Mobile District
Advanced Modeling (AM) Bulletin
Revit Project Set Up
SAM AMB 2024-08

Based on the standards produced by the

CAD·BIM
TECHNOLOGY CENTER

US Army Corps of Engineers
Mobile District
Engineering Division
September 2024

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Version changes:

December 2020

1. New bulletin 2020-06

April 2021
1. Updated screenshot of the Project Code Request form in section, Project Geospatial Coordinates
2. Updated instruction to require temporarily unloading links from the BASE model when performing Transfer Project Standards, in lieu of temporarily attaching the BASE model to the first discipline model file.
3. Revised Quick Reference steps to match updated instructions

June 2022

1. Updated links to the correct locations on Projectwise.

September 2024

1. Change the bulletin version to 2024-08

2. Table of Contents

General

In accordance with the US Army Corps of Engineers' mandated use of Advanced Modeling technologies, Mobile District has standardized on Autodesk Revit as the dominant BIM design platform for vertical construction projects. In accordance with USACE mandated use of Bentley ProjectWise, all design shall be hosted in Bentley ProjectWise, with Revit projects leveraging use of the ProjectWise integration functionality.

The information herein establishes the workflow and best practices for setting up Revit projects. For a less verbose step-by-step instructions, see the Quick Reference at the end of this document.

References

USACE ECB 2018-7 Advanced Modeling Requirements on USACE Projects

USACE ECB 2017-16 Bentley ProjectWise as the Corporate Tool for Engineering Data Management in USACE

Mobile District Advanced Modeling Bulletin SAM AMB 2018-01 - File Naming Convention

Mobile District Advanced Modeling Bulletin SAM AMB 2020-04 - Revit Templates

A/E/C Standards

US National CAD Standard

Revit Templates

The Mobile District (SAM) Revit templates are adaptations of the Autodesk Out-of-the-box templates modified to incorporate local requirements, standards from the USACE Revit templates, AEC Standards, and the National CAD Standard.

The current SAM Revit templates are located at Revit Templates 2022. The templates are pre-linked into one another to facilitate project set up.

The SAM Revit templates are as follows:

BASE template – This template is used as the coordination model. It is also the source of shared coordinates for the discipline models and contains the project sheet index and project cover sheet.

ARCH template – This template is used for architectural models and detail models, and other related architectural models. This model may also include interiors models.

INTR template – This template is used for interior design models.

STRC template – This template is used for structural models.

MECH template – This template is used for mechanical, plumbing, fire suppression systems, mechanical specialties, and fire suppression utilities models.

ELEC template – This template is used for electrical power, telecom, and lighting models.

Gathering Project Information

Information Required

The BIM manager, designated BIM technician or BIM designer will need the following minimum information before beginning the process of setting up Revit models.

- Project Code (CADD code) to locate the Project Request Form
- Verification of project geospatial coordinates
- Determination of the division of model(s), project and/or discipline
- Standalone or Central Files

Project Request Form

The CESAM-EN Project Code Request Form serves as the primary source of information required to set up the Revit model files. The Project code is needed to locate this form. Project request forms are submitted to EN-TS when requesting a project code and are stored in ProjectWise here, Project Definition , within their respective folder based on project type and fiscal year. Each request form contains information such as project title, project location, title block information, and the geographic location of the project.

Project Geospatial Coordinates

The LATLON is a required field in the Project Request Form. However, this needs to be converted to an appropriate coordinate system for Revit. Lacking actual project survey information, the LATLON should be converted to UTM for use in setting the Revit site survey point (SP) and project point (PP) coordinates. In Revit 2020, the Revit starting point (origin) is easily accessible and the best practice is to set the SP, PP to the corresponding project location and coincident with the origin. Several links are provided on the "File Setup" sheet in the Project Request Form to facilitate conversion of the LATLON to UTM. The elevation should also be set based on the LATLON location.

File Setup tab in the Project Request Form

Division of Model(s)

Small inhouse projects will be divided into major discipline models: architectural, structural, mechanical, electrical, and utilities. For larger projects, models may be divided further by sub-disciplines, functions, or use: architectural model, architectural details, HVAC, plumbing, fire protection, power, communication, interior, etc. The decision lies with the project technical lead, discipline leads, and design team.

Standalone or Central Files

Due to the size of most Revit projects within the Mobile District being small to medium, and technological challenges with network connectivity, it is more effective and efficient to use standalone files rather than central files. This mode works very well over VPN with ProjectWise. When more than one designer is assigned per discipline, consideration is given to creation of sub-discipline models. In the case of architectural discipline, we have had success in delineating between model files and detail files. In rare cases, central files can be used for limited times to allow multiple users to access the models concurrently.

