



Department of Local Government Finance

Ratio Studies

Deliverance Bougie and Barry Wood
January 2021



Today's Webinar Will Cover

- Ratio Studies
- Microsoft Teams
- Questions



Ratio Studies

- What is a Ratio Study?
- Deadline
- Time period for sales
- Sales - All sales are candidates
- The sample is a representation of the population
- Components of the Ratio Study



Ratio Studies

- Definition:
 - “Ratio study” is used as a generic term for sales-based studies designed to evaluate assessment performance. It is a study of the relationship between appraised or assessed values and market value-in-use as reflected by sales or other information.
 - 50 IAC 27-2-10



Ratio Studies

- The Ratio Study is used as a “measurement and evaluation of the level and uniformity of mass appraisal models” and as a “determination of whether administrative or statutory standards have been met.” – IAAO, Standard on Ratio Studies



Ratio Studies

- What is the “Ratio” in Ratio Studies?

$$\frac{\textit{Assessed Value}}{\textit{Sales Price}}$$



Ratio Studies

- Ratio Study compares assessment to sale prices of similar properties.
- Properties are grouped and the ratios are analyzed to see if assessments reflect market value-in-use.
- Ratio shows how close the assessment of a sold property is to its sale price.



Ratio Studies

$$\frac{\textit{Assessed Value}}{\textit{Sales Price}}$$

$$\frac{\$100,000}{\$150,000} = .67$$

<1 = Under-assessed

$$\frac{\textit{Assessed Value}}{\textbf{Sales Price}}$$

$$\frac{\$100,000}{\$80,000} = 1.25$$

>1 = Over-assessed



Ratio Studies Time Period

Time Period

- Due March 1.
- January 1, 2020 – December 31, 2020
- May use up to 5 years of sales.
- If more than one year of sales, time adjustment must be performed using all comparable older sales.



Ratio Studies Sales

Sales

- 50 IAC 27-4-7(f) All sales are candidates for the ratio study unless sufficient and compelling information can be documented to show otherwise.



Ratio Studies Sales

- After the sales submission has received a compliance status, we will use those files to generate a list of potentially valid sales. This includes all sales in the 300-599 class code that are >\$1,000 and do not have a special circumstance marked. These are sales we expect to see in the Ratio Study.
- Sales without a special circumstance marked must have an explanation on the Sales Reconciliation.



Ratio Studies





Ratio Studies Sample vs. Population

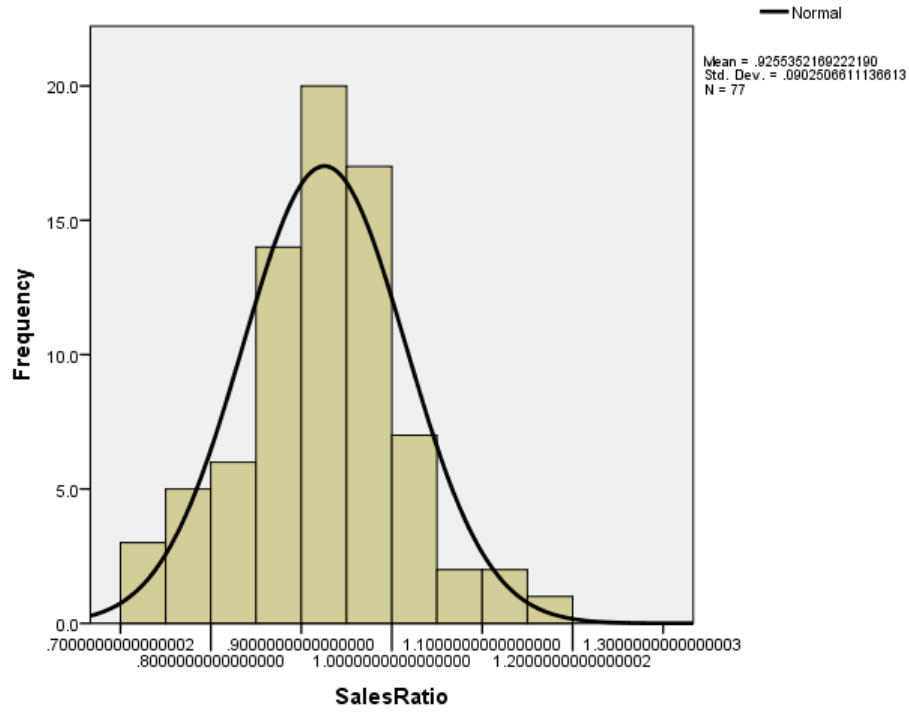
Sample vs. Population

- “The distribution of ratios in the population cannot be ascertained directly and appraisal accuracy can vary from property to property. By definition, a ratio study sample would be representative when the distribution of ratios of properties in the sample reflects the distribution of ratios of properties in the population.”

