

## Policies and Procedures

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FEBRUARY 12, 2019



# Contents

|   |           |
|---|-----------|
| <b>Contents</b>                               | <b>i</b>  |
| <b>I Brand</b>                                | <b>1</b>  |
| <b>1 Awards</b>                               | <b>3</b>  |
| 1.1 The GIS Champion Award . . . . .          | 3         |
| <b>Contents</b>                               | <b>i</b>  |
| 1.1.1 GIS Champion . . . . .                  | 1         |
| <b>II Methods</b>                             | <b>3</b>  |
| <b>2 Documentation</b>                        | <b>5</b>  |
| 2.1 About Documentation . . . . .             | 5         |
| 2.1.1 How Jalapeño Works . . . . .            | 5         |
| 2.2 Document Storage Concepts . . . . .       | 13        |
| 2.2.1 GIS File Standard . . . . .             | 13        |
| <b>3 Team Concept</b>                         | <b>15</b> |
| 3.1 Team Structure . . . . .                  | 15        |
| 3.1.1 Paired Programming . . . . .            | 15        |
| <b>III Service</b>                            | <b>17</b> |
| <b>4 Applications</b>                         | <b>19</b> |
| 4.1 Applications for Treasurer Dept. . . . .  | 19        |
| 4.1.1 Forfeiture Data Collection . . . . .    | 19        |
| <b>5 Tools</b>                                | <b>77</b> |
| 5.1 BSA Support . . . . .                     | 77        |
| 5.1.1 Adding a Layer to the BSA GIS . . . . . | 77        |
| 5.2 Core Data . . . . .                       | 82        |
| 5.2.1 Control Points . . . . .                | 82        |

|       |   |     |
|-------|---|-----|
| 5.3   | Core Data Schema . . . . .                                    | 86  |
| 5.3.1 | Production Data . . . . .                                     | 88  |
| 5.4   | ESRI Tools . . . . .  | 89  |
| 5.4.1 | COGO Tools in ArcGIS . . . . .                                | 89  |
| 5.5   | GIS Administration . . . . .                                  | 90  |
| 5.5.1 | New Connections in ArcCatalog . . . . .                       | 90  |
| 5.5.2 | Create Query in ArcGIS to SQL Database . . . . .              | 94  |
| 5.5.3 | Enterprise Geodatabase Maintenance . . . . .                  | 98  |
| 5.5.4 | Managing Map Services . . . . .                               | 105 |
| 5.5.5 | Managing Geodatabase Replicas . . . . .                       | 113 |
| 5.5.6 | Managing Geodatabase Versions . . . . .                       | 114 |
| 5.5.7 | MXD Management . . . . .                                      | 118 |
| 5.6   | L <sup>A</sup> T <sub>E</sub> X Packages . . . . .            | 119 |
| 5.6.1 | Common Errors . . . . .                                       | 119 |
| 5.6.2 | float Package . . . . .                                       | 129 |
| 5.6.3 | Graphics Examples and Notes . . . . .                         | 130 |
| 5.6.4 | graphicx Package . . . . .                                    | 131 |
| 5.6.5 | hyperref Package . . . . .                                    | 132 |
| 5.6.6 | import Package . . . . .                                      | 134 |
| 5.6.7 | wrapfig Package . . . . .                                     | 135 |
| 5.7   | L <sup>A</sup> T <sub>E</sub> X Templates . . . . .           | 137 |
| 5.7.1 | L <sup>A</sup> T <sub>E</sub> X Section Template . . . . .    | 137 |
| 5.7.2 | L <sup>A</sup> T <sub>E</sub> X Subsection Template . . . . . | 137 |
| 5.8   | PDF Tools . . . . .   | 141 |
| 5.8.1 | PDF Optimizer . . . . .                                       | 141 |
| 5.9   | QGIS Tools . . . . .  | 144 |
| 5.9.1 | QGIS Azimuth and Distance Plugin . . . . .                    | 144 |
| 5.9.2 | COGO Tools in QGIS . . . . .                                  | 146 |
| 5.9.3 | Search Layers Plugin . . . . .                                | 153 |

|   |            |
|---|------------|
| <b>IVResources</b>                        | <b>157</b> |
| <b>Geography 101</b>                      | <b>159</b> |
| Surveys and Plans . . . . .               | 159        |
| Northing And Easting . . . . .            | 159        |
| Coordinate Systems for Michigan . . . . . | 160        |
| <b>ESRI Information</b>                   | <b>161</b> |
| ESRI Product Documentation . . . . .      | 161        |
| Funcionality Matrices . . . . .           | 161        |
| <b>References</b>                         | <b>163</b> |
| <b>Glossary</b>                           | <b>165</b> |





