SCDOT BLUEBEAM REVU QUALITY ASSURANCE DESIGN REVIEW GUIDE

A Real-Time Collaborative and Transparent Review Process

January 29, 2021

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Trademarks

Bluebeam® Revu® is a registered trademark of Bluebeam, Incorporated.

Bluebeam Revu Software

Bluebeam® Revu® software is a pdf-based creation, editing, markup and collaboration tool built for the engineering and construction industry. Bluebeam Revu provides tools that enable electronic workflows for all phases of designing and reviewing projects. At SCDOT, Bluebeam Revu "Sessions" will be used to improve collaboration and transparency between design and quality assurance review teams; to allow multiple reviewers to access the document concurrently, digitally comment and review each other's comments in real-time; to reduce time to consolidate review comments, track and resolve by having the comments in a single review document; and to allow designers to begin addressing comments earlier in the process.

There are two roles within a Bluebeam Revu "Session", that of the initiator, and that of a participant. To initiate a "Session", the user is required to have a *licensed version* of Bluebeam Revu. To be a participant in a "Session", the user will need an *unlicensed version* of Bluebeam Revu at a minimum.

Preconstruction has reserved licenses for the majority of Preconstruction employees. There will be a few employees who will participate in "Sessions" only and thus do not require a licensed copy. To determine if you are a licensed user or unlicensed user, please contact the Preconstruction Support Design Automation team for assistance.

For design teams outside of SCDOT that will be participating in a collaborative quality assurance review, Bluebeam Revu can be downloaded at the following link: Download Center | Bluebeam, Inc. This will give you access to all of Bluebeam Revu's features for free for 30 days. Once the trial ends, you can continue using Revu, but only in View mode which allows you to still participate in a "Session".

> SCDOT is currently using Bluebeam Revu Standard version 20.0.20.

Policy vs. Guidance Statement

Policy: A PCDM policy indicates that Preconstruction shall adopt Bluebeam Revu as a "tool" to benefit our quality assurance reviews. This policy will be developed and released *at a later date*; once we have fine-tuned the workflow processes utilizing the guidance provided in this document. This document is not a one size fits all and thus should not be interpreted as a policy. We will continuously modify the processes before a policy can be established.

Guidance: Determining best practices for optimizing this "tool" in our review processes is left up to everyone participating, thus this document is intended to provide guidance of a generalized workflow for performing the reviews.

This guidance can be adapted for a variety of workflow processes within SCDOT to collaborate and provide comment on any and all engineering documents. As we formally adopt Bluebeam Revu into our Preconstruction quality assurance workflows, we will learn what works and what doesn't and will continually update this "guide" with best practices. We welcome both positive and negative feedback, so that we can make this endeavor successful for everyone participating in these reviews.

Terminology

Where **Program Manager** is referenced, this may be substituted by any member of the project team to include the Program Manager, Assistant Program Manager, Design Manager, Assistant Design Manager, Design Discipline Lead, or other responsible project team member.

Where **Design Team** is referenced, this may be substituted by any member of the design team to include Structures, Roadway, Geotechnical, and Hydraulic designers primarily in Preconstruction. Externally, the Design Team would be the consultant designers. This definition can also be extended to include other disciplines such as Traffic, Districts, Right of Way, Environmental, and Surveys, etc.

Where **Review Team** is referenced, this may primarily be substituted with the Preconstruction Support Quality Assurance Engineer for each design discipline in Preconstruction. This definition can also be extended to include other divisions such as Traffic, Districts, Right of Way, Environmental, Surveys and/or other participants in the review process.

Real-Time Collaborative Quality Assurance Review Process Overview:

For in-house developed projects:
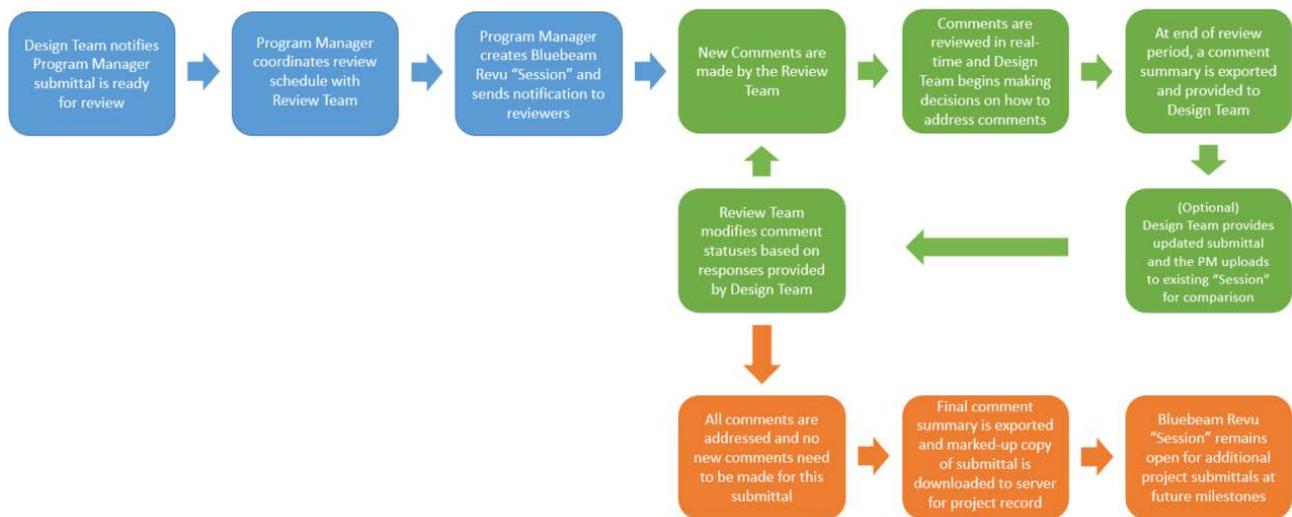
1. The in-house Design Team will notify the Program Manager with a link to the pdf document when the submittal is ready for the review process.
2. The Program Manager (or designee) will coordinate an appropriate review schedule with the Review Team.
3. The Program Manager will upload the submittal (pdf) into a Bluebeam Revu "Session" and notify the participating reviewers in the quality assurance review with the "Session" information and established review schedule.
4. All reviewers will add comments to the submittal utilizing their appropriate discipline specific Bluebeam Revu "Tool Chest" and assign a comment status to each line item to be resolved.
5. During the review process, the Program Manager and Design Team will monitor the comments in real-time to begin making decisions for modifications to the design documents as necessary or may elect to wait until the review period has ended to address them.

6. At the end of the review period, the Program Manager will consolidate the comments and export a detailed comment summary report. The marked-up pdf and detailed comment summary will be downloaded and saved to the appropriate project directories. The detailed comment summary report will be provided to the Review Team and the Design Team for their records to ensure each comment is appropriately addressed.
7. (Optional) Once comments have been addressed and a new submittal document has been prepared, the Program Manager may upload the new submittal to the existing Bluebeam Revu "Session" to allow the participants to compare the original document with comments to the newly updated document for resolution. This step may also be completed as part of an internal quality control process in preparation for the next milestone review period.
8. The Program Manager will provide a response to the Review Team to address all comments within an agreed upon time frame. The Review Team (primarily Preconstruction Support for Quality Assurance Reviews) will re-status the comments to the proper resolution status.
9. When all comments are appropriately addressed and no new comments are necessary, the Program Manager will once more consolidate the comments and export a final completed detailed comment summary report. The final marked-up pdf and detailed final comment report will be downloaded and saved to the appropriate project directories. The detailed final comment report and marked-up pdf will be provided to the Review Team and the Design Team for their records.
10. The Bluebeam Revu "Session" will remain open for additional project submittals at future milestones.

Getting Started with Bluebeam Revu

Profiles: Opening the SCDOT Profile

Bluebeam Revu allows users to customize the interface, which is controlled by **Profiles**. A standard **Profile** has been created for SCDOT users. This **Profile** has color coordinated markup tools for multiple disciplines which includes: Construction, Environmental, Geotechnical, Roadway, Traffic, etc. The **Profile** may be downloaded on the www.scdot.org "Design Quality" page.
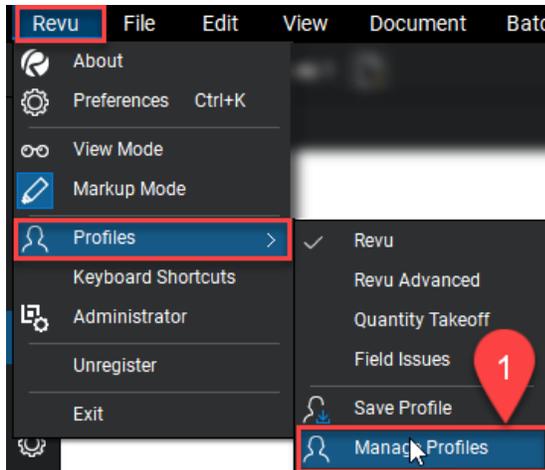
Open Bluebeam and in the upper left, select **Revu > Profiles > Manage Profiles.**

On the Manage Profiles dialog, select the **Import** button. Browse to the location where you saved the downloaded **SCDOT.bpx** profile. Press the **Open** button to return to the Manage Profiles dialog. Press **OK** to accept the import.
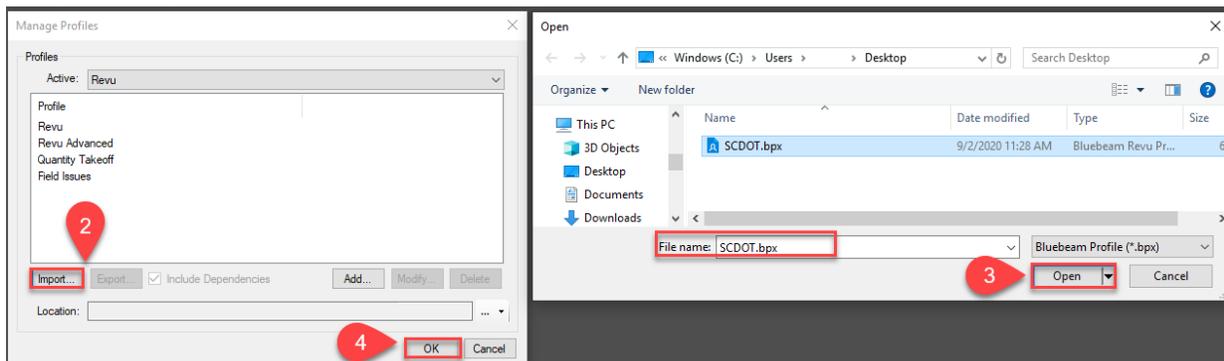
Once you have imported the SCDOT profile, you can return to the **Revu > Profiles > SCDOT** option to choose the newly imported profile.
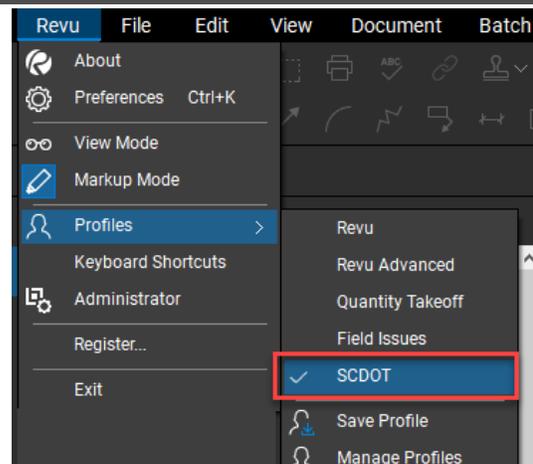
To turn on/off "Tool Chests" so that you are left with only the ones that are applicable to your specific discipline, select the **Settings** icon and then **Hide** to close each of the tool chests that are not applicable. You will only need to this once.
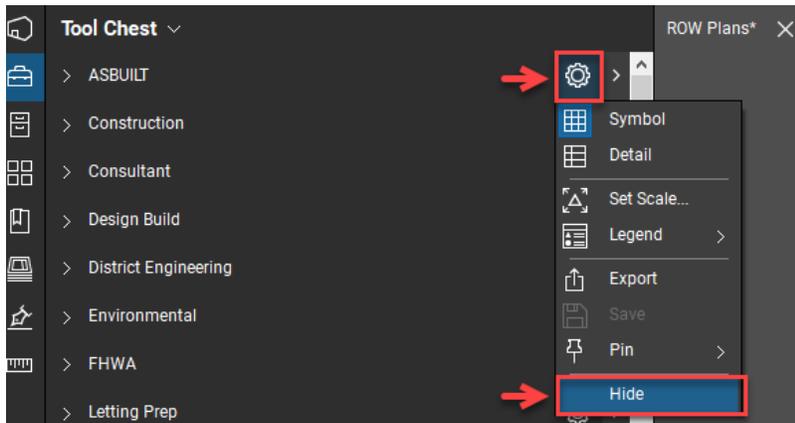
Layers: Adding Layers in Bluebeam Revu

Bluebeam Revu allows for the addition of layers in a PDF similar in function as in a CADD file where layers are used to isolate certain features from view and in this case mark-ups. **Layers must be present in a document before adding to a Session for review.** This section will demonstrate how to use the **SCDOT_Bluebeam_Revu_Layers_Template.pdf** to add layers into a set of plans before uploading to a Session.