Copying Templates and Naming Files

ProjectWise

When sets of files are copied within ProjectWise, the system will recognize that multiple files of a set are being copied and will automatically remap known references the new set of files.
Copying can be accomplished either using drag-CTRL-drop, or right-click/copy/paste. Files that are individually copied will require a manual Revit "reload from" to correct the reference paths. A basic tutorial on using ProjectWise can be found here, Projectwise User training 101.pptx

File Naming Convention

The file naming convention can be found here, SAM AMB 2018-01 - File Naming Convention.pdf. However, the Project Request Form mentioned earlier provides automated generation of the required file names and the document description based on the project code and is applicable to most common inhouse projects.

File Naming

At this point, any models required to be a central file should have worksets enabled.

```
MHY18001-G-CM01.rvt
BASE01 - PROJECT DESCRIPTIONS (MHY18001)

MHY18001-CHAR01.rvt
CHAR01 - PROJECT DESCRIPTIONS (MHY18001)

MHY18001-ARCH01.rvt
ARCH01 - PROJECT DESCRIPTIONS (MHY18001)

MHY18001-STRC01.rvt
STRC01 - PROJECT DESCRIPTIONS (MHY18001)

MHY18001-MECH01.rvt
MECH01 - PROJECT DESCRIPTIONS (MHY18001)

MHY18001-ELEC01.rvt
ELEC01 - PROJECT DESCRIPTIONS (MHY18001)
```

File Names and Document Description provided in the Project Request Form

Setting Up the Models

Project Information

Once the files are copied and properly renamed, the BIM manager or designated person can begin setting up the project. The best practice is to set up the BASE model first and use the Revit "Transfer Project Standards" tool to copy the project

information to the other models. While any file could be used to establish the project coordinates, for consistency, it is best to use the BASE model file so that in the event of errors or issues, the file from which the originating source of the coordinate system is known. The SAM 2020 Revit templates' Starting View contains all the project information fields that need to be updated for a new project. All other information fields are usually provided later.
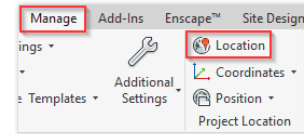
PROJECT INFORMATION

USACE District:	Mobile District	Contractor Name / ID:	
Project Number:	PROJECT #		
Issue Date:	MMMMMMMM YYYY	Contractor Address:	
Project Name:	PROJECT/CONTRACT DESCRIPTION2		
Project Address:	PROJECT/CONTRACT LOCATION 1		
Contract Number:	W91328-XX-X-XXXX		
Solicit Number:	W91328-XX-X-XXXX		
File Name:	BASE_Revit Project Template_CESAM 2020.rvt		
File Number:	FILE NUMBER		

Project Information displayed on the USACE Revit Starting View

Field	Value	Source
Project Number	Project Code (CADD Code)	Project Technical Lead / Project Request Form
Project Name	Official project title	Project Request Form
Project Address	Project Location	Project Request Form
File Name	Revit File Name	Actual model file name

Geographic Location and Site

The project location settings can be found on the Manage ribbon, Project Location, Location tool.

Geographic Location

This is typically only used by Revit for weather and sun studies. Set the "Define Location by" option to "Internet Mapping Service" and use the project LATLON to set the project location. Note that Revit will resolve this into the closest street address.

Project Location tool

Site

Use the project code to rename the site. For typical projects, there will only be one site define. The rare use case for utilizing multiple sites is to support multiple instances (exact duplicates) of a structure on a single site. When multiple sites are utilized, sites will need to be named to correspond to and provide a meaningful description of the instance.
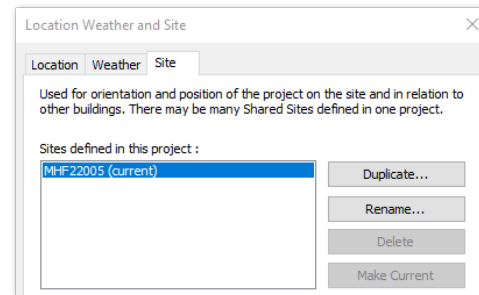
Name Site using the project code

Establishing Project Coordinates

Open a floor plan (preferably one of the 00_SitePlan views), that has the survey point, project point, and internal origin displayed.