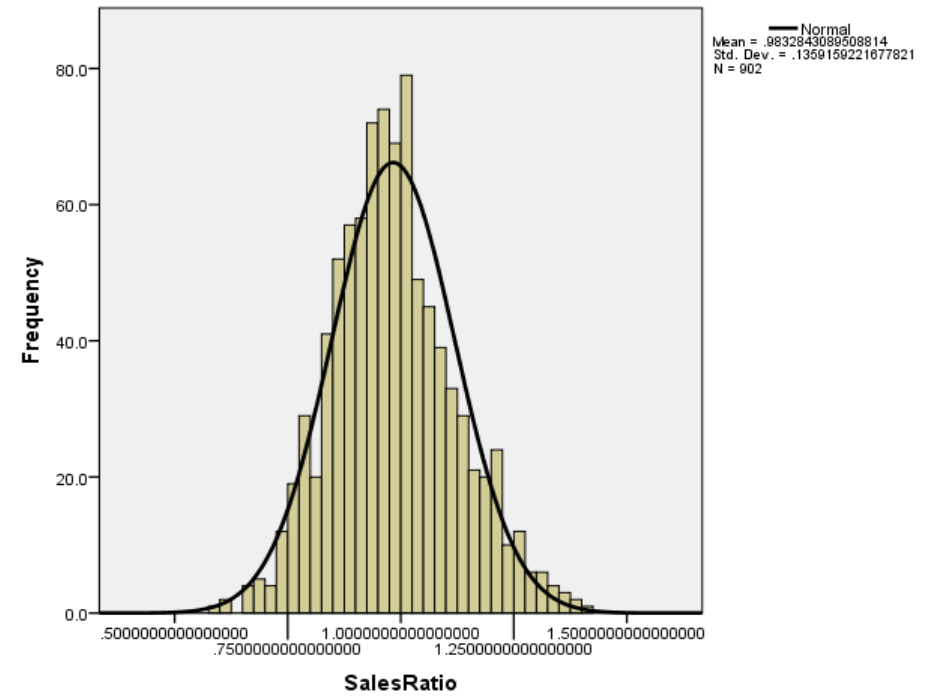


Ratio Studies Sample vs. Population

Sample: n=77



Population: N=902





Ratio Studies Sample vs. Population

- (cont.) “Representativeness is improved when the sample proportionately reflects major property characteristics present in the population of sold and unsold properties. As long as sold and unsold parcels are appraised in the same manner and the sample is otherwise representative, statistics calculated in a sales ratio study can be used to infer appraisal performance for unsold parcels.”



Ratio Studies Sample vs. Population

- (cont.) “However, if parcels that sell are selectively reappraised based on their sale prices and if such parcels are in the ratio study, uniformity inferences will not be accurate (appraisals appear more uniform than they are). In this situation, measures of appraisal level also will not be supportable unless similar unsold parcels are appraised by the model that produces the same overall percentage of market value (appraisal level) as on the parcels that sold.”



Ratio Studies Sample vs. Population

- (cont.) “Assessing officials must incorporate a quality control program; including checks and audits of the data, to ensure that sold and unsold parcels are appraised at the same level.”



Ratio Studies Sample vs. Population

(cont.) “Operationally, representativeness is improved when the following occur:

1. Appraisal procedures used to value the sample parcels are similar to procedures used to value the corresponding population.
2. Accuracy of recorded property characteristics data for sold property does not differ substantially from that of unsold property.



Ratio Studies Sample vs. Population

(cont.)

3. Sample properties are not unduly concentrated in certain areas or types of property whose appraisal levels differ from the general level of appraisal in the population.
4. Sales have been appropriately screened and validated.

- *(IAAO – Standard on Ratio Studies, 4.5)*



Ratio Studies Statistical Measures

Statistical Measures

- Level (ratio): 0.90-1.10
- Coefficient of Dispersion (COD):
 - <15 for residential improved
 - <20 for other real property
- Price-Related Differential (PRD): 0.98-1.03
- *Note: Spearman Rank rather than PRD is used for groupings with 20 or fewer sales.