In Bluebeam Revu, open the set of plans you wish to add layers to and open the Layers icon. Notice that it is currently blank, without any layers.
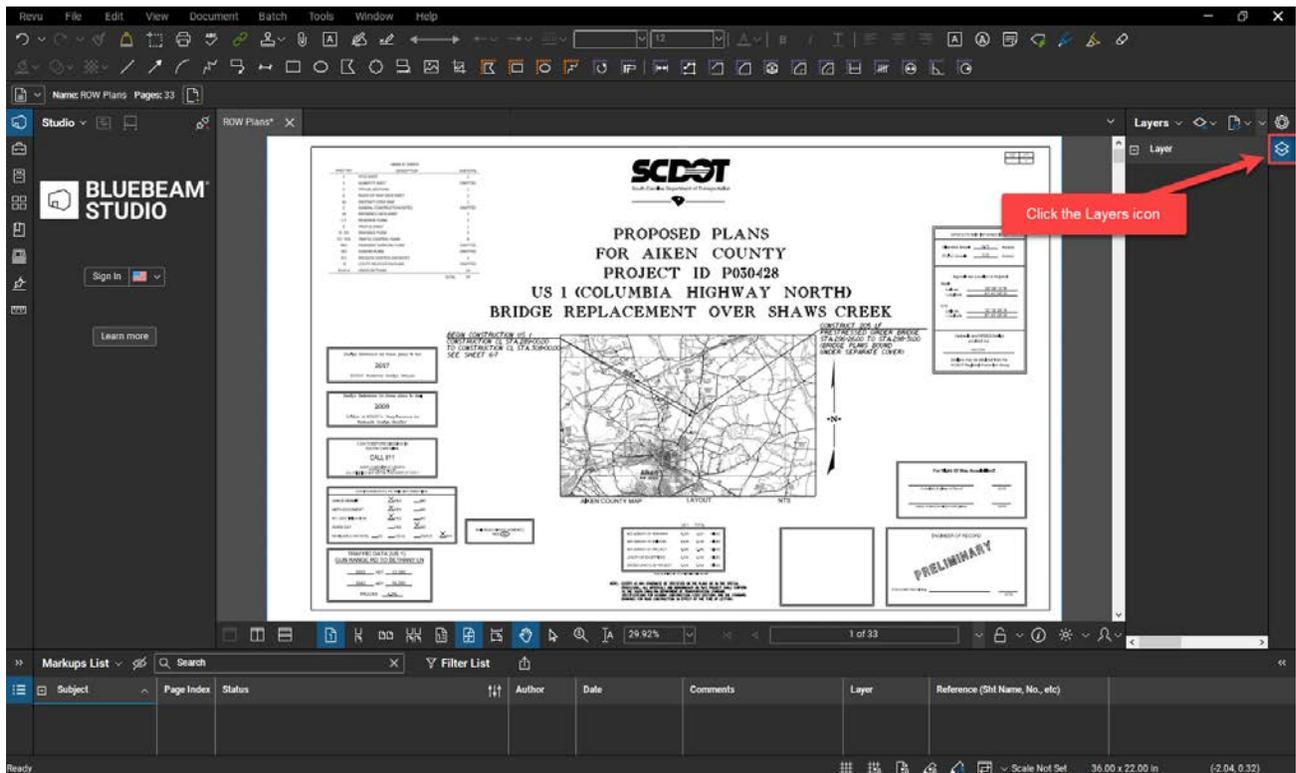
Now open the **SCDOT_Bluebeam_Revu_Layer_Template.pdf** as a second document. You will have two tabs above the pdfs to toggle back and forth between the two documents. Notice the **Layers** dialog is now populated.
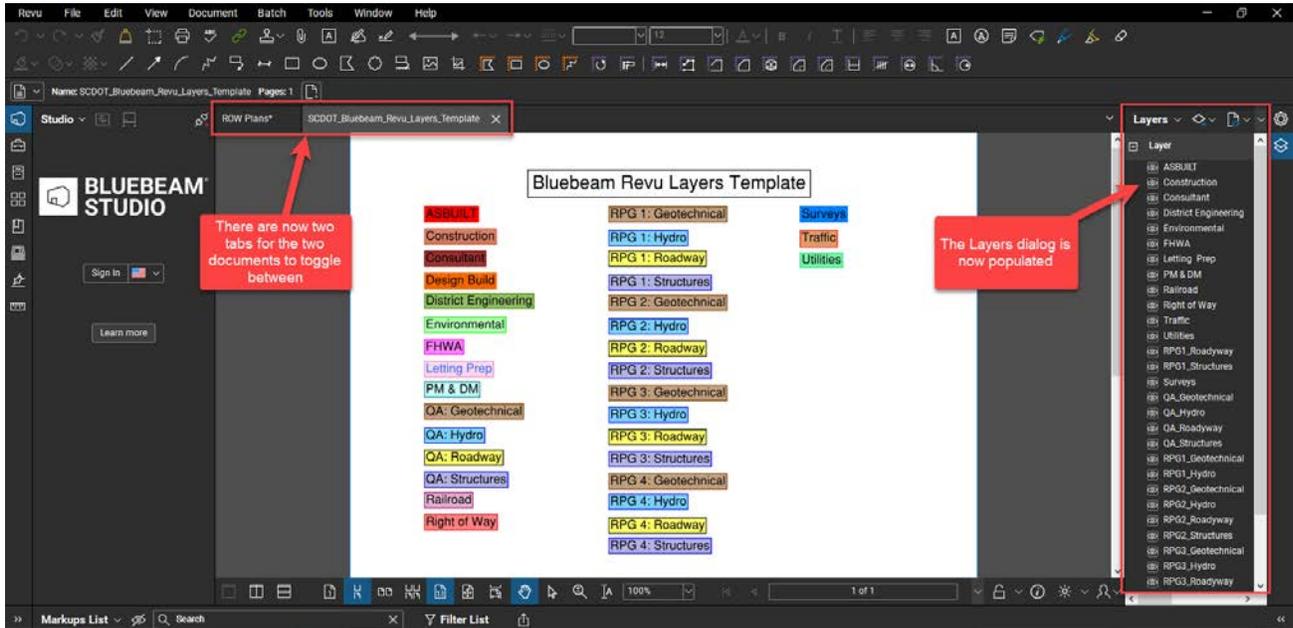
Click at the top on the tab for the set of plans and open the **Thumbnail** icon on the toolbar to the left.
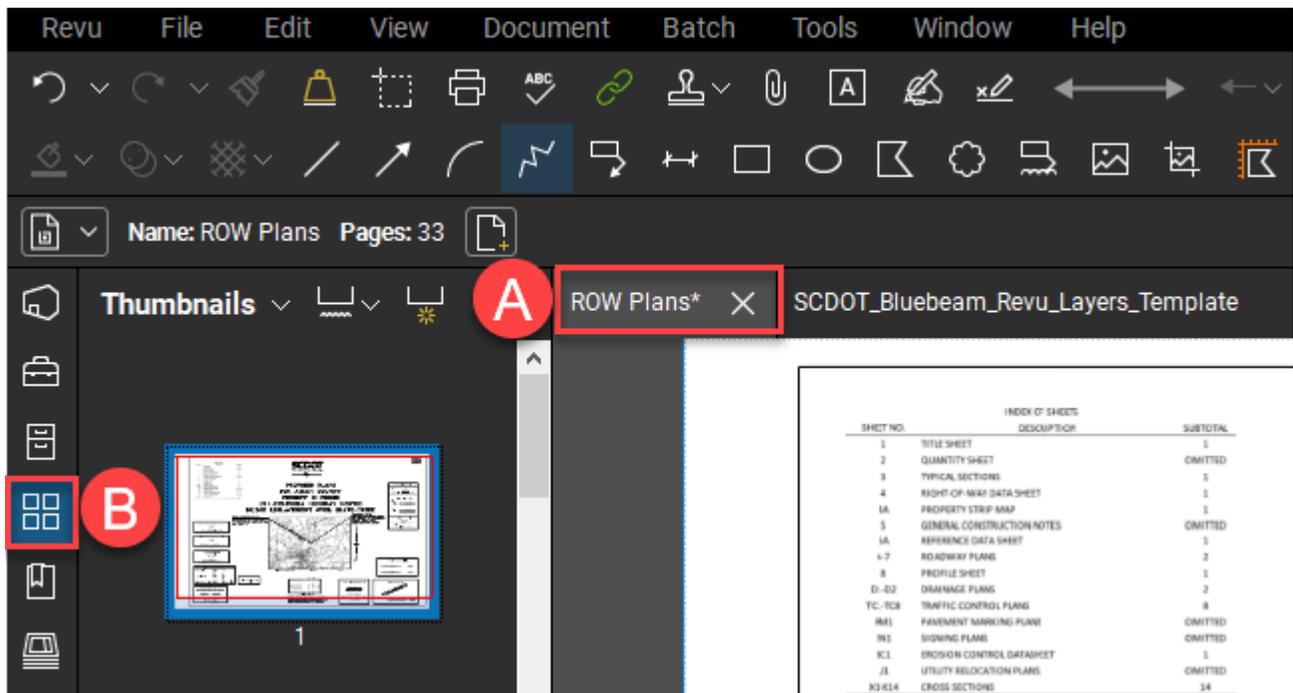
Click on the **Thumbnails** "drop-down" and select **Insert Pages**
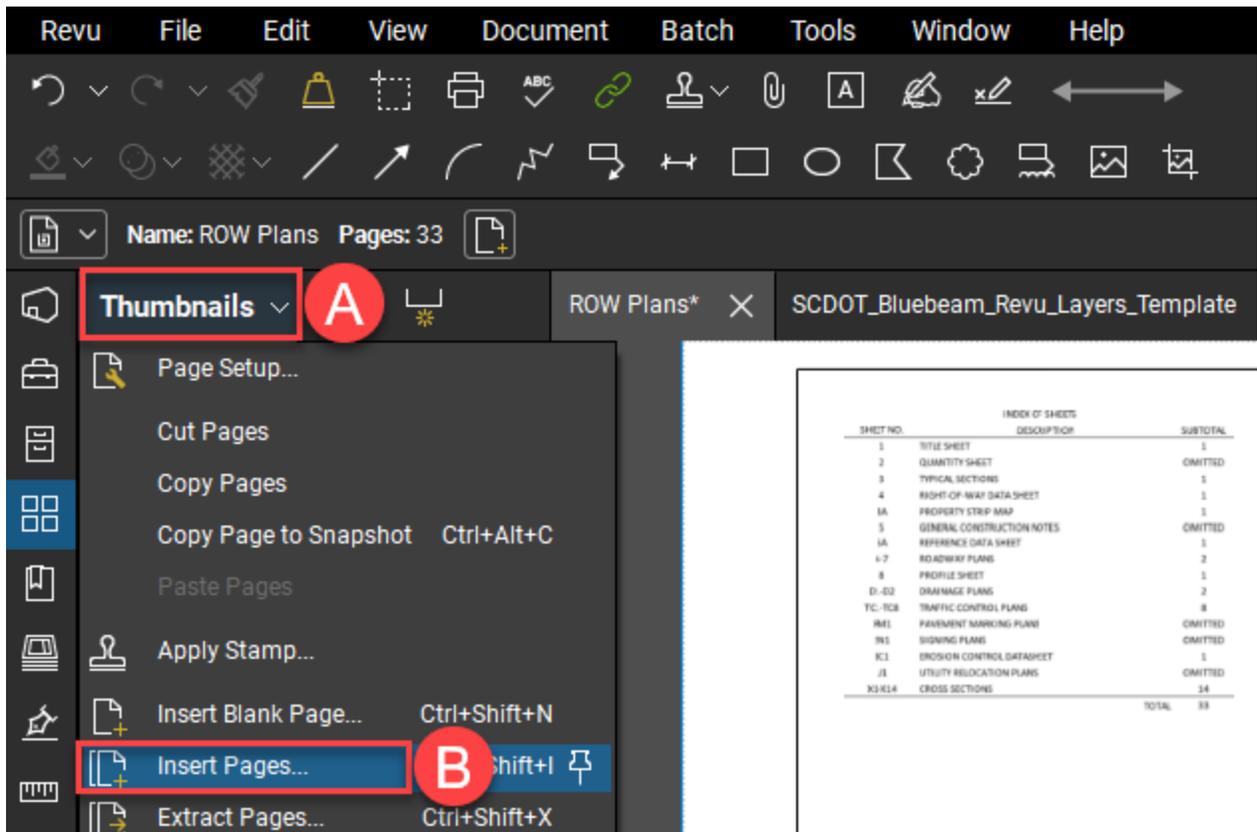
Click the **Add Open Files** button, check on the **Merge Layers** box, and then click **OK**.
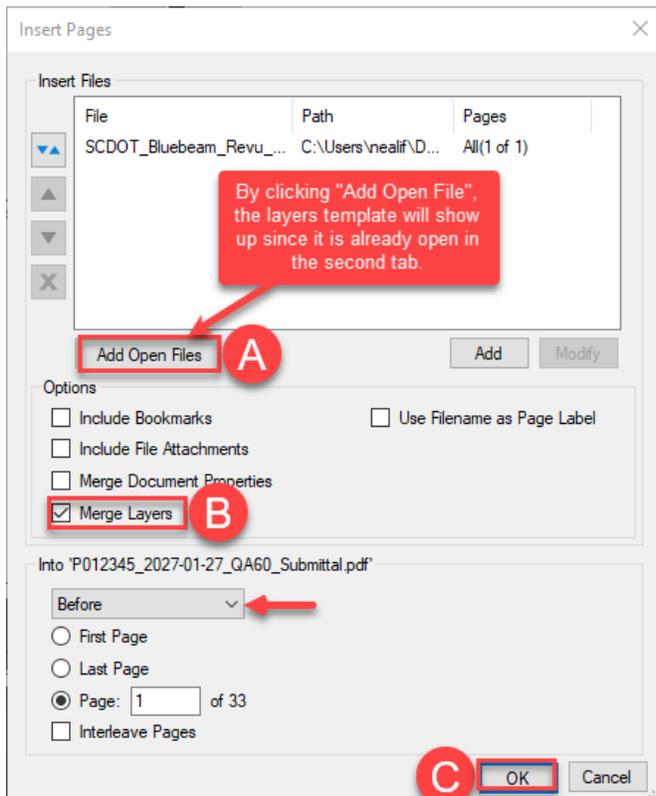
The Bluebeam Revu Layers Template was added into the plan set as an **additional page**. This was necessary to add the layers to the pdf. **This page can now be removed** leaving the newly added layers in the plan set document.