Part I

**Brand**

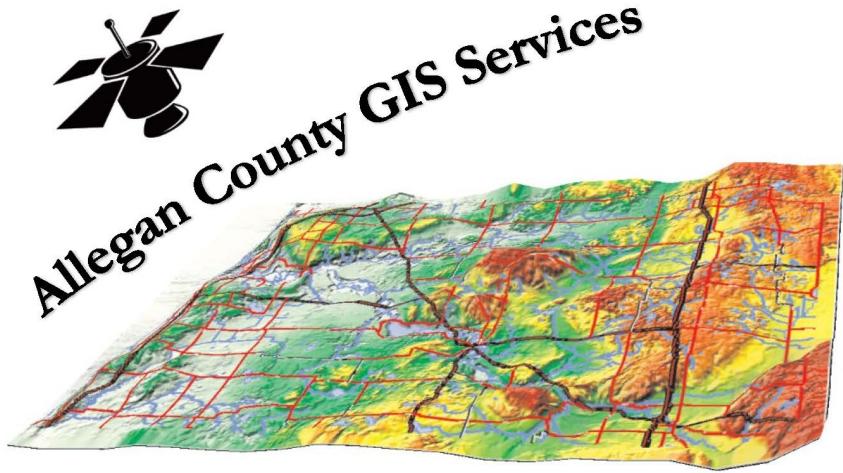


# — 1 —

## Awards

### 1.1 THE GIS CHAMPION AWARD





## GIS Champion Award

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FEBRUARY 12, 2019



# *Contents*

|   |           |
|---|-----------|
| <b>Contents</b>                               | <b>i</b>  |
| <b>I Brand</b>                                | <b>1</b>  |
| <b>1 Awards</b>                               | <b>3</b>  |
| 1.1 The GIS Champion Award . . . . .          | 3         |
| <b>Contents</b>                               | <b>i</b>  |
| 1.1.1 GIS Champion . . . . .                  | 1         |
| <b>II Methods</b>                             | <b>3</b>  |
| <b>2 Documentation</b>                        | <b>5</b>  |
| 2.1 About Documentation . . . . .             | 5         |
| 2.1.1 How Jalapeño Works . . . . .            | 5         |
| 2.2 Document Storage Concepts . . . . .       | 13        |
| 2.2.1 GIS File Standard . . . . .             | 13        |
| <b>3 Team Concept</b>                         | <b>15</b> |
| 3.1 Team Structure . . . . .                  | 15        |
| 3.1.1 Paired Programming . . . . .            | 15        |
| <b>III Service</b>                            | <b>17</b> |
| <b>4 Applications</b>                         | <b>19</b> |
| 4.1 Applications for Treasurer Dept. . . . .  | 19        |
| 4.1.1 Forfeiture Data Collection . . . . .    | 19        |
| <b>5 Tools</b>                                | <b>77</b> |
| 5.1 BSA Support . . . . .                     | 77        |
| 5.1.1 Adding a Layer to the BSA GIS . . . . . | 77        |
| 5.2 Core Data . . . . .                       | 82        |
| 5.2.1 Control Points . . . . .                | 82        |
| 5.3 Core Data Schema . . . . .                | 86        |
| 5.3.1 Production Data . . . . .               | 88        |

|   |   |            |
|---|---|------------|
| 5.4                                       | ESRI Tools . . . . .  | 89         |
| 5.4.1                                     | COGO Tools in ArcGIS . . . . .                                | 89         |
| 5.5                                       | GIS Administration . . . . .                                  | 90         |
| 5.5.1                                     | New Connections in ArcCatalog . . . . .                       | 90         |
| 5.5.2                                     | Create Query in ArcGIS to SQL Database . . . . .              | 94         |
| 5.5.3                                     | Enterprise Geodatabase Maintenance . . . . .                  | 98         |
| 5.5.4                                     | Managing Map Services . . . . .                               | 105        |
| 5.5.5                                     | Managing Geodatabase Replicas . . . . .                       | 113        |
| 5.5.6                                     | Managing Geodatabase Versions . . . . .                       | 114        |
| 5.5.7                                     | MXD Management . . . . .                                      | 118        |
| 5.6                                       | L <sup>A</sup> T <sub>E</sub> X Packages . . . . .            | 119        |
| 5.6.1                                     | Common Errors . . . . .                                       | 119        |
| 5.6.2                                     | float Package . . . . .                                       | 129        |
| 5.6.3                                     | Graphics Examples and Notes . . . . .                         | 130        |
| 5.6.4                                     | graphicx Package . . . . .                                    | 131        |
| 5.6.5                                     | hyperref Package . . . . .                                    | 132        |
| 5.6.6                                     | import Package . . . . .                                      | 134        |
| 5.6.7                                     | wrapfig Package . . . . .                                     | 135        |
| 5.7                                       | L <sup>A</sup> T <sub>E</sub> X Templates . . . . .           | 137        |
| 5.7.1                                     | L <sup>A</sup> T <sub>E</sub> X Section Template . . . . .    | 137        |
| 5.7.2                                     | L <sup>A</sup> T <sub>E</sub> X Subsection Template . . . . . | 137        |
| 5.8                                       | PDF Tools . . . . .   | 141        |
| 5.8.1                                     | PDF Optimizer . . . . .                                       | 141        |
| 5.9                                       | QGIS Tools . . . . .  | 144        |
| 5.9.1                                     | QGIS Azimuth and Distance Plugin . . . . .                    | 144        |
| 5.9.2                                     | COGO Tools in QGIS . . . . .                                  | 146        |
| 5.9.3                                     | Search Layers Plugin . . . . .                                | 153        |
| <b>IVResources</b>                        |   | <b>157</b> |
| <b>Geography 101</b>                      |   | <b>159</b> |
| Surveys and Plans . . . . .               |   | 159        |
| Northing And Easting . . . . .            |   | 159        |
| Coordinate Systems for Michigan . . . . . |   | 160        |
| <b>ESRI Information</b>                   |   | <b>161</b> |
| ESRI Product Documentation . . . . .      |   | 161        |
| Funcionality Matrices . . . . .           |   | 161        |
| <b>References</b>                         |   | <b>163</b> |
| <b>Glossary</b>                           |   | <b>165</b> |
| <b>Index</b>                              |   | <b>167</b> |

### 1.1.1 GIS CHAMPION

An individual whose actions promote the use of GIS

## GIS CHAMPION AWARD



Figure 1.1: Example GIS Champion Award

## Background

Though Allegan County has had a formal GIS department for over 20 years, few people have learned to use it.

## Statement of Problem

GIS is underutilized in Allegan County government. The county would benefit from more GIS use in its government. Currently there is no formal recognition of individuals that promote GIS.

## Analysis

The GIS Champion Award is a simple method of recognizing those that promote GIS in the county.