Components of the Ratio Study Submission

Components of the Ratio Study Submission

- Ratio Study
- Workbook
- Sales Reconciliation
- Narrative (use of Narrative template is required)
- All must be separate files. Spreadsheets should be in xlsx format.



Ratio Studies Formatting

Formatting

- Must be properly formatted before Ratio Study will be reviewed.
- Ratio Study Guidance includes sample spreadsheets with examples of correct and incorrect formatting.



Ratio Studies Formatting

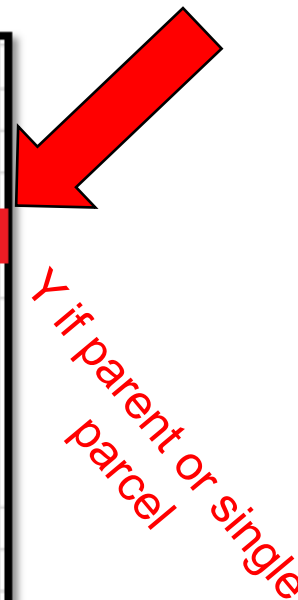
- Formatted tab must be named “Formatted”
- Workbook tab must be named “Workbook”
- Three cyclical columns: 2018 Cyclical Reassessment, 2019 Cyclical Reassessment, and 2020 Cyclical Reassessment. **If 2021 included, all cells must contain “N” only.**
- Column names must be same as example (exact spelling).



Ratio Studies

Workbook Column Names	Example
Parcel Number	12-34-56-789-123.456-789
Township Number	three-digit number
Township Name	Jackson Township
Neighborhood Code	12345
Prior Year Property Class	500
Current Year Property Class	510
Taxing District	three-digit number
Prior Year Land AV	2000
Prior Year Improvement AV	0
Prior Year Total AV	2000
Current Year Land AV	2500
Current Year Improvement AV	95000
Current Year Total AV	97500
2018 Cyclical Reassessment	Y/N
2019 Cyclical Reassessment	Y/N
2020 Cyclical Reassessment	Y/N

Ratio Study Column Names	Example
SDFID	C01-2019-9876543
Parcel Number	12-34-56-789-123.456-789
MultiParcel	Y/N
Primary	Y/N
Study Section	ResImp
Grouping	must be unique for each study section; use "None" when township/study section does not have different groupings
Township Name	Jackson Township
Neighborhood	12345
Property Class	510
Taxing District	three-digit number
Sale Date	MM/DD/YY
Study Sale Price	100000
Current Land AV	2500
Current Improvement AV	95000
Current Total AV	97500





Ratio Studies

- R software will sum all MPS parcels with matching sale date and sale price; MPS tab no longer needed
- Files must be named “County Name Ratio Study” and “County Name Workbook”
- Grouping must be unique for each study section. Grouping “A” cannot contain both ResImp and ResVac. Use “None” if there are no special groupings.



Resources

- Resources:
 - [Ratio Study Guidance Memo](#)
 - [Narrative Template](#)
 - [Sample Ratio Study](#)
 - [Sample Workbook](#)



Resources

- Standard on Ratio Studies – IAAO
 - https://www.iaao.org/media/standards/Standard_on_Ratio_Studies.pdf
- Standard on Verification and Adjustment of Sales – IAAO
https://www.iaao.org/media/standards/Verification_Adjustment_of_Sales.pdf
- Standard on Mass Appraisal of Real Property – IAAO
<https://www.iaao.org/media/standards/StandardOnMassAppraisal.pdf>
- Indiana Administrative Code: 50 IAC 27
http://www.in.gov/legislative/iac/iac_title?iact=50
- *IAAO = International Association of Assessing Officials



MS Teams for Ratio Studies

- Beginning with the 2020 Ratio Study review process, all file sharing and communication has been conducted through Microsoft Teams.