Internal Origin

This is Revit's internal origin. It is represented with a green/red/blue icon.
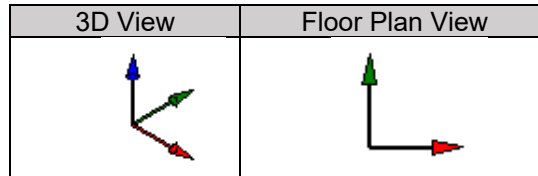
3D View	Floor Plan View

This is the starting point in Revit for which content should not be placed further than 10 miles away. The relative location of the internal origin does not affect the project coordinates.

Survey Point

The survey point is represented by a triangular icon, . The template has the survey point set at 0,0,0. Unclip the Survey, and set its location and elevation to the correct values if actual survey information is known. Otherwise use the UTM coordinates derived from the LATLON. Clip the survey point, then move it to coincide with the Revit internal origin.

Project Point

The project point is represented by a circular icon, . The template has the project point set at 0,0,0. Because the survey point coordinates were set and then moved while clipped to be coincident with the project point and the Revit internal origin, the project point now also has the same coordinates as the survey point. Next, set the project point elevation using the Project Relocation Tool using an elevation view. If the actual finish floor elevation is known, then use that elevation. Otherwise set it to match the survey point elevation. Verify that Level 01 (FF) is at 0'-0" elevation (assuming the level is set to Project Base Point as the Elevation Base). Pin the Project Point.

The coordinate system of this file is ready to be shared to other models.

Project Info / Shared Coordinates

Transfer Project Standards

When setting up a new project, in addition to the shared coordinates, other project information also needs to be shared including project title, project location, etc. Thus, the simplest method is to use the Revit 'Transfer Project Standards' tool, which acquires the Project Point coordinates and location site along with the project information.
Note that all the Revit templates are pre-linked together and therefore only one file can be opened at a time in a single Revit session.
To transfer project standards from the BASE file to the first file needing to acquire the shared coordinates, the links within the BASE file will need to be temporarily unloaded prior to opening the first discipline model file.

For the purpose of illustration, the ARCH model file will be used as the first discipline model. However, any discipline file can be the first one. Using the 'Transfer Project Standards' tool, select the BASE file as the source and click the 'Check None' button to de-select all types. Select only the 'Project Info' and click OK. Select 'Overwrite' to confirm overwrite of duplicate types.

Verify Project Info

On the USACE Revit Starting View, verify that the project information fields have been updated.
Update the 'File Name' field to reflect the name of the current file.
Go to the Project Location tool. On the Location tab, verify that the geographic location has been updated. On the Site tab, select the newly acquired site and click 'Make Current'. Select the "PROJCODE" site and click 'Delete'. Click OK.

Finalize Acquired Coordinates

Open a floor plan (preferably one of the 00_SitePlan views), that has the survey point and project point displayed. Verify that the Project Point is showing the updated coordinates and elevation. Select the Survey Point and verify that it is showing the Shared Site name. Unclip the Survey Point, select the Move tool and move it to be coincident with the Project Point. Set the Survey Point elevation to match the Project Point. Clip and pin the Survey Point.

Save the ARCH file, close, and select 'Update Server Copy'. This closes the file, updates the master copy in ProjectWise, but leaves the file checked out.

Repeat this process for the other discipline files.

Updating Links / Verifying References

Verifying and Updating Link Instances

Once all the model files have successfully acquired the project shared coordinates, it is time to update the link instances. Starting with the BASE file, select each link reference and use the Properties dialog to set the Shared Site to the project
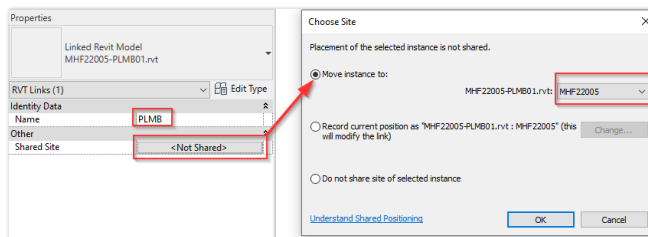
Setting the Shared Site using the Link Instance Properties Dialog

Site. Although not necessary, it is good practice to name the link instance. The example shows a plumbing model link instance named "PLMB". As a best practice, be sure to pin the link instance so that it does not inadvertently get moved. Note that
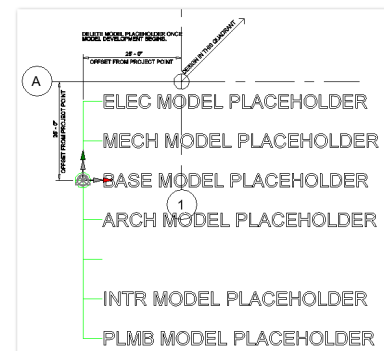
Model Placeholders aligned properly

each discipline model files contains placeholder model content within a model group called "MODEL_PLACEHOLDER". The model placeholders are designed to align properly when the shared coordinates are correctly done.