## Past GIS Award Recipients

- Ian Hanes
- Karen
- Brian Redmon

## GIS Champion Award Code

## Part II

# Methods



# — 2 — Documentation

## 2.1 ABOUT DOCUMENTATION

### 2.1.1 HOW JALAPEÑO WORKS

## PROBLEM AND ANALYSIS

### Background

GIS Services has complicated and evolving workflows and uses everchanging technologies

- version control
- finding the documentation
- disseminating the documentation

### Statement of Problem

GIS documentation has traditionally been done in different formats and stored in many different files and folders in the county network. This has resulted in problems with:

### Analysis

The Jalapeño folder along with some open-source software provides a robust documentation tool for GIS documentation.

# COLORS

## Blues

HeaderBlueA \_\_\_\_\_  
HeaderBlueB \_\_\_\_\_  
HeaderBlueC \_\_\_\_\_  
HeaderBlueD \_\_\_\_\_  
HeaderBlueE \_\_\_\_\_

## Golds

HeaderGoldA \_\_\_\_\_  
HeaderGoldB \_\_\_\_\_  
HeaderGoldC \_\_\_\_\_  
HeaderGoldD \_\_\_\_\_  
HeaderGoldE \_\_\_\_\_

## Oranges

HeaderOrangeA \_\_\_\_\_  
HeaderOrangeB \_\_\_\_\_  
HeaderOrangeC \_\_\_\_\_  
HeaderOrangeD \_\_\_\_\_  
HeaderOrangeE \_\_\_\_\_

## Greens

HeaderGreenA \_\_\_\_\_  
HeaderGreenB \_\_\_\_\_  
HeaderGreenC \_\_\_\_\_  
HeaderGreenD \_\_\_\_\_

---

HeaderGreenE 

## Others

HyperlinkBlue1 

graphicOrange 

## GENERAL NOTES:

- jalapeno folder is a git package. <https://github.com/nbesteman/jalapeno>
- Project is coded with relative paths and jalapeno can be located anywhere.

## PROJECT FILE STRUCTURE:

... \jalapeno\..

| folder        | description                      |
|---------------|----------------------------------|
| documentation | resources used in Jalapeño       |
| processing    | .tex documents and build folders |
| source        | common image files               |

... \jalapeno\documentation\..

| folder or file     | description   |
|--------------------|---|
| moduleTemplates    | .tex templates  |
| packageDocs        | L <small>A</small> T <small>E</small> X documentation |
| references         | reference and appendix resources                      |
| unsorted           | catch all for unsorted documentation                  |
| BookStructureMM.mm | A mindmap of jalapeno                                 |

... \jalapeno\processing\..

| folder or file             | description   |
|----------------------------|---|
| ...Part                    | folders of book <i>parts</i>  |
| build                      | L <small>A</small> T <small>E</small> X folder for .pdf output and temp files |
| build\referenceEntries.bib | entries that appear in references   |
| commonTitle.tex            | code for all title pages  |
| fullCompile.sh             | shell script to compile GISDocumentation.tex                                  |
| GISDocumentation.tex       | master document code  |
| glossaryEntries.tex        | entries that appear in glossary   |
| indexEntries.tex           | entries that appear in the index  |
| preamble.tex               | preamble code for all documents   |

### \*Note about referenceEntries.bib

Any reference entries built here can be cited in any .tex document in the project.

## USING THE GLOSSARY

### Glossary Requirements

Glossary commands require a Perl interpreter. Activeperl is a free Perl interpreter and can be downloaded from:

<https://www.activestate.com/activeperl/downloads> (A typical installation adds Perl to your path). Compiling the glossary requires running the makeglossaries command either in a L<sup>A</sup>T<sub>E</sub>X IDE or in command line as described here. PDFLatex must be run first to create a .aux file that is used by makeglossaries to create an .gls file. After the .gls file is created, PDFLatex must be run again to insert the glossary at the \printglossaries location.

### Creating a new glossary entry

To **create a new glossary entry**: Add an entry to glossaryEntries.tex. Save it there and then use the makeglossaries command to recompile the .gls file.

### Rebuilding the glossary

To Recompile the .gls. In the (main document)build folder:

- Launch command prompt
- enter command: **makeglossaries GISDocumentation\***

#### \*Note:

This command reads the .aux file and creates the .gls file. The .aux file is created by compiling with PDFLatex. If there is no .aux file the command will fail.

### Using glossary terms in a subdocument:

In the subdocument you must add code to input the glossaryEntries file. For example:

After the line:

```
\input{.../.../preamble}
```

Add the line:

```
\input{.../.../glossaryEntries}
```

---

## To use a glossary term in the subdocument:

In place of the term, use code referencing the key (in the glossaryEntries file):

- \gls{key}

## To add the glossary to the subdocument:

- Add the line \makeglossaries to the preamble of the subdocument.
- Add the line \printglossaries to the subdocument.
- Run makeglossaries in command line on the subdocument similar to how is described above.

# USING THE BIBLIOGRAPHY(REFERENCES)

## Bibliography requirements

Compiling the bibliography requires running bibtex either in a L<sup>A</sup>T<sub>E</sub>X IDE or in command line as described here. PDFLatex must be run first to create a .aux file that is used by bibtex to create a .bbl file. After the .bbl file is created, PDFLatex must be run again to insert the bibliography at the \bibliography location.

For example, the command:... \bibliography{referenceEntries}  
...places the bibliography called referenceEntries.bib which must be in the same folder as the project .aux file.

## Creating a new bibliography entry

**To create a new bibliography entry:** Add an entry to referenceEntries.bib. Save it there and then use bibtex to recompile the .bbl file.