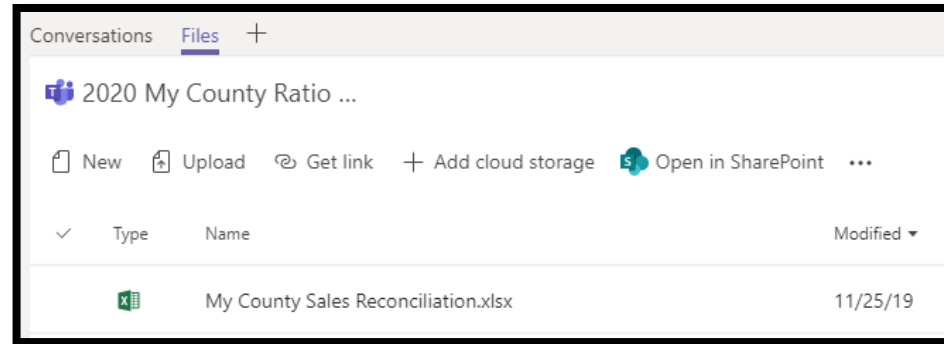
Sales Reconciliation

Sales Reconciliation

- After a county has received compliance status, the Department will generate your Sales Reconciliation (potentially valid sales) from the sales files uploaded by the county.
- This may take a few days from the time you receive compliance status.
- This is not a comprehensive list of all sales that will be in your Ratio study, nor is it a requirement to include all of these sales.
- This is a courtesy to speed up the Ratio Study review process.



MS Teams for Ratio Studies



- When the file is generated, the Department will upload it to your Team and notify you in Teams
- Notify the Department in Teams that you have received the file ('like', @mention, etc.)
- The sales on this list that are not included in the Ratio Study will require an explanation
- Use this file to submit your explanations (retain all columns)



File Submission

- File Submission
- County must have compliant sales status, submit all files, and all files must be formatted correctly to be considered a compliant submission.
- Workbook, Ratio Study, and Sales Reconciliation must be separate files and should be in xlsx format
- Narrative template must be used



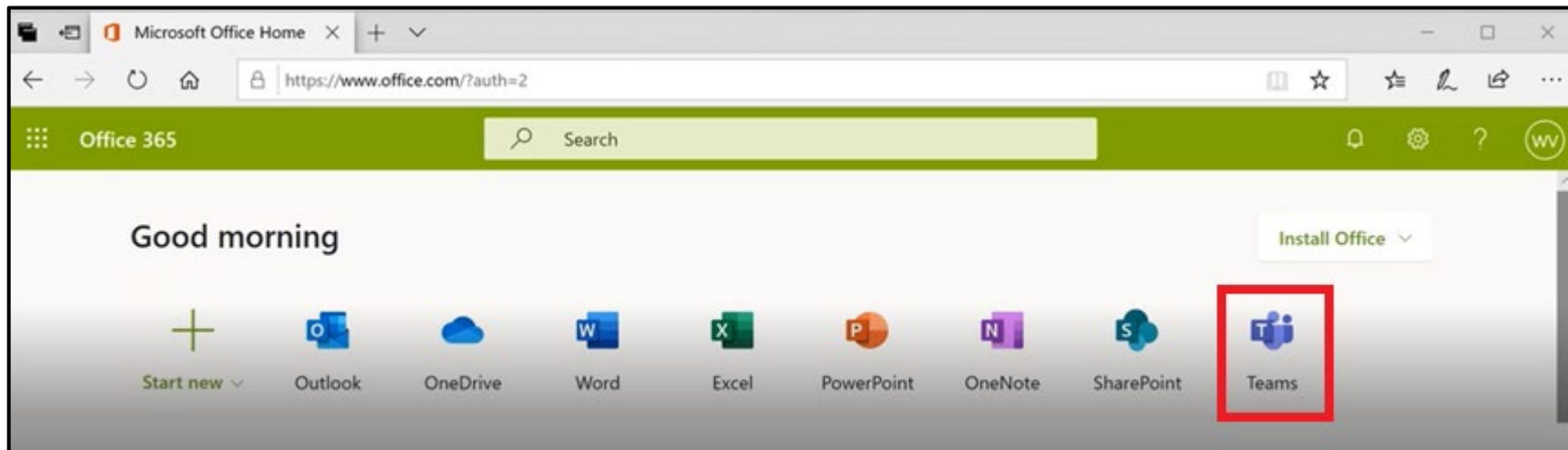
MS Teams for Ratio Studies

- All Teams retain 2020 members. If anything has changed, notify Deliverance via chat or dbougie@dlgf.in.gov
- New guests will receive an invitation to join the team via email from Microsoft
- Follow prompts in email to accept invitation
- Log in to Teams before it is time to submit the Ratio Study to ensure there are not snares.
- DLGF does not have access to passwords. Teams password is your Microsoft account password. Your IT can help you if you do not know your password.