With the **set of plans as the active pdf**, on the **Thumbnails** dialog, click on the **Layers Template** thumbnail to select the page. Press the **Delete** key on the keyboard. Press **OK** to confirm your selection. (To undo this action, press Ctrl + Z.)

You will be left with the original plan set with the layers still merged in.
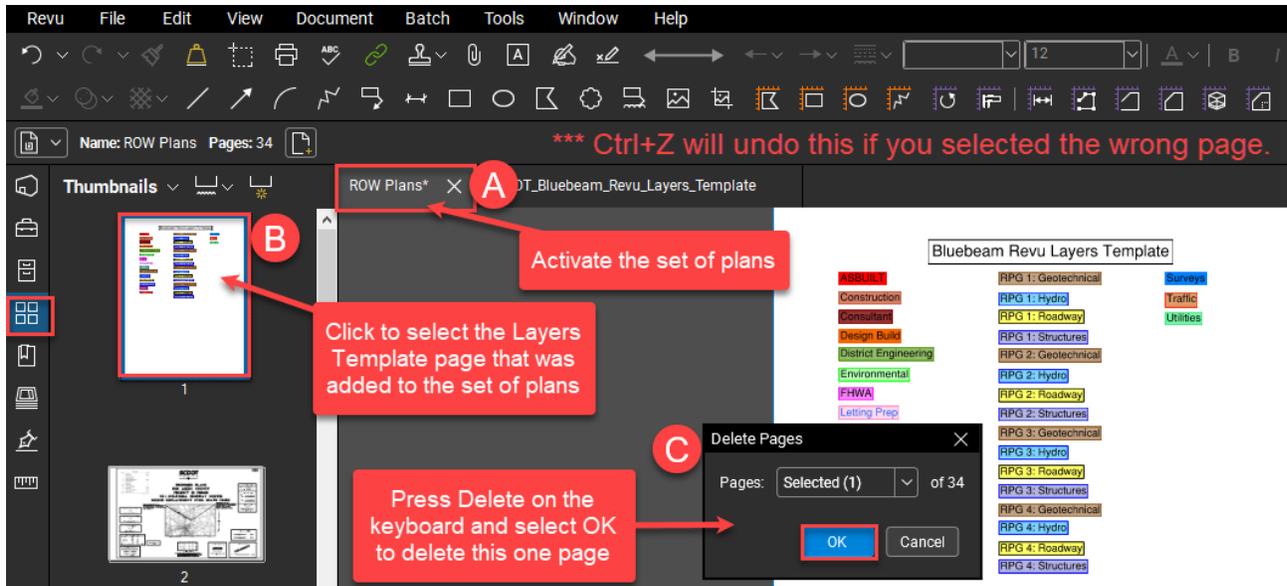
Right click on the tab for the *active set of plans* and select **Save**. This document is now ready to be uploaded into a "Session" for the review process.
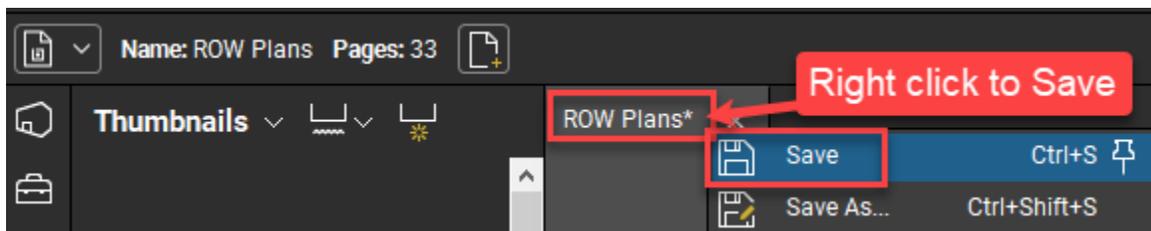
Creating a Bluebeam Id

The collaborative experience is all based upon creating an account with Bluebeam called a "Bluebeam ID". The Bluebeam ID is what other users will see as in the "Author" field in the Markup List, so it needs to be your NTS username or your proper name.

Account information can be updated at https://studio.bluebeam.com/.

To create a Bluebeam ID, navigate to **the Sign In** option on the Studio Tab in the Bluebeam Revu software. Select the **Studio US** option.
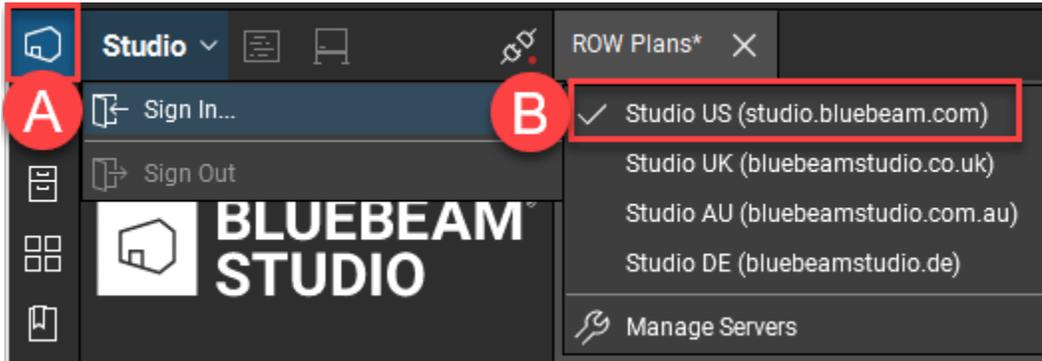
Click on **Create Account**. This step will only be completed for the 1st time you login. For future sessions, you will simply login (see below for further instruction).

Fill in the Form as a first time user. Press **Create Account**.
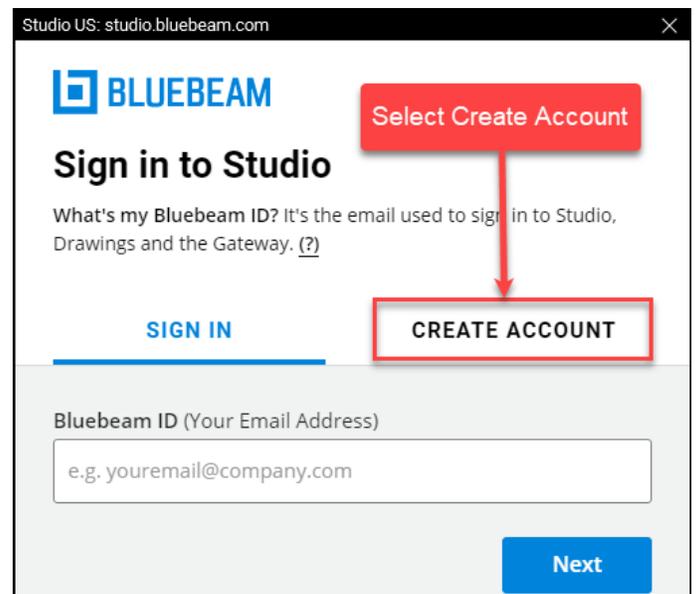
Note: You will need to remember your password. DO NOT USE your nts password for this account.

Press **I Accept** to accept the Bluebeam Terms of Use.
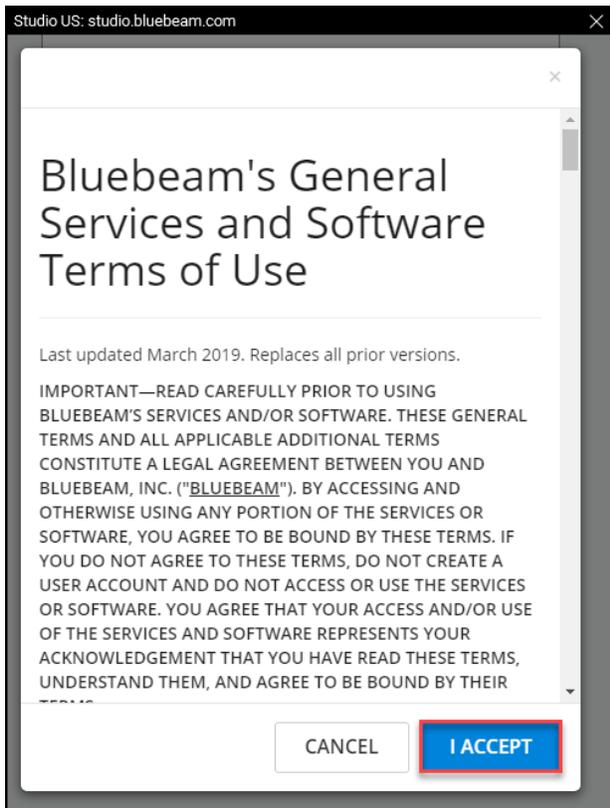
Open your email and **find the email** from do-not-reply@bluebeamops.com with the subject Bluebeam email Verification. Click the green button **Confirm My Bluebeam ID**.