## Rebuilding the bibliography

**To Recompile the .bbl.** In the (main document)build folder:

- Launch command prompt
  - enter command: **bibtex GISDocumentation**
-

### \*Note:

This command reads the .aux file and creates the .bbl file. The .aux file is created by compiling with PDFLatex. If there is no .aux file the command will fail.

## To cite a bibliography source in a subdocument:

In the place that you want the citation:

- `~\cite[pg.#]{key}`

### Adding the bibliography to the subdocument

- Similar to adding to the master document but not documented here.

## USING THE INDEX

### Index requirements:

Compiling the index requires running the makeindex command either in a L<sup>A</sup>T<sub>E</sub>X IDE or in command line as described here. PDFLatex must be run first to create a .aux file that is used by makeindex to create an .idx file. After the .idx file is created, PDFLatex must be run again to insert the index at the \printindex location.

### Creating a new index entry

To create a new index entry: Add an entry to indexEntries.tex. Save it there and then use the makeindex command to recompile the .idx file.

### Rebuilding the index

To Recompile the .idxIn the (main document)build folder:

- Launch command prompt
  - enter command: **makeindex GISDocumentation\***
-

**\*Note:**

This command reads the .aux file and creates the .idx file. The .aux file is created by compiling with PDFLatex. If there is no .aux file the command will fail. Run PDFLatex first

## Access the index from a subdocument

In the subdocument you must add code to input the indexEntries file. For example:  
After the line:

```
\input{../../../../../preamble}
```

Add the line:

```
\input{../../../../../indexEntries}
```

### To use a index term in the subdocument:

In place of the term, use code referencing the key (in the indexEntries file):

➤ \index {key}

### To add the index to the subdocument:

- Add the line \makeindex to the preamble of the subdocument.
- Add the line \printindex to the subdocument.
- Run makeindex in command line on the subdocument similar to how is described above.

## USING THE APPENDICES

---

## 2.2 DOCUMENT STORAGE CONCEPTS

### 2.2.1 GIS FILE STANDARD

# FOLDERS INSIDE THE PROJECT FOLDER

Lets talk about map projection

- archive
- build
- delivered
- documentation
- processing
- source



# — 3 —

## *Team Concept*

---

### 3.1 TEAM STRUCTURE

#### 3.1.1 PAIRED PROGRAMMING

A paragraph about pp from Joy Inc.



# Part III

# Service



# 4

## Applications

### 4.1 APPLICATIONS FOR TREASURER DEPT.

#### 4.1.1 FORFEITURE DATA COLLECTION

## PROBLEM AND ANALYSIS

### Background

Treasurer department has an annual responsibility to properly document the tax forfeiture process. The LIS Department built an application in MS Access and MapInfo that consumed a daily export from BSA and was deployed to the field on a laptop. A digital camera was used for site photos and later imported into the laptop.

### Statement of Problem

The current Tax Forfeiture workflow is built on MapInfo software and MS Access and executed on a laptop pc. Both MapInfo and MS Access are no longer supported in county workflows. ESRI software can be used to rebuild the workflow. *Forfeiture Data Collector Application, (Forfeiture App)* must be recreated in the ESRI framework.

### Analysis

**Forfeiture App** will facilitate: *Mobile data collection on a handheld device, (Mobile Interface)* and an *in office workflow to complete data processing, (Pre and PostProcessing)*

#### Mobile Interface

- Synchronize with data in the office (online)
- Collect data and photos of forfeiture sites (offline)
- Synchronize the collected data with data in the office (online)