MS Teams for Ratio Studies

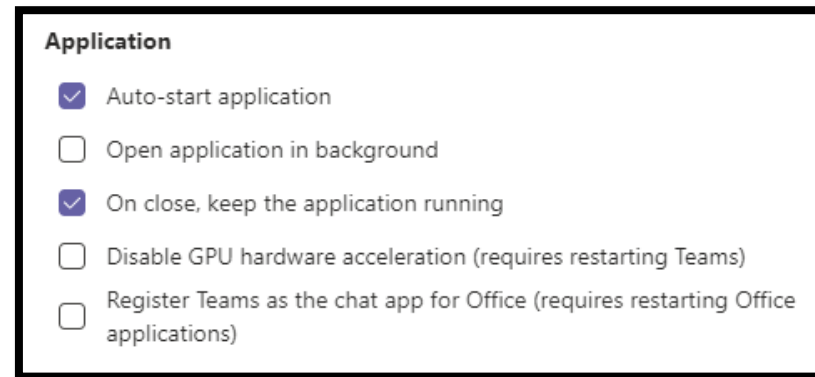
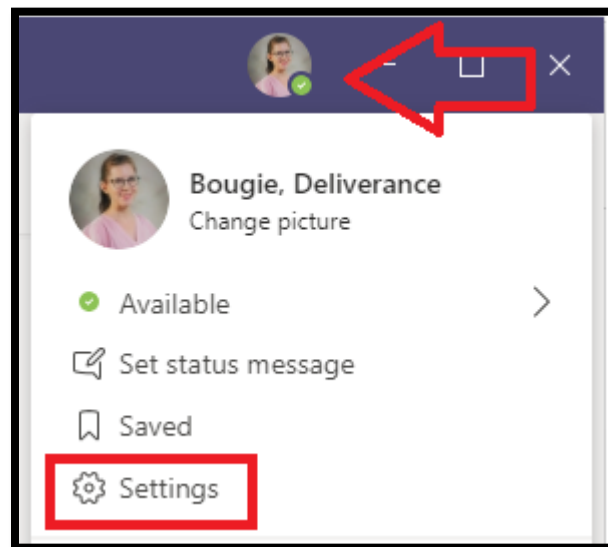
- Teams is accessible through the desktop app (downloaded onto your computer) or the web app.
- To access the web app, go to www.office.com





MS Teams for Ratio Studies

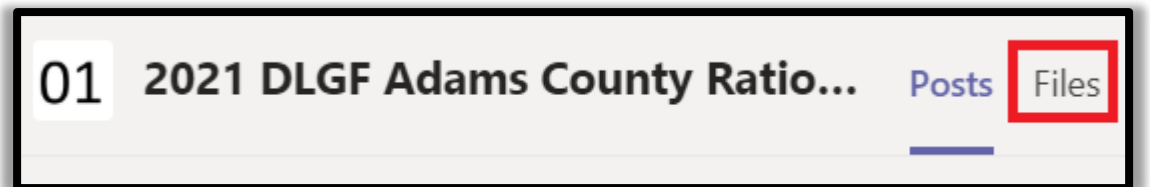
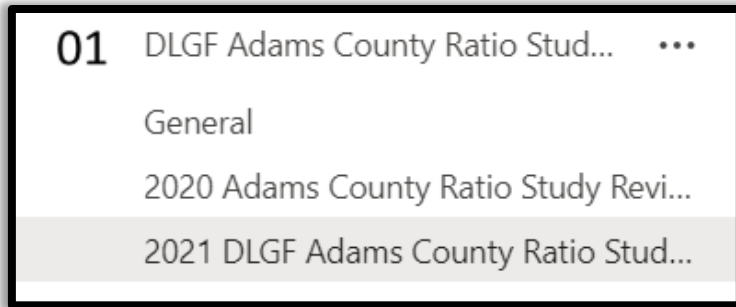
- During the Ratio Study season, always keep Teams open to get notification immediately.
- Pro tip: Set Teams up to auto-start. Teams will open when you start your computer.