Once your account has been created, navigate to **the Sign In** option on the Studio Tab in the Bluebeam Revu software. Select the **Studio US** option.
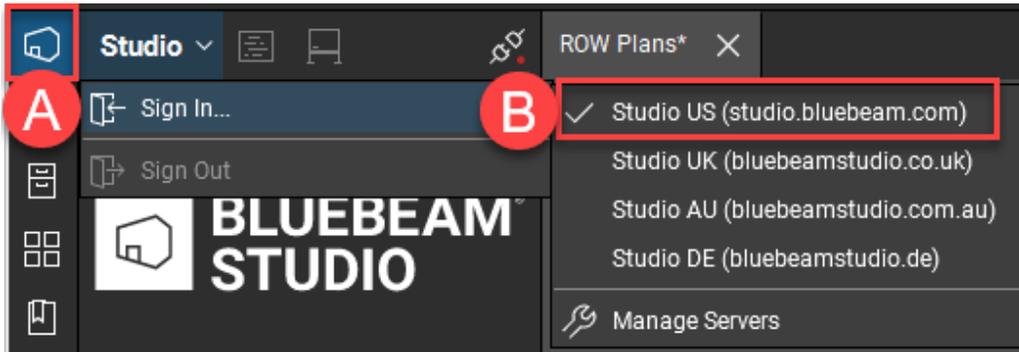
Select **Sign In**, enter your **email address**, and press **Next**.
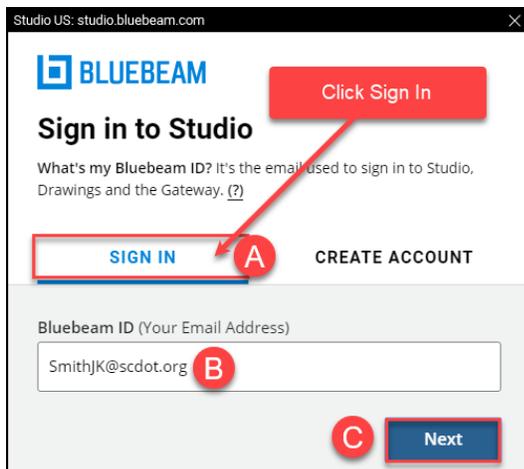
On the next dialog, enter your **password**, check on **Keep me signed in** and press **Sign In**.
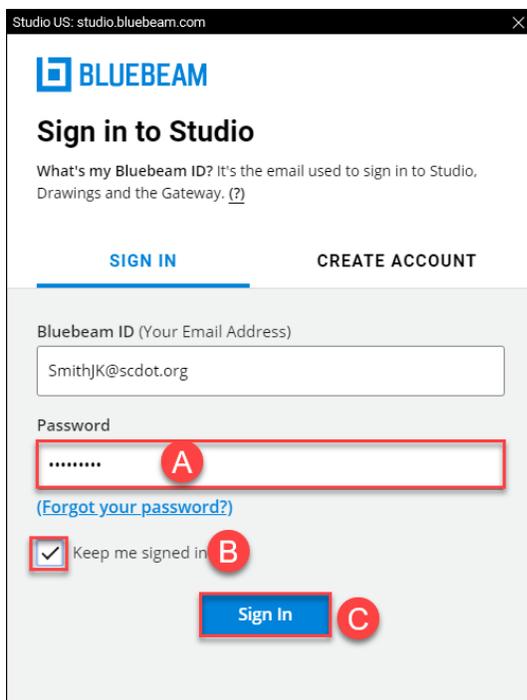
Once you have created your Bluebeam ID, you will be able to log in to Studio to create a Session. You will need the registered copy of Bluebeam Revu in order to create a Session.

On the left, select the Studio icon to begin creating a Session. Ensure the **Session** icon is selected in the middle of the toolbar. Press the **+ Add** icon and select **New Session**.
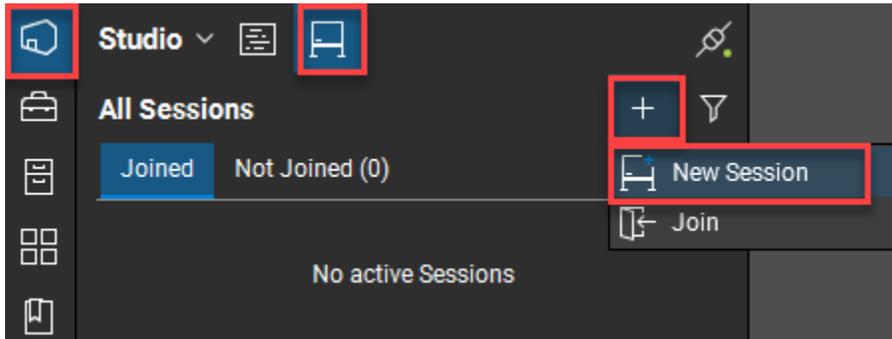
From there, the **Start Studio Session** window will appear.

1. **Session Name:** Enter the **Project Id** as the session name that will be displayed for all invitees.
2. **Documents:** Click **Add Open Files** to upload the submittal (pdf) that is already open in Bluebeam Revu. You can add additional files by selecting **Add**.
3. **Options:** Make sure to change the **Permissions**. These will be the default permissions for attendees until they are placed in a permissions group or their permissions are changed manually.
4. Click **OK.**
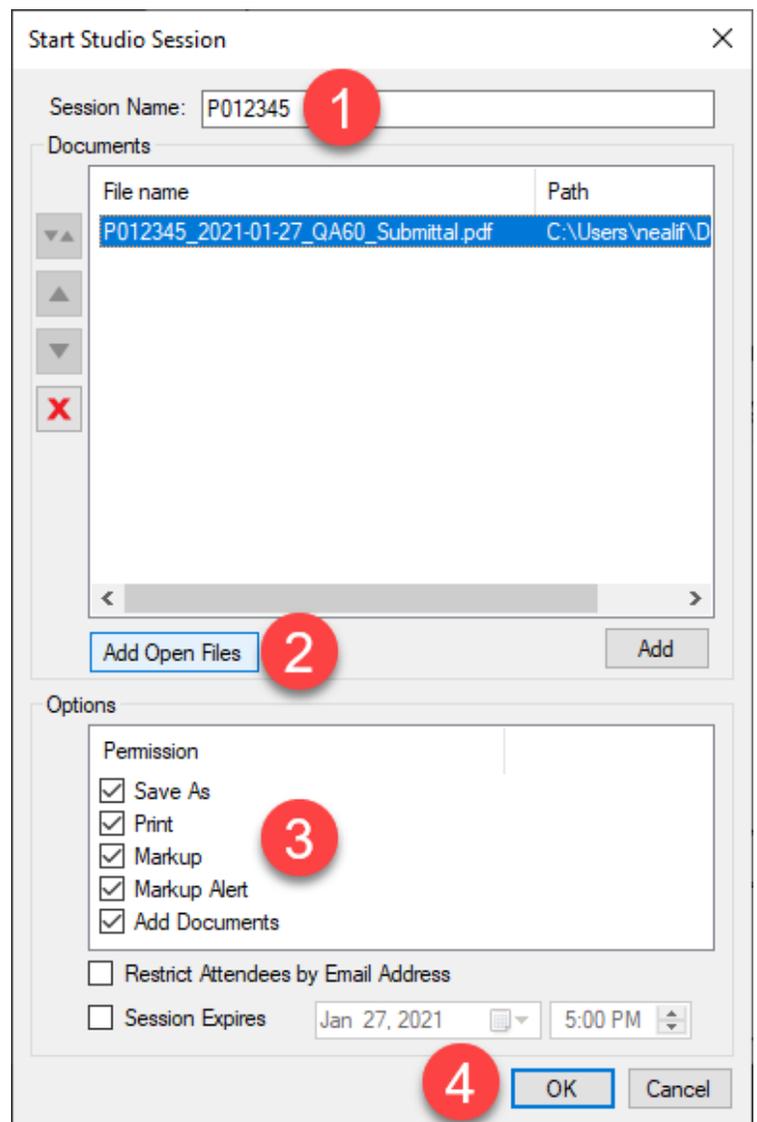
You will now see the **Studio** panel change, showing the Session name, a **9-digit Session ID**, Attendees, Documents and Record.
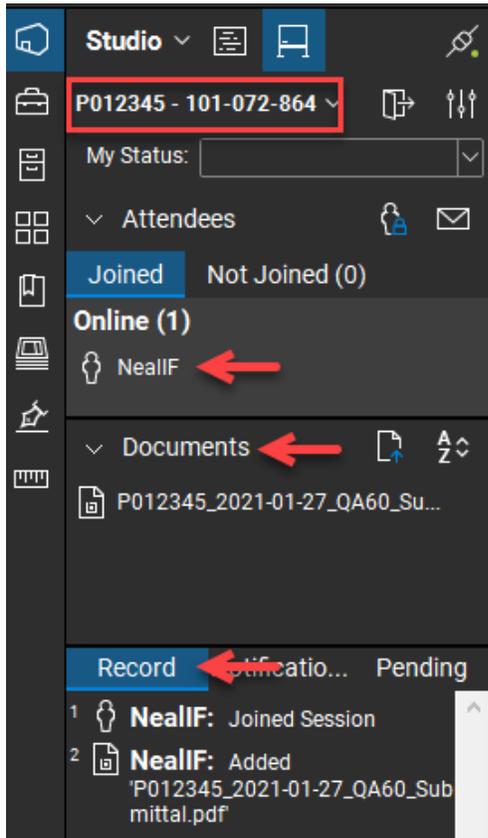
Sessions: Inviting the Review Team

A **Session Invitation** window will also pop up on your screen. In this window, you will be able to invite review participants to your Session by clicking the **Type or Paste Emails** option in the Add Emails to Invite section.
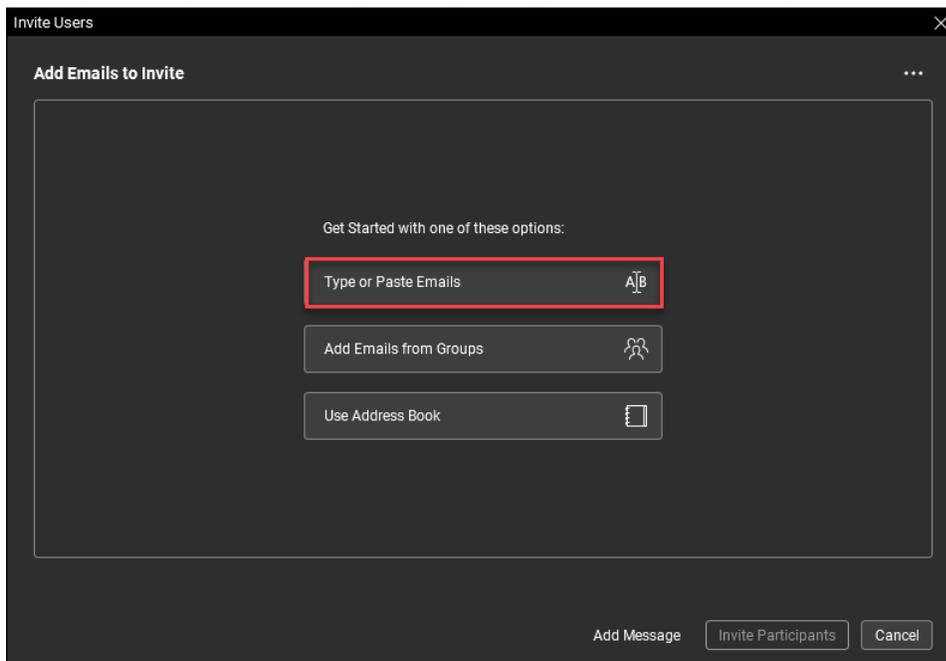
Enter email addresses or copy and paste from Outlook. Delineate each address using a space or semi-colon. Press the **Check & Include Emails** button to return to the previous dialog.

Press the **Add Message** option at the bottom of the Invite Users dialog (not pictured). Copy/paste or type a message that you would like for the Review Team to receive. Be sure to include the session id # and the agreed upon review date. Press the **Save Message** button to return to the previous dialog.

Press the **Invite Participants** button to send off the invitation to begin the review process. Additional participants can be added by pressing the Add Emails button.