Note that the model placeholder in each file is only intended to provide a visual indication that all the models have been properly aligned. Designers must delete the placeholders once design begins.

Repeat this for each link instance. Save, close the file, and check in. Repeat for each model file.

Once all discipline models are set up, return to the BASE model and reload all links, save, and check in the BASE model file.
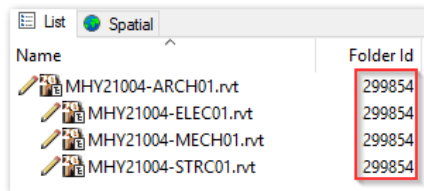
Verifying ProjectWise references

To ensure that the references are mapping to the correct set of files, it is important to verify that the references, as seen by ProjectWise, are correct. ProjectWise file references can be revealed by right-clicking on a file, and selecting Set, Show References.
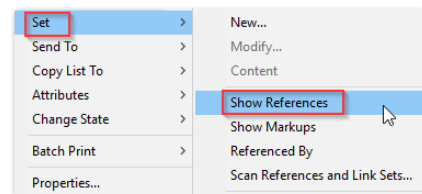
ProjectWise right-click menu
showing Set/Show References

A) Review and confirm that all references are listed. This is done simply by reviewing the ProjectWise references of each of the model files.

ProjectWise file references and Folder ID

B) Review and confirm that the Folder ID of the file matches the Folder ID of all the references, indicating that all the files are from the same folder.

Additional Notes

Attachments vs Overlays

Revit references can be set to attachment or overlay. Most references will need to be set to overlay to avoid circular references. The use of reference attachment is only useful in situations where there is a master model and sub-models are referenced as attachment into the master model.

Setting True North

True north should be set as part of the project coordinates set up, even if the rotation is only approximate. Proper true north can aid in sunshade and solar studies. When true north is unknown, the true north and project north settings should be set the same.

Quick Reference - SAM Revit Project Set Up

START

Locate Project Request Form (PRF) in ProjectWise

Project Definition

Verify Required Info is provided

Required Info
- Project Code
- Project Coordinates
- Division of Model(s)
- Standalone/Central Files

Abbreviation	Description
PRF	Project Request Form
SP	Survey Point
PP	Project Point

Copy Revit Templates to the Project Revit folder

Rename files using info from PRF

Is project survey info available?

Yes

No

Use LATLON from PRF to obtain project UTM coordinates & elevation (links provided in the PRF)

Open BASE File

Enter Project Info on the Starting View

Open Site plan. Unclip the Survey Point (SP) and set the coordinates & elevation

Establishing Project Coordinates with the BASE file

Is project point (PP) coordinate different from SP?

Yes

No

Turn off display of the PP if it was enabled in the previous step.

Open an elevation view, and enable display of the PP. Use the Relocate Project tool to move the PP to the correct elevation

With the Site Plan View, use the Relocate Project tool to align the PP with the SP.

With the Site Plan View, use the Relocate Project tool to set the PP to the proper coordinates

Pin the PP and SP

Set the project Geographic Location using LATLON

Use the Project Code to name the Site

Temporarily unload all Links

Save BASE file

Based on Revit 2020

Update Links / Verify References

Save, close and check in the file.

Set each link instance to the Shared Site and name the instance if needed

Verify the file references in ProjectWise

Reload all links

Repeat the process for each file

Open BASE File

Central File(s)?

Yes

No

FINISH

Enable Worksets

Discipline Files

Open ARCH File

Open Transfer Project Standards

Select the BASE file, and choose only the Project Info

Select Overwrite for duplicate types

On the Starting View, Verify Project Info

Update File Name Field

Verify Geographic Location

Set the acquired site as current

Delete the "PROJCODE" site

Open a Site plan and verify that the PP is at the correct coordinates & elevation

Verify that the SP is showing the correct shared Site name

Unclip the Survey Point (SP) and set the coordinates & elevation. Clip the SP

Pin the SP and PP

Save ARCH file, close, Update Server Copy

Repeat this process for other files, using the BASE file link as the source of the Transfer Project Standard

Based on Revit 2020

--- End of Document ---