MS Teams for Ratio Studies

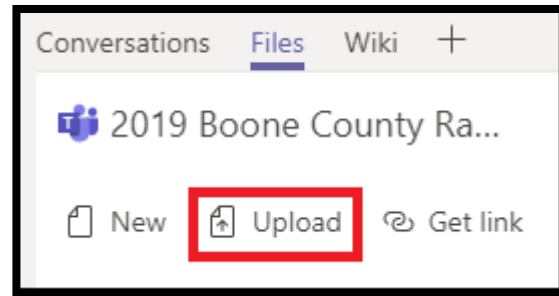
- To submit your Ratio Study files, locate and click on the 2021 channel in your Team.
- At the top of the screen, you will see tabs named Posts, Files, etc. Click on Files.





MS Teams for Ratio Studies

- Below the tabs you will find an “Upload” button. Select that and navigate to the appropriate file on your computer.
- When you select your files and click “Open” they will upload to this channel.
- Repeat these steps for all files if uploading individually.

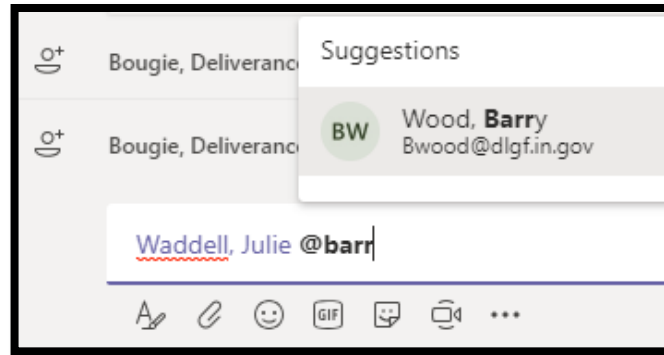


- Alternatively, you can “drag and drop” your files into the Files tab



MS Teams for Ratio Studies

- Notify the Department of your complete file submission by tagging @Barry Wood, @Deliverance Bougie, and @Julie Waddell in the conversations tab.



- If you do not @mention us, the Department staff will not know of your submission.
- The Department will acknowledge receipt of your Ratio Study.



MS Teams for Ratio Studies

- Before the review begins, the Department will check for duplicates in the Ratio study (SDFID) and Workbook (Parcel Number).



- If there are duplicates in either of the files, the Department will upload a spreadsheet with these duplicates and ask for explanation or removal from the files in Teams.



MS Teams for Ratio Studies

- After the duplicates are removed, the Department will check for discrepancies in AVs between the Workbook and Ratio Study.
- Remember: Each parcel is included in the Ratio Study with its respective AV. If this is not done correctly it will be flagged as a discrepancy.
- Parcels that have had changes made after the Jan 1 assessment date will also be flagged as discrepancies.
- If there are any discrepancies for which staff cannot determine the reason, the department will upload a file containing these discrepancies and you will be asked to either make necessary corrections or give an explanation.



MS Teams for Ratio Studies

- The Ratio Study submission is deemed compliant once all files are submitted, all formatting is correct, there are no duplicates, and there are no discrepancies.
- You will receive notification of this compliance. This is not an approval of the Ratio Study.
- At this time, all statistics will be run and AV files will be generated. Your Ratio Study will then be assigned to a field rep for review.