After sending the invitation, the list of **Attendees** will update with a list all of the people that have joined the Session at least once. It will also list those who have Not Joined.
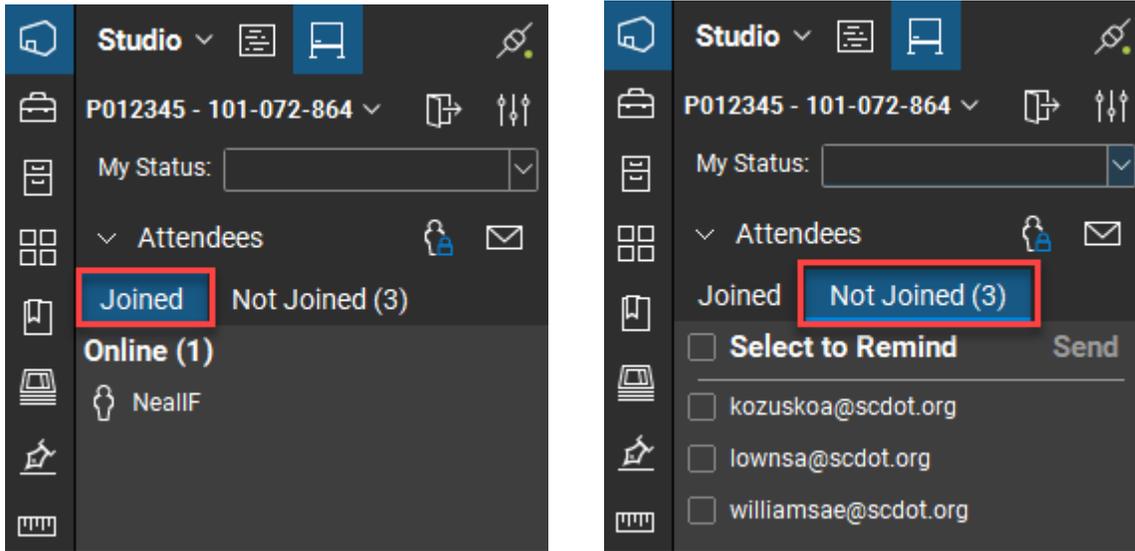
To send a reminder, on the **Not Joined** tab, check next to the person's name and press the **Send** button. Enter a message and press **Send Reminder**.
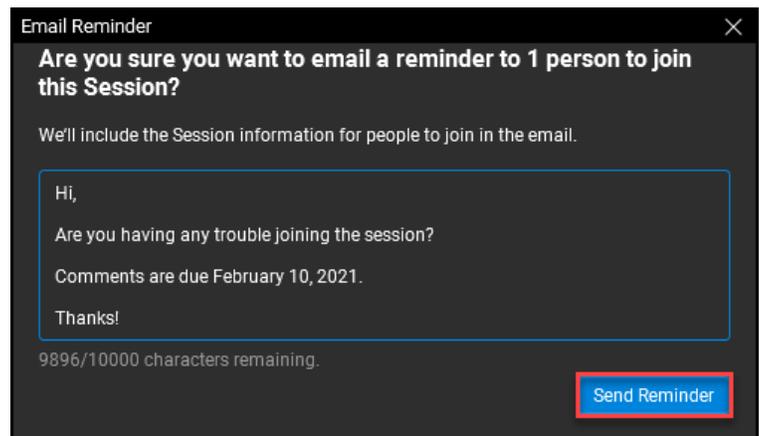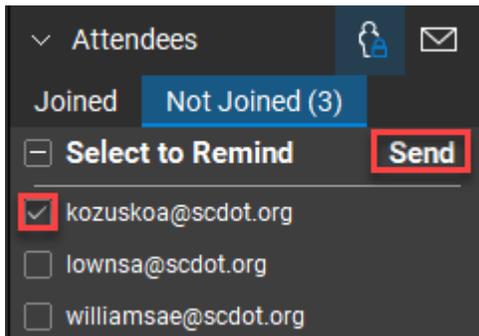

To add additional participants, press the **Invite** icon in the Attendees panel. **Repeat** the process outlined above on adding email addresses, a message, and sending the invitation.
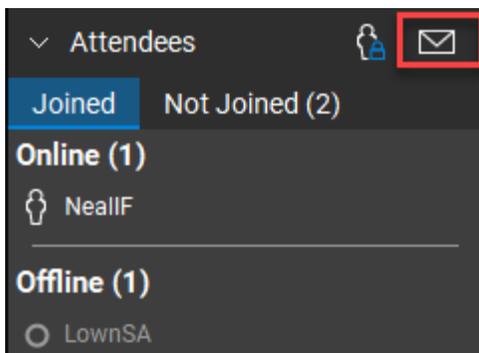
Sessions: Restrict Attendees by Email Address

At any point during the review process, permissions may be modified to grant or restrict access by email addresses. To grant or restrict access, press the **Attendee Access** button.
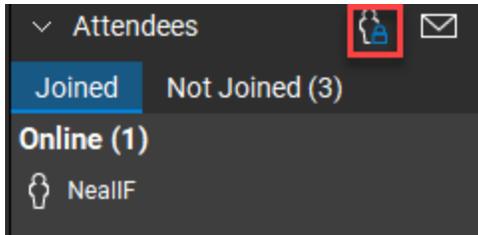
Check on the "**Restrict Attendees by Email Access**". Highlight the email addresses of the participants whose access needs to be modified. Press the **Allow or Deny** button to assign the appropriate permissions. Press OK when complete. These can be modified again at a later date.

Note: This feature *should only be utilized* when there is a reason to keep the contents of the *session confidential*.

When the **Restrict Attendees by Email Address** is selected, the session cannot be forwarded to additional participants who were not included in the original invitation unless their email addresses and permissions are added. We want our "Sessions" to be as collaborative and transparent as possible, so we will rarely utilize these settings at SCDOT.
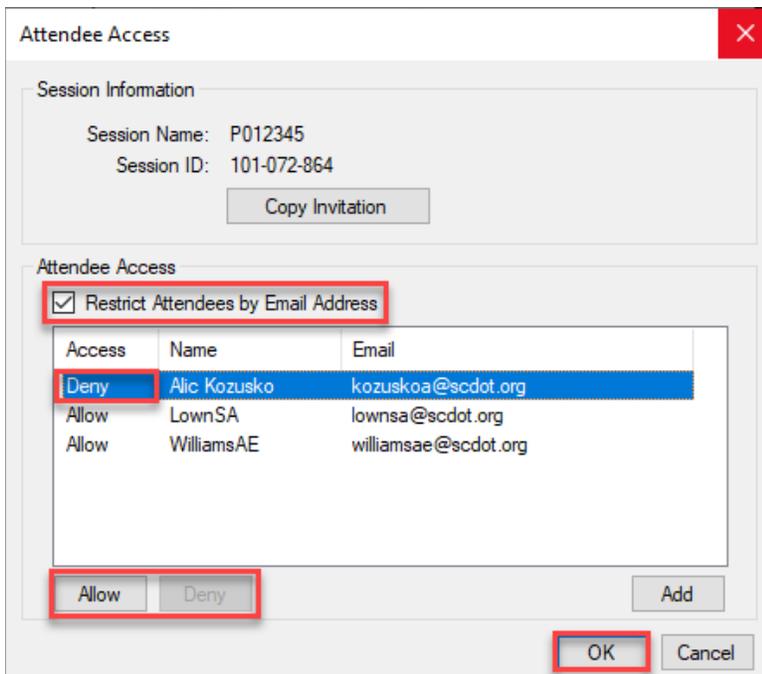
To join a session, you will receive an invitation by email or may be forwarded the **9-digit Session ID**. If you receive a **Studio Session invite** from someone, all you have to do is click the link provided to join a session.

Clicking the link will open Revu and prompt you to log in with your Bluebeam ID.
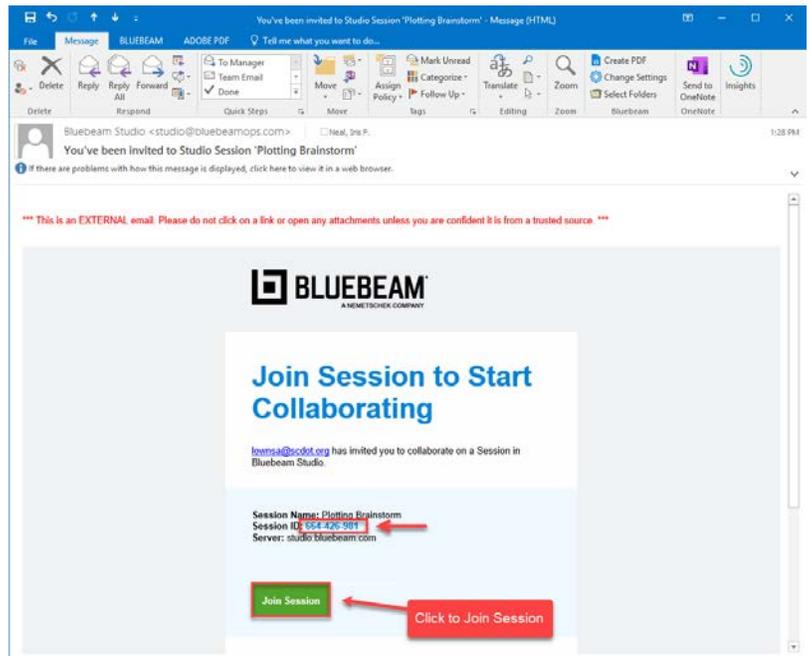
To join by Session ID number, press the **+** next to All Sessions and select Join. Enter the **9-digit Session ID** and press **OK**.
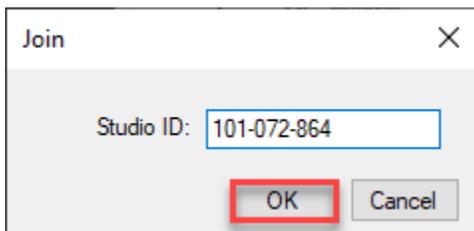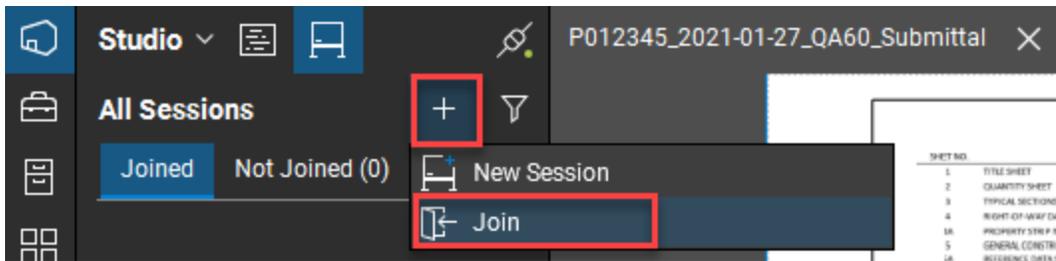

Under All Sessions in Studio, you can see which sessions you have joined, and which ones you have been invited to, but have not yet joined. Click on the Session you wish to join under the Not Joined tab.
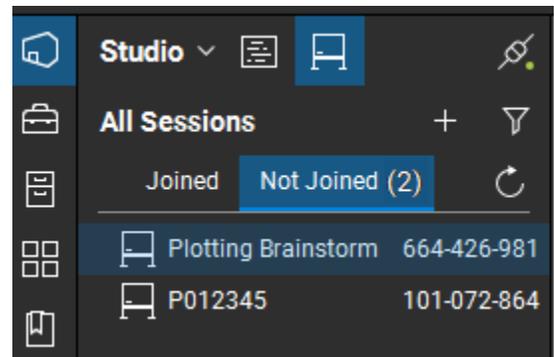
To move between different sessions, click on the **Leave Session** icon to return to the All Sessions dialog. Select the Session you wish to activate.
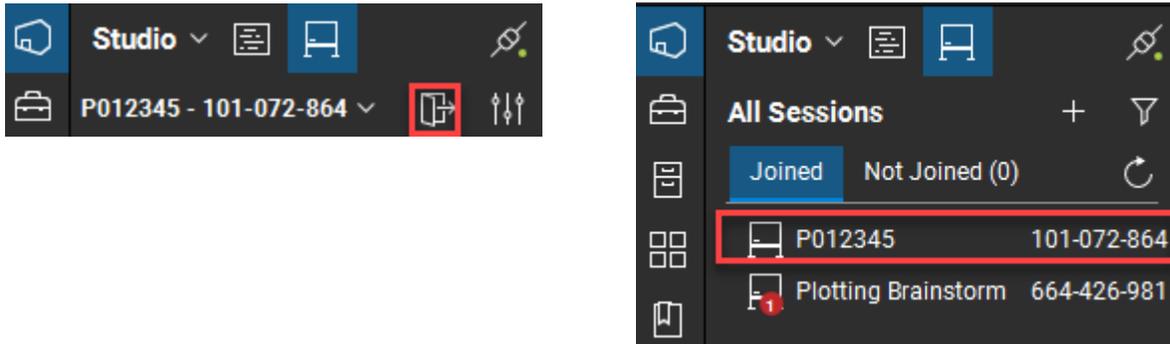
At any point during the review process, you can update the My Status field to Waiting, Reviewing, or Finished.
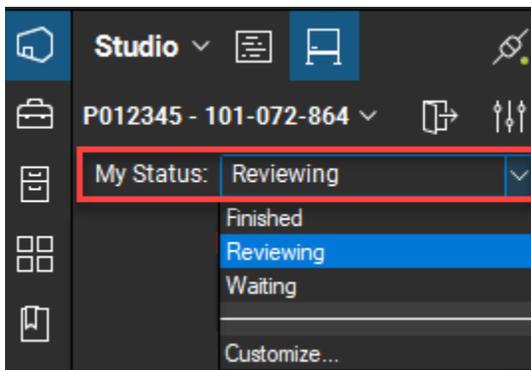

Tool Chests: Commenting, Statusing and Replying

To access a customized "Tool Chest" for your specific discipline, the SCDOT.bpx profile must be loaded before you begin commenting. Please see previous instructions to complete this step.