#### Pre & Post Processing

- Produce and print a form for each site visited with required data and images

# DESIGN OVERVIEW

Forfeiture Parcels is used through the workflow

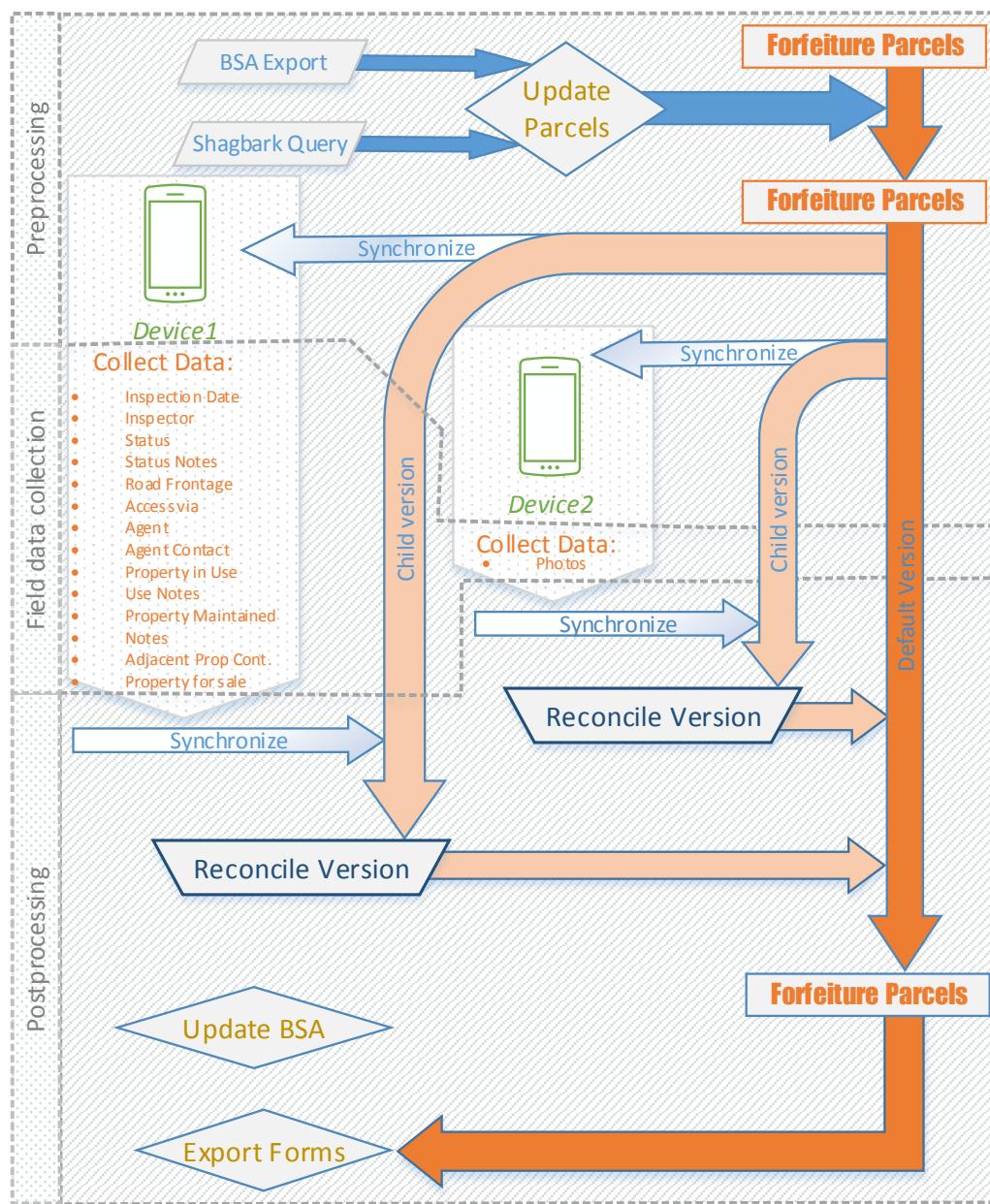


Figure 4.1: Project Design

## Forfeiture App Summary

There are three parts to the daily routine:

1. Preprocessing (in the office):

- Export current forfeiture list from BSA
- Update Forfeiture Parcels with BSA export
- Update Forfeiture Parcels with contaminated sites information
- Synchronize Forfeiture Parcels to Mobile Interface

2. Field data collection with Mobile Interface:

- Aids in navigation
- Provides a Checklist of data points for each site
- Attaches photos for each site
- Save results for synchronization in post-processing

3. Post-processing (in the office)

- Synchronize data and images collected in Mobile Interface to Forfeiture Parcels
- Export form for each site
- Print form for each site
- Update BSA data

## Technologies Used in The Forfeiture App

### BSA Data

Details of parcels in the forfeiture process are managed in BSA Delinquent Tax.net. The Treasurer office does a BSA export of the parcels in need of a site visit in the pre-processing.

### ArcGIS Desktop

Tools are designed to preprocess and post-process forfeiture parcel data for fieldwork. The user will execute a preprocess script tool that prepares the data for field deployment. After fieldwork, a post process script tool synchronizes data from the fieldwork with the live data on the Allegan County network.

### ArcGIS Collector

A free mobile application developed and tested on Android is deployed to the field for data collection. The application is con-

figured to work offline (without an internet or cellular connection) by synchronizing before and after fieldwork. The user collects the necessary information on each forfeiture parcel in the field disconnected, and then uploads the changes when reconnected.

### Enterprise Geodatabase

Live data from a publishing geodatabase (ACPub), running on SQL Server database server (acintsql01) provides access to Forfeiture Parcels

### ArcGIS Portal

Forfeiture Parcels is served as a feature service (REST service) named TaxReversionParcels. A webmap on Portal, called the Forfeiture Field Map consumes the TaxReversionParcels exposing the data to editing. The Forfeiture Field Map is configured to work in the ArcGIS Collector App.

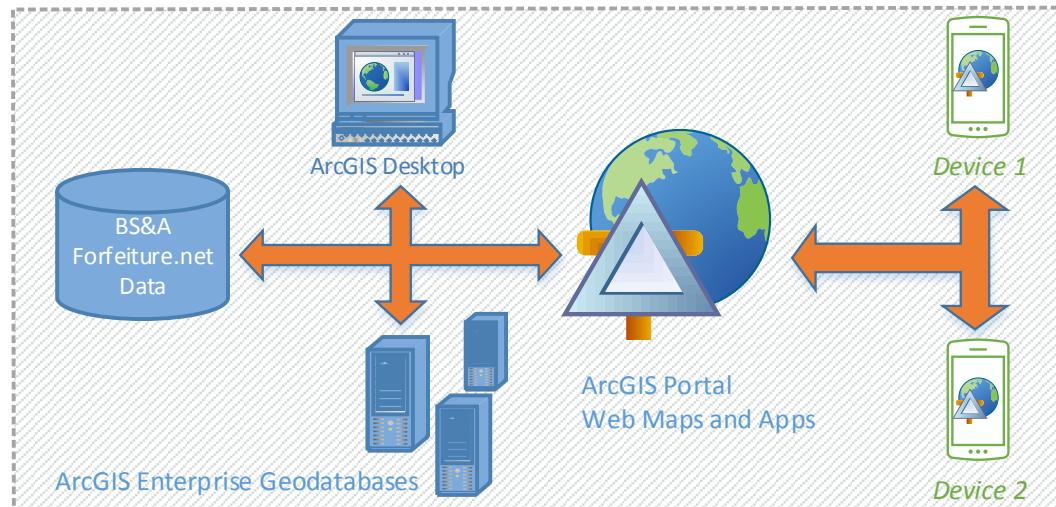


Figure 4.2: Technology Design

# DATA DETAILS

The data is located in a geodatabase called ACPUB. ACPUB is on SQL Server AC-INTSQL01.