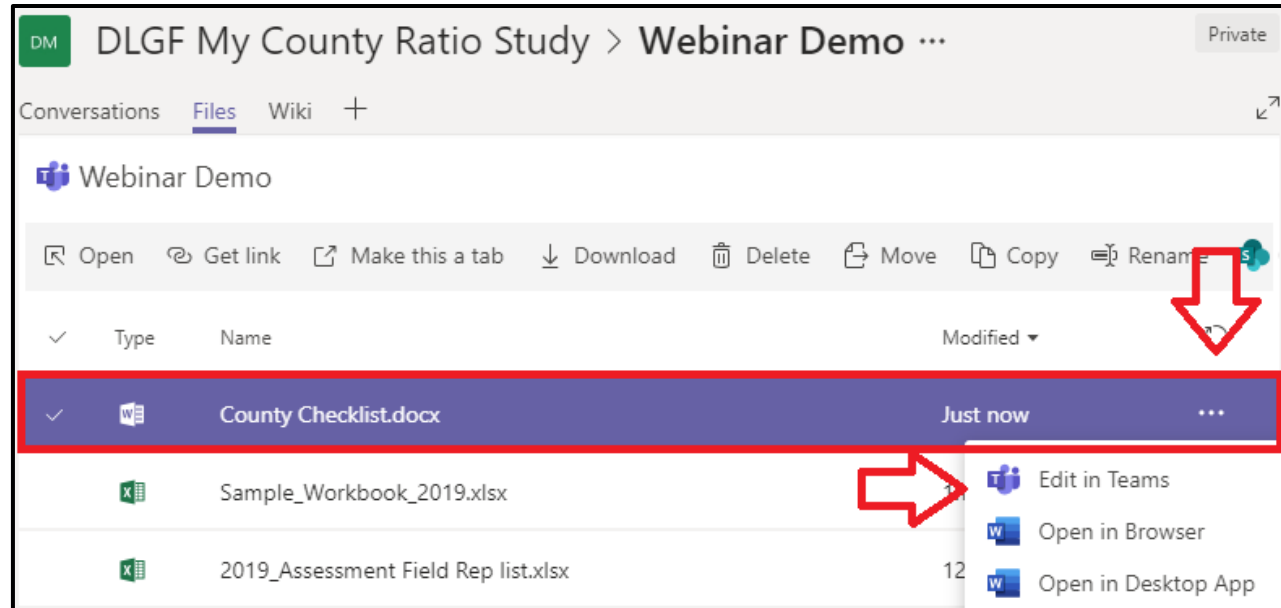
MS Teams for Ratio Studies

- Once the assigned field representative has reviewed your files, they will upload a checklist with additional questions they have about items such as groupings (not thoroughly explained in the Narrative), AV changes not explained in the Narrative, out-of-tolerance statistics, and cyclical reassessment.
- Hint: To calculate AV changes, filter prior year pcc and calculate prior year AV, then filter on current year pcc and calculate current year AV.



MS Teams for Ratio Studies

- Answer these questions within the file that was uploaded in Teams.





MS Teams for Ratio Studies

Search or type a command

County Checklist.docx

Start conversation Close

Word County Checklist - Saved Simplified Ribbon Bougie, Deliverance

File Home Insert Layout References Review View Help Open in Desktop App Tell me what you want to do Comments

Times New Ro... 12 A⁺ A⁻ B I U

2020 Annual Sales Ratio Study Checklist

COUNTY: My County

Pursuant to 50 IAC 27-5 we have made an initial review of your study. Our review indicates the study is missing the following information:

Note: All ratio studies are being reviewed in RStudio using the "Formatted" tab, not the individual ratio study tab by township.


Issue #1: Based on the attached "COUNTY AV Comp Detail 03-26-2020.pdf" file please provide explanations for the townships by major class, why the AV from last year increased or decreased by more than 10%. The AV explanations explained on the narrative have not been included here.

Commercial Improved

Washington	21.3%
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County Response:

Here is my county response





MS Teams for Ratio Studies

- After all checklist questions have been answered, the Ratio Study will go through a second review. Once the second reviewer has completed their review and all AVs are considered final, two statistical tests will be run.



Spearman Rank

- **Spearman Rank**
 - Test for vertical equity.
 - Groupings of 5-20 sales.
 - Trend of ratios across AVs.
 - Vertical inequity will need to be corrected.
 - Make corrections to the Ratio Study file submitted in Teams.



Mann-Whitney

- Mann-Whitney
 - Test for equal appraisal between sold and unsold properties.
 - Most recent cyclical phase not included.
 - 95% must pass ($p > .05$)
 - NBHDS with diff $> 3\%$ will be reviewed for questioning.
 - Explain parcel changes in spreadsheet uploaded to Teams.
 - Include SOP for effective age changes with narrative to speed this process.



Things that cause delays

- Things that cause delays
 - Incorrect formatting.
 - Missing or insufficient explanation on reconciliation.
 - Narrative does not explain AV changes.
 - Delayed response to messages.
 - No or inadequate grouping explanations.



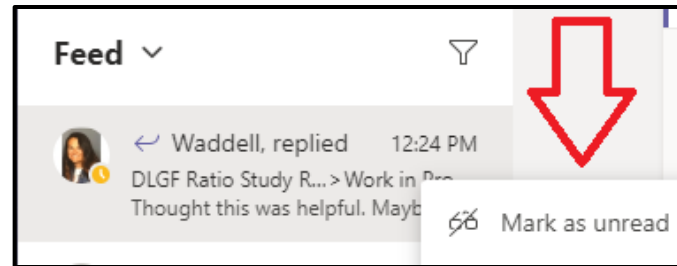
How to get a timely approval

- How to get a timely approval
 - Get acquainted with Teams (review how to make changes to files).
 - Submit all files.
 - Format all files correctly.
 - Include all necessary information in Narrative.
 - Include Standard Operating Procedure for effective age changes in Narrative.
 - Keep Teams open during process.
 - Review notifications immediately.