A **Tool Chest** is capable of taking tools from multiple toolbars and allowing you to custom them with specific colors, layers, and other settings. (For example, all Roadway comments have been set to the color "yellow" to allow the reviewers to quickly distinguish which comments are for roadway.) The Tool Chests are then saved for ease of access to utilize during the review process.

Select the **Tool Chest** icon on the left and locate the Tool Chest for your specific discipline. Click on the "chevron" to expand the Tool Chest to access all of the commonly used mark-up options.
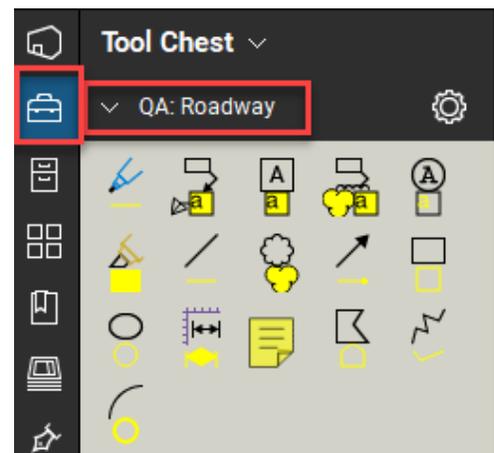
Select the appropriate tool to begin making comments to the set of plans. Click on the spot in the pdf document where you wish to place the comment. You will see the comment appear in the Markup List at the bottom. Edit the text, modify the size, or move the comment as necessary to address the area of concern.
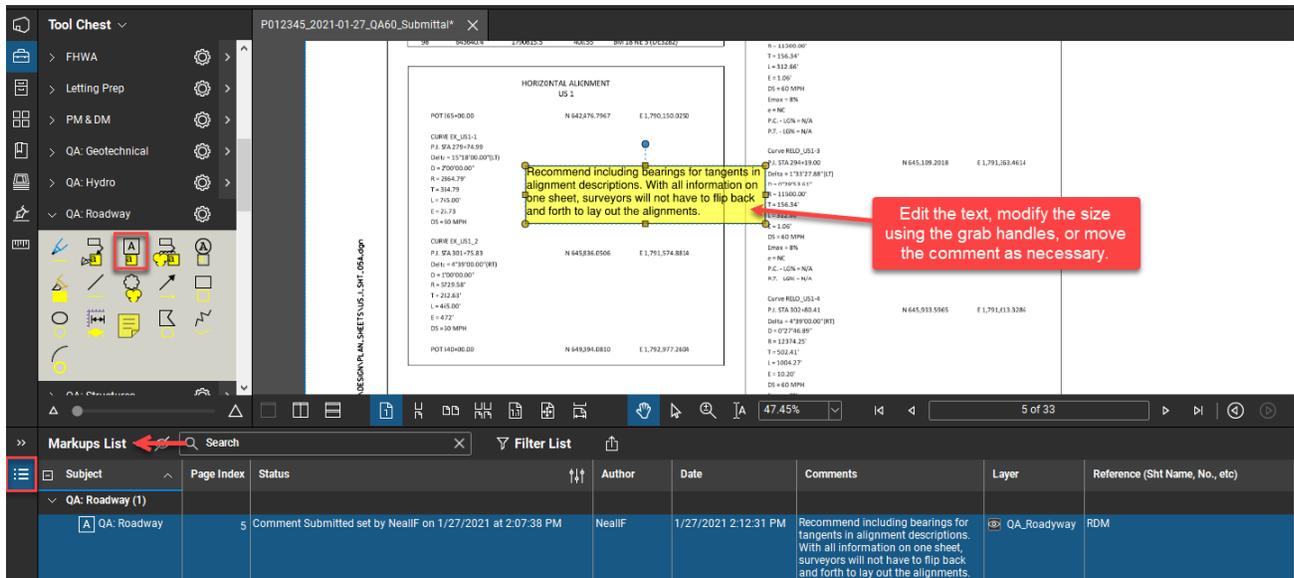

In the **Markup List**, the available columns are described below:

Subject: This is set by the Tool Chest group you selected. No user input is required.

Page Index: This is the page number in the pdf where the markup is located. No user input is required.

Status: The Review Team will set the status by right clicking to select **Set Status** and selecting the appropriate option.
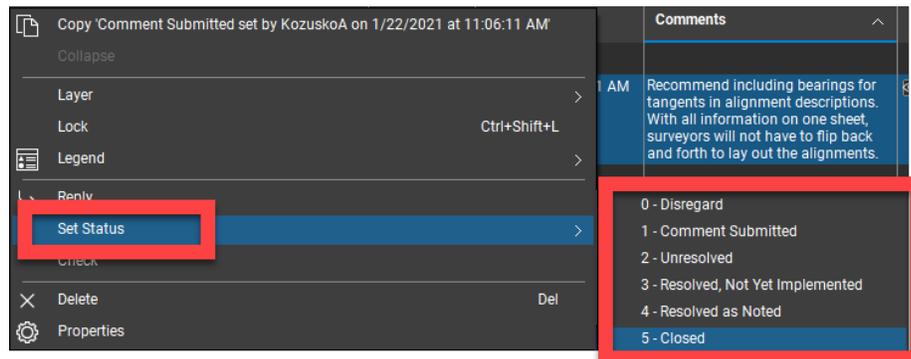
Author: This is the person who made the comment. No user input is required.

Date: Date and time of which the comment was last edited. No user input required. This does not affect the time stamp in the Status column.

Comments: This column includes any text that was added to the markup.

Layer: This is set by the Tool Chest group you selected. No user input required. Layers can be turned on and off by clicking the "view" icon in front of the layer name. It can be useful when multiple disciplines are reviewing and you need to isolate comments by discipline.

Reference: The Review Team will enter any reference source information to support the comment posted. For example, RDM 22.2.8.1
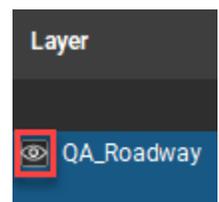
After the Review Team has added comments, any other review participant can respond to address the comment. This is done by **highlighting the comment in the Markup List, right clicking and selecting Reply**.
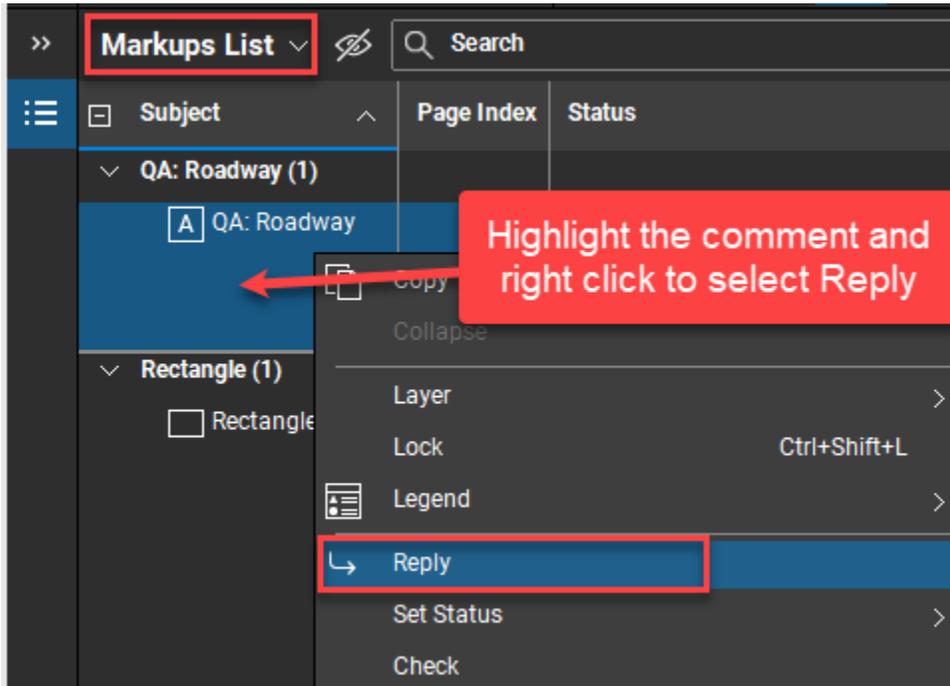
By using the Reply feature (instead of a new comment), all of the information can be neatly tied to the original comment.

The Status of the original comment will remain unchanged and the reply has its own status that can be chosen.

The **Design Team** (or designee) will address comments using the Reply option. The **Review Team** will assign the Status in Original comment to show the proper resolution status.
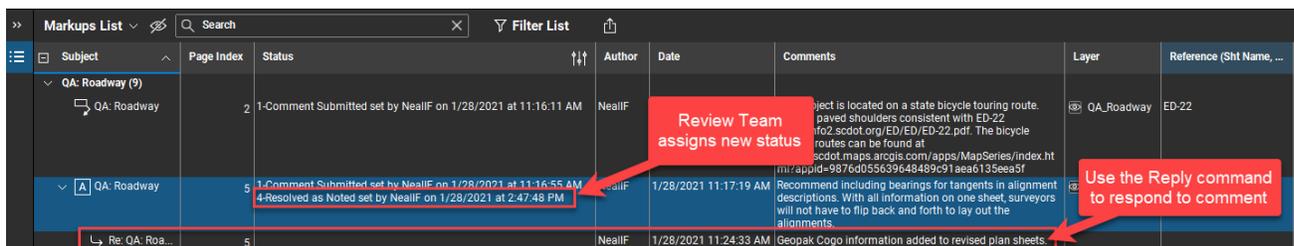
Consolidate Comments and Export Comment Summary Report

At the end of review period, the comments will be exported to be formally addressed, if they were not already addressed during the review period.
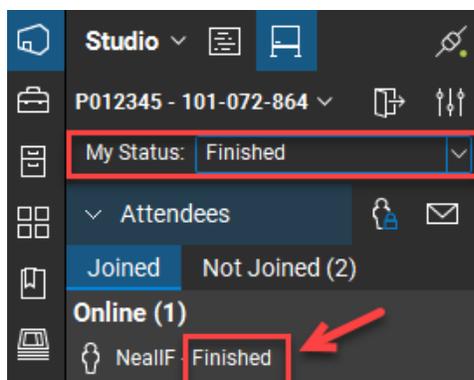
Check to see if all users have the Status "Finished" next to their name.

Use this feature to determine if you need to contact anyone as the review period end date is approaching to ensure they have had the opportunity to provide their comments by the end of the review period.

Additionally, if everyone finishes early, this status can be helpful to close out the comments sooner.

To create a PDF report, in the Markup List area, adjust the column widths to make the comments as legible as possible, sort of like Excel columns.

In the Markup List area, select the **Summary** icon and select **PDF Summary**.