Forfeiture Parcels Data

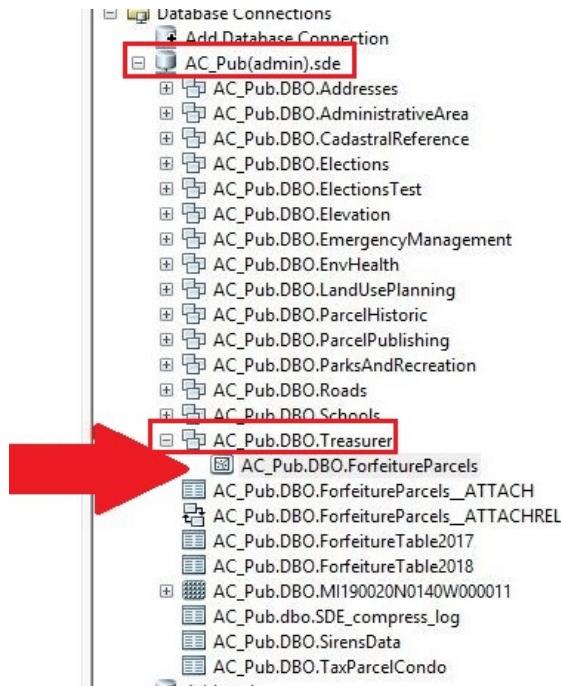


Figure 4.3: Live Data Location

Contamination Data

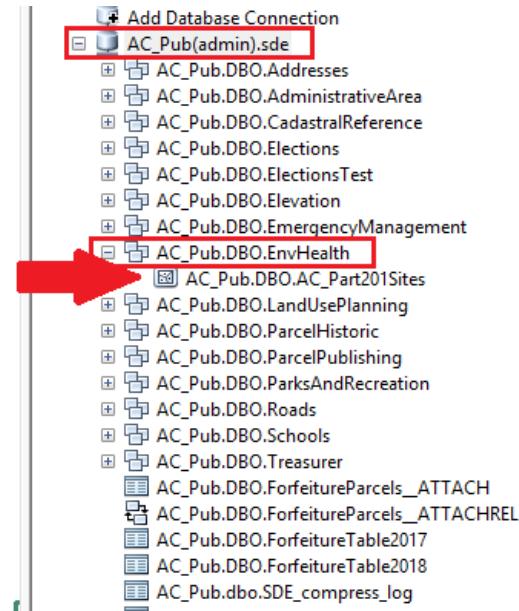


Figure 4.4: Contamination Feature Class

## ForfeitureParcels Feature Class

| Attribute Details            |                                 |                      |               |
|------------------------------|---------------------------------|----------------------|---------------|
| Field Name                   | Field Alias                     | Entry Type           | Note          |
| PropertyNumber               | Property Number                 | Prefilled            | NA            |
| Need2Print                   | Print Today                     | Dropdown             | Yes or No     |
| InspectionDate               | Inspection Date                 | Autofill or Dropdown | NA            |
| Inspector                    | Inspector                       | Dropdown             | NA            |
| Address                      | Address                         | Prefilled            | NA            |
| Status                       | Status                          | Dropdown             | NA            |
| StatusNotes                  | Status Notes                    | Open Entry           | 120Char       |
| Roadfrontage                 | Road Frontage                   | Dropdown             | Yes or No     |
| AccessVia                    | Access Via                      | Open Entry           | 30Char        |
| Agent                        | Agent                           | Open Entry           | 30Char        |
| AgentContact                 | Agent Contact                   | Open Entry           | 30Char        |
| PictureComments              | Picture Comments                | Open Entry           | 50Char        |
| PropertyInUse                | Property In Use                 | Dropdown             | Yes or No     |
| UseNotes                     | Use Notes                       | Open Entry           | 120Char       |
| PropertyMaintained           | Property Maintained             | Dropdown             | Yes or No     |
| PropMaintNotes               | Property Maintained Notes       | Open Entry           | 120Char       |
| PropertyContaminated         | Property Contaminated           | Prefilled            | Preprocessing |
| PropertyContaminatedNotes    | PropertyContaminatedNotes       | Prefilled            | Preprocessing |
| AdjacentPropertyContaminated | Adjacent Property Contaminated  | Prefilled            | Preprocessing |
| AdjPropertyContaminatedNotes | Adj Property Contaminated Notes | Prefilled            | Preprocessing |
| PropertyForSale              | Property For Sale               | Dropdown             | Yes or No     |
| GlobalID                     | GlobalID                        | NA                   | NA            |
| PostedDate                   | Posted Date                     | Dropdown             | Date          |
| Posted                       | Posted                          | Prefilled            | NA            |
| InList                       | In List                         | Prefilled            | Preprocessing |
| PostedInList                 | Posted In List                  | Prefilled            | Preprocessing |
| Acres                        | Acres                           | Prefilled            | NA            |
| Class                        | Class                           | Prefilled            | NA            |

Table 4.1: Dataset Details

## Webmap Details

The Forfeiture Field Map is made up of a basemap and a feature layer.

The screenshot shows the 'Forfeiture Field Map' details page. At the top, there's a blue header bar with the title 'Forfeiture Field Map' and a 'Edit' button. Below the header are tabs for 'Overview' (which is selected) and 'Settings'. The main content area starts with a 'Thumbnail' section featuring a circular logo for 'ALLEGAN COUNTY MICHIGAN' with a bird illustration. To the right of the thumbnail, the map's purpose is described: 'Map for field data collection in annual tax forfeiture processing' by 'bmey531' (Last Modified: August 21, 2018). Below this is a 'Web Map' link and an 'Add to Favorites' button. The next sections are 'Description' (with a placeholder 'Add an in-depth description of the item.'), 'Layers' (listing 'TaxReversionParcels' and 'World\_Street\_Map'), and 'Access and Use Constraints' (with a placeholder 'Add any special restrictions, disclaimers, terms and conditions, or limitations on using the item's content.').

