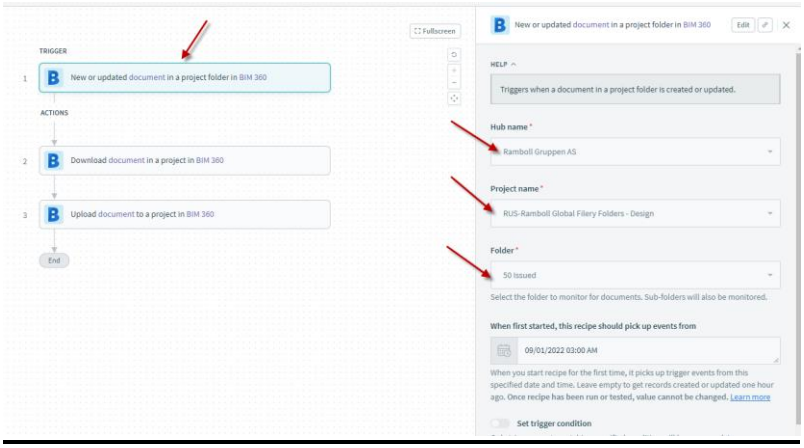
For this example we are going to look at watching a file in a folder on on eproject and automatically downloading it and then uploading to a different project when something changes. Once you are logged into your Workato account you need to create a proct and start a recipe.



This recipe is basic, and the logic is that you have a trigger that starts the recipe. This trigger happens when a file is placed into a a specific folder. Once this trigger happens ACC Connect will perform an action which is to download the file. Once the file is downloaded it will upload the file to a different project and project folder.

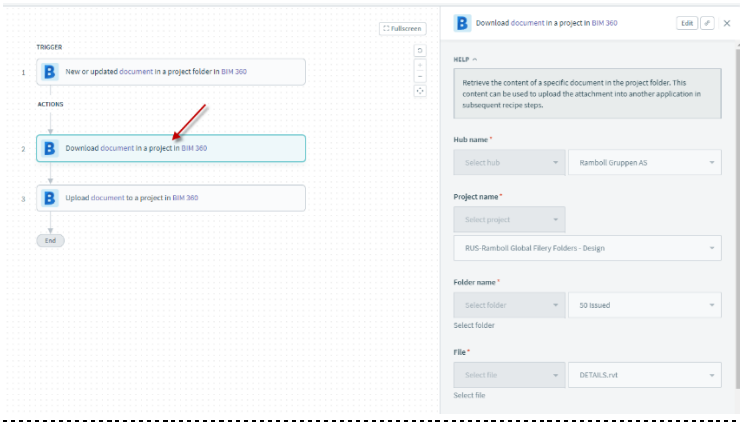
Let's break down this basic recipe. The first thing we need to take care of is establishing the connection to the Source folder and destination folder.



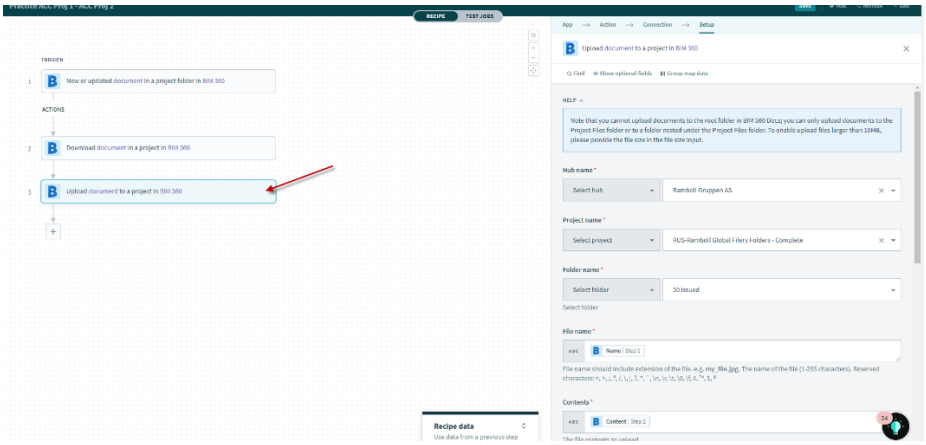


The image above shows the trigger details. The details are looked at a specific target folder within our ACC hub.

The action which is step 2 in this reci[pe example is to download the said document.



Once the document is downloaded the last step in the recipe is to upload the file to a given folder.



This is a basic recipe example, but a perfect scenario is when you are working on a project in your own hub but need to upload your latest model to a client hub. This will automate that process for you.

Additional Resources

Autodesk Construction Cloud Product and Tool Limitations
https://knowledge.autodesk.com/support/docs/learn-explore/caas/CloudHelp/cloudhelp/ENU/Docs-About-ACC/files/Product-Limitations-html.html

Autodesk Health Dashboard
https://health.autodesk.com/

Autodesk Construction Cloud Learning Resource
https://learnacc.autodesk.com/page/courses

Autodesk Build Pricing
https://construction.autodesk.com/pricing/autodesk-build/

ACC Connect
https://construction.autodesk.com/products/autodesk-connect/

Autodesk Build – Submittals
https://help.autodesk.com/view/BUILD/ENU/?guid=Submittals_Overview

Getting Started with Autodesk Desktop Connector

Learning - Collaboration for Civil 3D