Review the **Columns** tab to ensure all of the appropriate columns are selected for exporting. Uncheck Layer to remove it from the report.

On the Filter and Sort tab, in the Status section, uncheck any comments that are marked as "0 – Disregard". Check that the Sorting is set to Sort By **Subject**.
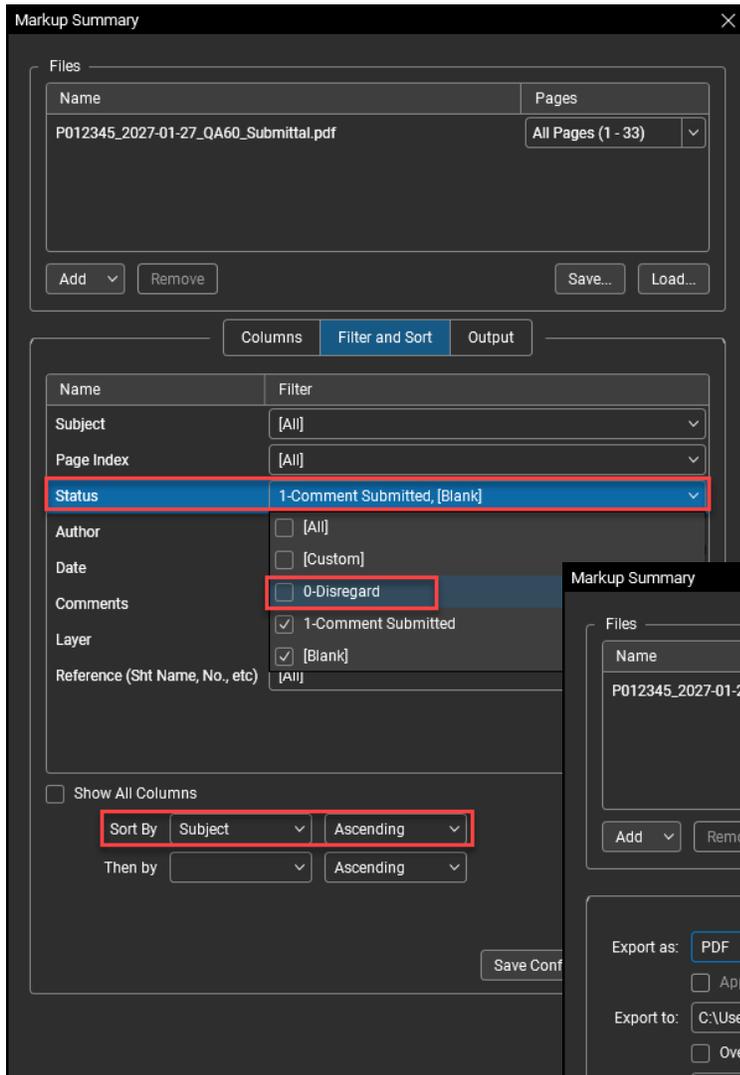
On the **Output** tab, modify the settings as shown to the right.

- Press the **Import** button next to Template to add the background template for the comment report.
- Set **Style** to **Table** and ensure **Use Current Column Widths** is checked on
- Set **Thumbnail** to Medium
- Modify **% Padding** to 10
- Press **OK**
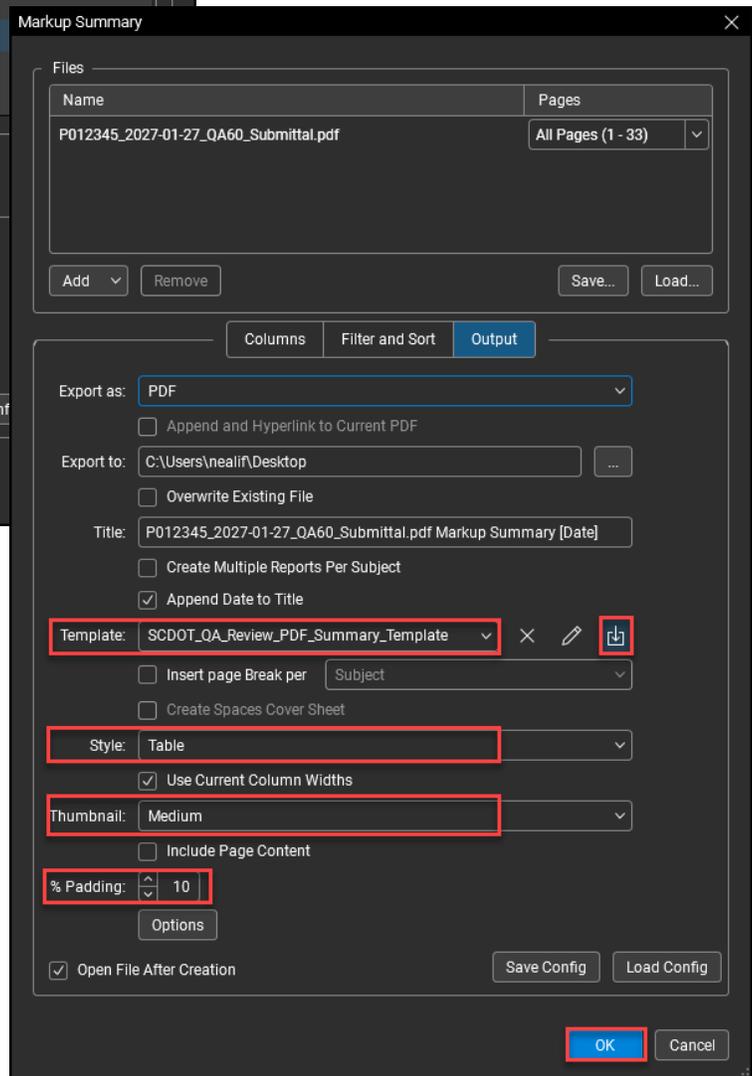
Review the PDF Summary report and modify the column widths, filters, etc. until the report is aesthetically pleasing and most importantly, complete and legible.

For additional flexibility working with comments, it is best to also create an Excel report. The Excel report will be helpful for consolidating comments, filtering and editing anything prior to sending to the Design Team.

For tracking, the Excel reports can also be combined across multiple projects to recognize any trends in items that are most commented on. In the future, this information will be used to locate any gaps in our policies, manuals, and workflow practices.

To create an Excel report:

In the Markup List area, select the **Summary** icon and select **CSV Summary**.
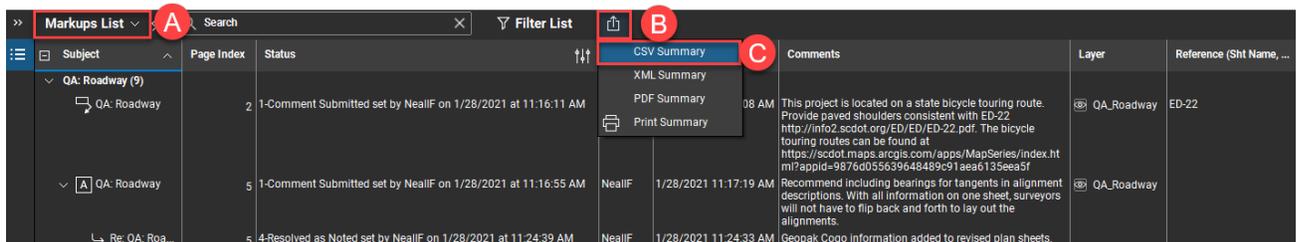
Review the **Columns** tab to ensure all of the appropriate columns are selected for exporting.
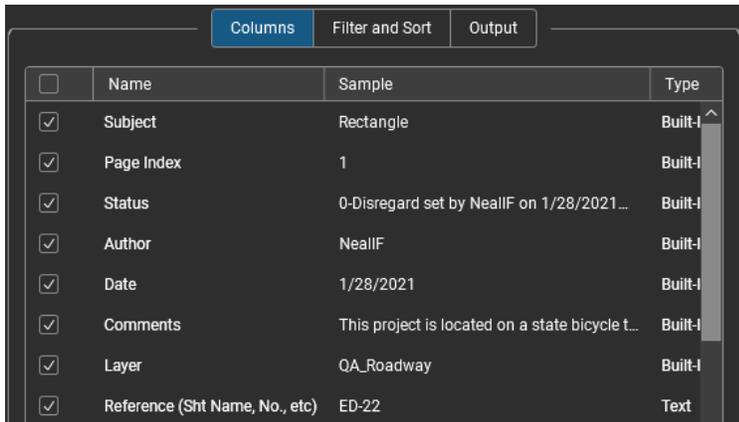
On the Filter and Sort, in the Status section, uncheck any comments that are marked as "0 – Disregard". Check that the Sorting is set to Sort By **Subject.**
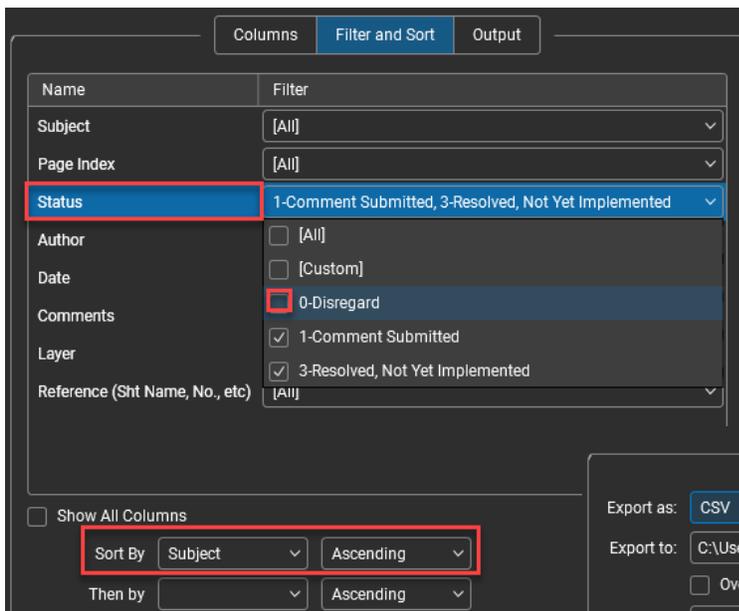
On the **Output** tab, accept the defaults, and press the OK button
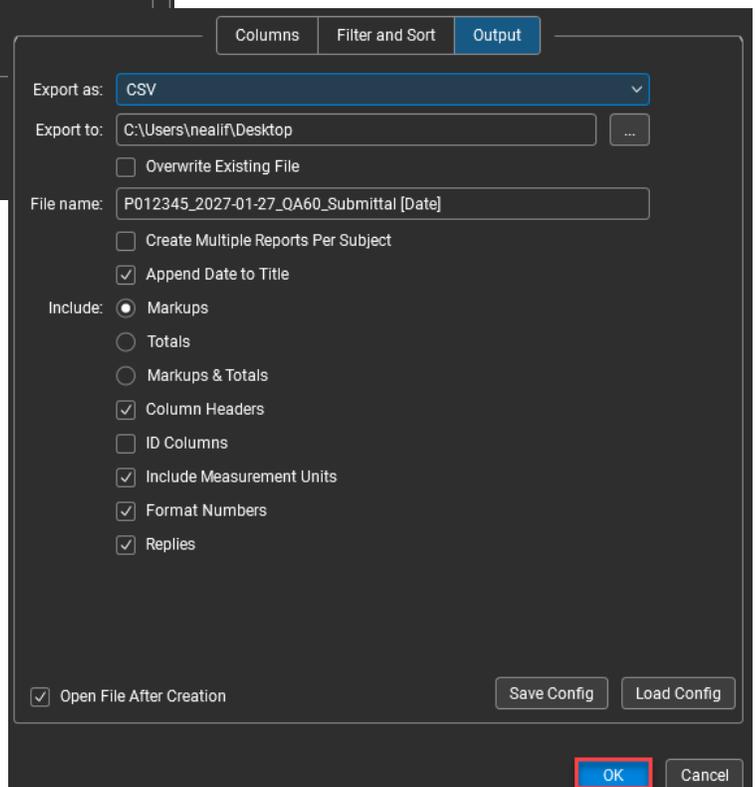
Review the outputted Excel file. Perform any adjustments to the column widths, text wrap, borders, alignment, and edit text as desired. Save as a *.xslx file and maintain this file for the project record.