How to get a timely approval

- How to get a timely approval
- Mark activity as unread if unable to respond immediately

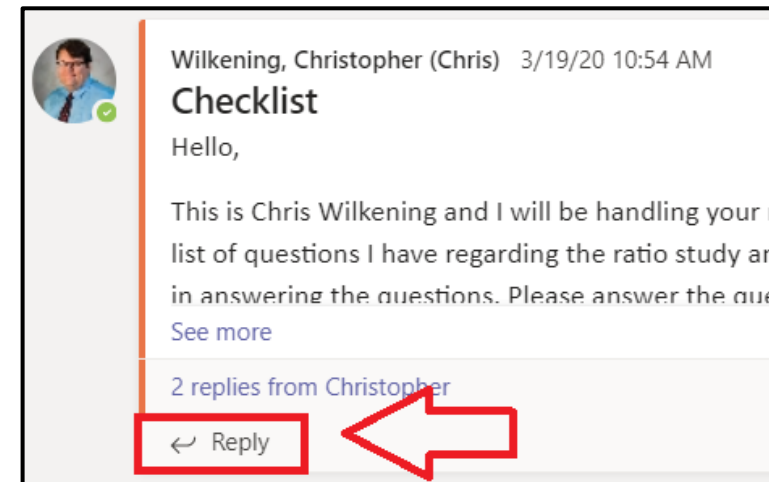


- ‘Like’ posts you have read.
- @mention the individual with whom you are communicating.
- Learn VLOOKUP
- [Review the User Guide](#)



Helpful Hints

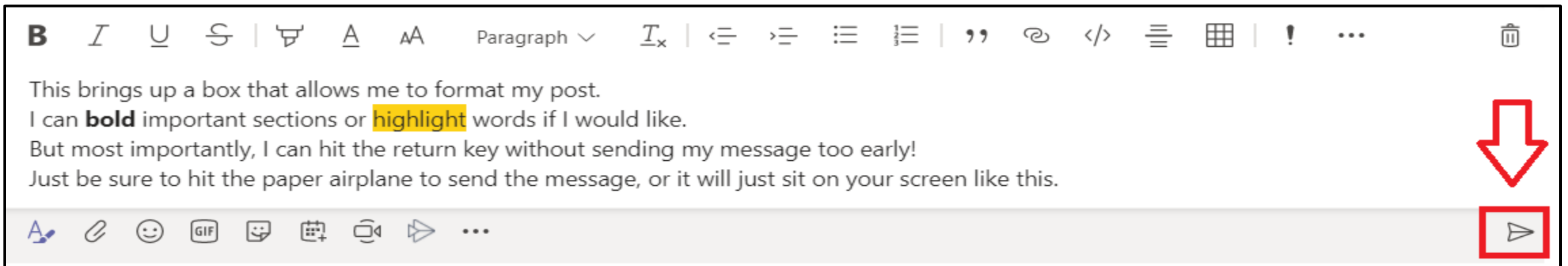
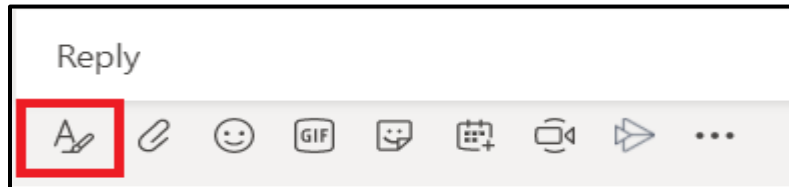
- Helpful hints
- Your 2020 Ratio Study review process is now at your fingertips! Review those files and communications now to see if there were any issues that can be addressed before submission.
- Always use the Reply button when responding to communication to keep the conversation in one place.





Helpful Hints

- Helpful hints
- When posting, click on the formatting button to avoid sending a message before you are finished with your thought (we have ALL done that!)
- Just be sure to click the send button!





Questions



Contact Us

- Barry Wood
 - Telephone: (317) 232-3762
 - Email: bwood@dlgf.in.gov
- Deliverance Bougie
 - Telephone: (317) 234-5861
 - Email: dbougie@dlgf.in.gov
- Website: www.in.gov/dlgf
 - “Contact Us” <http://www.in.gov/dlgf/2338.htm>