Figure 4.5: Web Map Details

## Feature Layer Details

TaxReversionParcels has been configured for offline use.

The screenshot shows the 'TaxReversionParcels' details page. The layout is similar to Figure 4.5, with a blue header bar, 'Overview' selected, and tabs for 'Data', 'Visualization', and 'Settings'. The 'Thumbnail' section shows a red and green abstract pattern. The description reads: 'Map service exposing treasurer forfeiture data for edits' by 'bmey531' (Last Modified: August 20, 2018). It includes a 'Feature Layer' link and an 'Add to Favorites' button. The 'Layers' section lists 'Tax Reversion Parcels' with options to 'Open In' or view the 'Service URL'. The 'Access and Use Constraints' section has a placeholder for adding restrictions.

Figure 4.6: Feature Layer Details

## Basemap Details

- A tiled basemap service is used
- The infoserv user credentials are used for sharing
- The url for the shared service is:

[https://tiledbasemaps.arcgis.com/arcgis/rest/  
services/World\\_Street\\_Map/MapServer](https://tiledbasemaps.arcgis.com/arcgis/rest/services/World_Street_Map/MapServer)

The screenshot shows the ArcGIS Online interface for the "World Street Map (for Export)" layer. At the top, there's a navigation bar with links for ArcGIS, Pricing, Map, Scene, and Help, along with a sign-in button and a search bar. Below the header, the title "World Street Map (for Export)" is displayed, with a "Overview" tab selected. To the right of the title, there are three buttons: "Open in Map Viewer", "Open in Scene Viewer", and "Open in ArcGIS Desktop".

The main content area features a thumbnail image of a map showing a red rectangular area of interest. Next to it is a detailed description: "This layer presents highway-level data for the world and street-level data for many areas around the world. This layer is designed to support export of basemap tiles for offline use. ArcGIS Online Subscription required." Below the description, there are two status indicators: "Tile Layer by Esri" and "Authoritative".

Below the description, there are several sections of text and links. The "Description" section explains the layer's purpose and includes a note about its use for exporting tiles. The "Service Information for Developers" section provides instructions for using the layer in developer applications. On the right side, there are sections for "Details" (listing source as "Map Service", size as "1 kb", and a 5-star rating), "Owner" (listing Esri as the owner and managed by "esri"), and "Tags" (listing various geographical and thematic tags).

Figure 4.7: Basemap Source Description

## HARD COPY RECORD

screenshots: arcmap map arcmap tools portal screenshots sql server mgt screenshots phone screenshots

# ArcGIS Server

# ADMINISTRATIVE MANUAL

## Annual Setup

A new dataset for forfeiture parcels must be created each year. The forfeiture information comes from BSA Forfeitures.net and the parcel geometry and other attributes comes from ACParcelsCombined.

To get the BSA Forfeiture data, create a table query for a certain year.

First, clear the features from the existing ForfeitureParcels dataset

- Use the Delete Feature Tools
- In the tool:
  - Select AC\_Pub.DBO.ForfeitureParcels

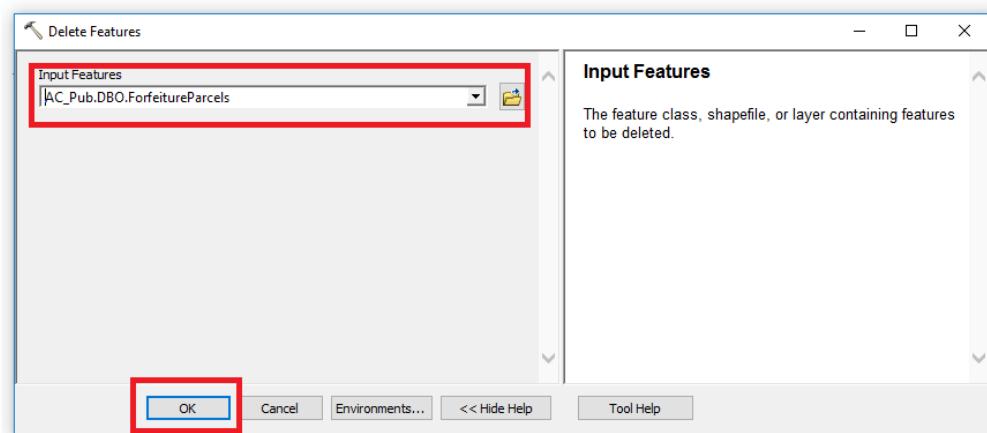


Figure 4.8: Delete Features

---

Press OK

## Add Query Layer

- In ArcMap ⇒ Open the New Query Layer Dialog
- File ⇒ Add Data ⇒ Add Query Layer
- Select your connection