|	Subject	Page Index	Status	Author	Date	Comments	Layer	Reference (Sht Name, No., etc)
2	QA: Roadway	2	1-Comment Submitted set by NeallF on 1/28/2021 at 11:16:11 AM	NeallF	1/28/2021 11:16	This project is located on a state bicycle touring route. Provide paved shoulders consistent with ED-22 http://info2.scdot.org/ED/ED/ED-22.pdf. The bicycle touring routes can be found at https://scdot.maps.arcgis.com/apps/MapSeries/index.html?appid=9876d055 639648489c91aea6135eea5f	QA_Roadway	ED-22
3	QA: Roadway	5	1-Comment Submitted set by NeallF on 1/28/2021 at 11:16:55 AM	NeallF	1/28/2021 11:17	Recommend including bearings for tangents in alignment descriptions. With all information on one sheet, surveyors will not have to flip back and forth to lay out the alignments.	QA_Roadway	
4	Re: QA: Roadway	5	4-Resolved as Noted set by NeallF on 1/28/2021 at 11:24:39 AM	NeallF	1/28/2021 11:24	Geopak Cogo information added to revised plan sheets.		
5	QA: Roadway	5	1-Comment Submitted set by NeallF on 1/28/2021 at 11:17:43 AM	NeallF	1/28/2021 11:17	Include station and offsets of topographic features.	QA_Roadway	RDM Section 22.2.8.1
6	QA: Roadway	6	1-Comment Submitted set by NeallF on 1/28/2021 at 11:18:12 AM	NeallF	1/28/2021 11:18	Show bridge construction access lines	QA_Roadway	RDM Section 12.1.15
7	QA: Roadway	6	1-Comment Submitted set by NeallF on 1/28/2021 at 11:18:34 AM	NeallF	1/28/2021 11:18	NPDES linestyle does not denote silt fence and should not be used to depict a double row of silt fence underneath the bridge.	QA_Roadway	RDM Section 12.1.5.2
8	QA: Roadway	7	1-Comment Submitted set by NeallF on 1/28/2021 at 11:20:01 AM	NeallF	1/28/2021 11:19	Include a station equation and all applicable notations for where the construction centerline reconnects with the survey centerline. Whenever a new relocation centerline departs and ties back into an existing surveyed centerline, a gap in the stationing of the 2 centerlines will inevitably occur. Surveyors, designers, contractors will need to know that variance when stationing the layout for construction in order to account forthe difference, or the entire alignment will need to be re-stationed. The station equation is generally notated as Sta. XX+XX.XX (Back) (the final relocated centerline station) = Sta. XX+XX.XX (Ahead) (the tie in station to the original centerline) (+/- the distance difference).	QA_Roadway	
9	QA: Roadway	8	1-Comment Submitted set by NeallF on 1/28/2021 at 11:19:57 AM	NeallF	1/28/2021 11:19	Have vertical curves for grades greater than 3% been grade adjusted?	QA_Roadway	
10	QA: Roadway	8	0-Disregard set by NeallF on 1/28/2021 at 11:19:51 AM|3-Resolved, Not	NeallF	1/28/2021 11:19	Verify tie in grade at the end of the project. Based on a sketch using the profile grid of the PDF the grade appears to be steeper than 2%.	QA_Roadway	
11	QA: Roadway	8	1-Comment Submitted set by NeallF on 1/28/2021 at 11:19:50 AM	NeallF	1/28/2021 11:19	Show toe of fill stations, fill slopes under bridge, and notes for the rip rap	QA_Roadway	RDM Section 22.2.8.18

Adding Additional Submittals

Bluebeam Revu "Sessions" allow multiple documents to be added to the **same** Session for multiple collaborative reviews to be conducted on the same project. These documents could include quality control reviews, quality assurance reviews, intermediate reviews, and reviews of proposals and special provisions, etc.

With the flexibility of adding additional participants throughout the process, the reviews for the project can be conducted within one "Session" to keep all project records together. This also allows participants to review comments on previous submittals to easily identify how these have been addressed on future milestone submittals.

During a review period, the Design Team may provide updated sheets to quickly demonstrate that the comments have been resolved in lieu of waiting until the next milestone submittal.
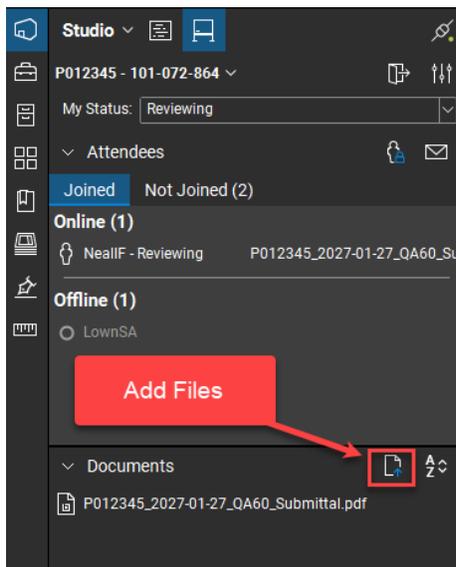

To add an additional document to the Session, prepare the document by adding the "layers" as described in previous instructions. Click on the **Add** button in the Documents section of the Studio dialog.

Browse to select the additional document to be uploaded. Select the file and press **Open** to upload.
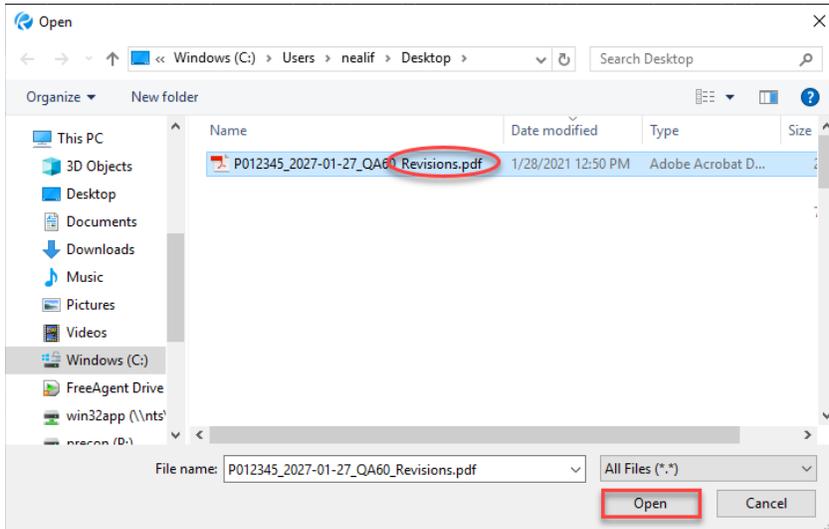
The newly loaded document will be added and reviewers can begin making comments or comparing the updated file to previous submittals as applicable.
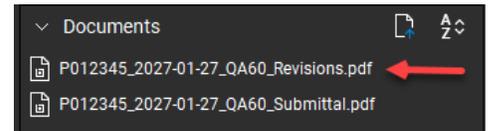

Repeat this process through-out the life cycle of the project for additional submittals and review periods.

Download and Archive Marked-Up PDF

Once the review period has ended and the Review Team has finalized all comments for this submittal period, both the Marked-Up PDF and the Comment Summary with Responses will need to be downloaded and saved to the network for record retention. [The Bluebeam Revu "Session" is a temporary "cloud" storage and does not meet SCDOT record retention requirements.]

To export the final summary report, repeat the steps outlined in previous sections for exporting the PDF and Excel Comment Reports. Save these documents in the appropriate project directory on the server. Provide a link or email a copy of these documents to Review Team and the Design Team.

To save the marked-up pdf, at the top of the document, right click on the file name and select **Save As**.
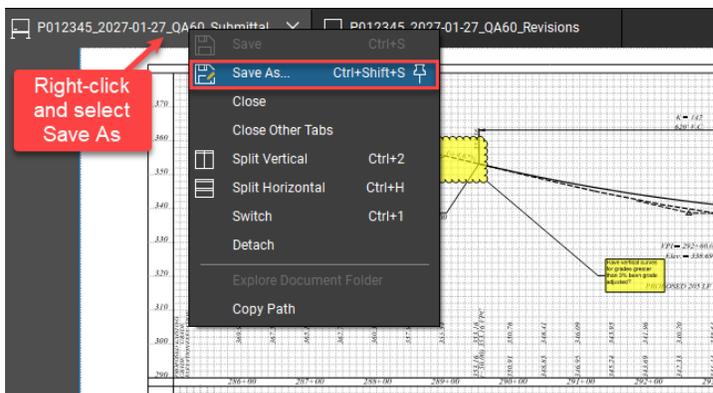
Browse to the appropriate project directory on the **Precon** server, enter a file name and press **Save**.
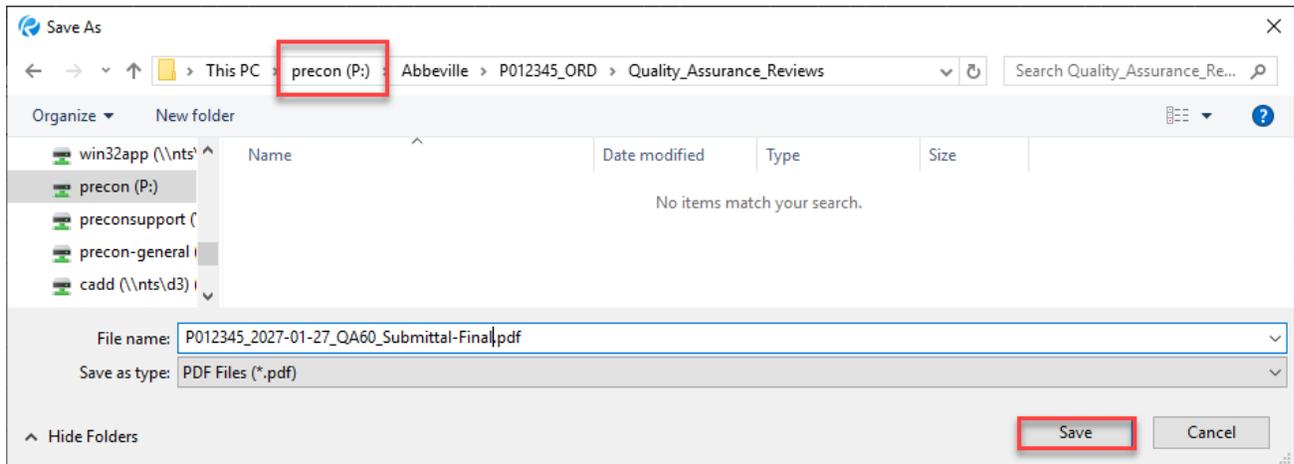

This step can be repeated at any duration during the review period to capture mark-ups and comments at various stages.

Appendix

SCDOT Bluebeam Toolset Overview

SCDOT Bluebeam Revu Toolset Overview
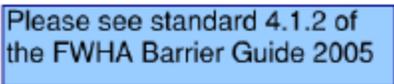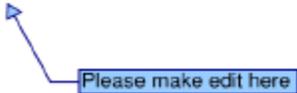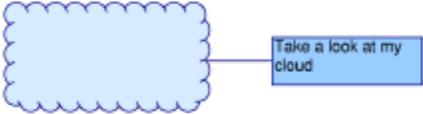
Tool Description	Example
Pen (P): Adds a free-drawn markup.	
Text Box (T): Places a text box markup.	Please see standard 4.1.2 of the FWHA Barrier Guide 2005
Callout (Q): Adds a text callout markup.	Please make edit here
Cloud+ (K): Adds a polygon markup with a cloud-like appearance and callout ox present.	Take a look at my cloud
Typewriter (W): Enables freely typing text on a PDF	Free forming text
Highlight (H): Adds a semi-transparent line simulating a highlighter.	Introduction Scripting is integrated into
Line (L): Adds a line markup.	
Arrow (A): Adds an arrow markup.	
Cloud (C): Adds a polygon with a cloud-like appearance preset.	For example: SetPDFSecurity('abacadabra', 193)
Rectangle (R): Adds a rectangular markup.	
Length (SHIFT + ALT + L): Calculates a singular linear measurement.	1,168'-5 3/4"
Ellipse (E): Adds an elliptical markup.	
Note (N): Inserts a sticky note.	
Polygon (SHIFT + P): Adds a polygon markup with no set angles.	