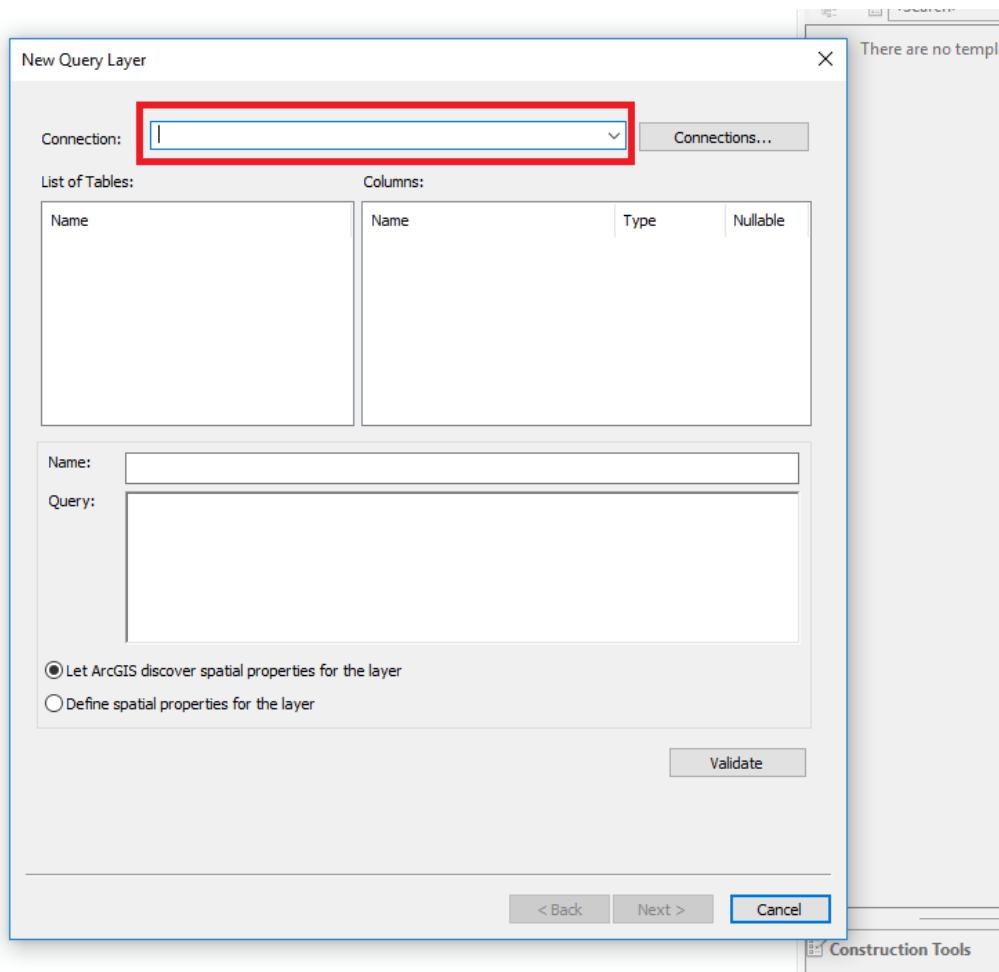


Figure 4.9: New Query Layer Dialog

### Query Text:

```
SELECT [parcelnumber] FROM [D005ALLEGAN].[dbo].[Forfeitures]
WHERE forf_year = 2019
```

## Details of the Query Layer

- Choose connection
- Name the query
- Enter SQL query

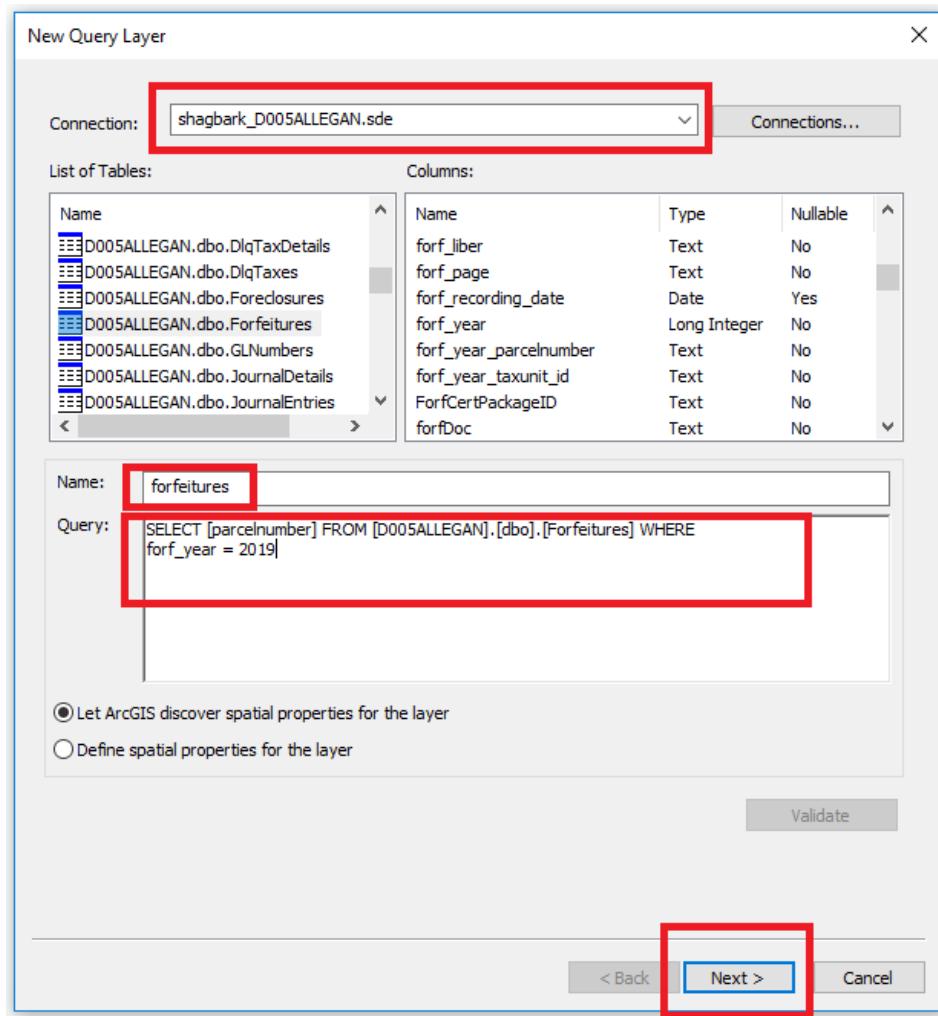


Figure 4.10: Forfeiture Query Layer Details

- Press Next

## Select a Unique Identifier

- Press Finish

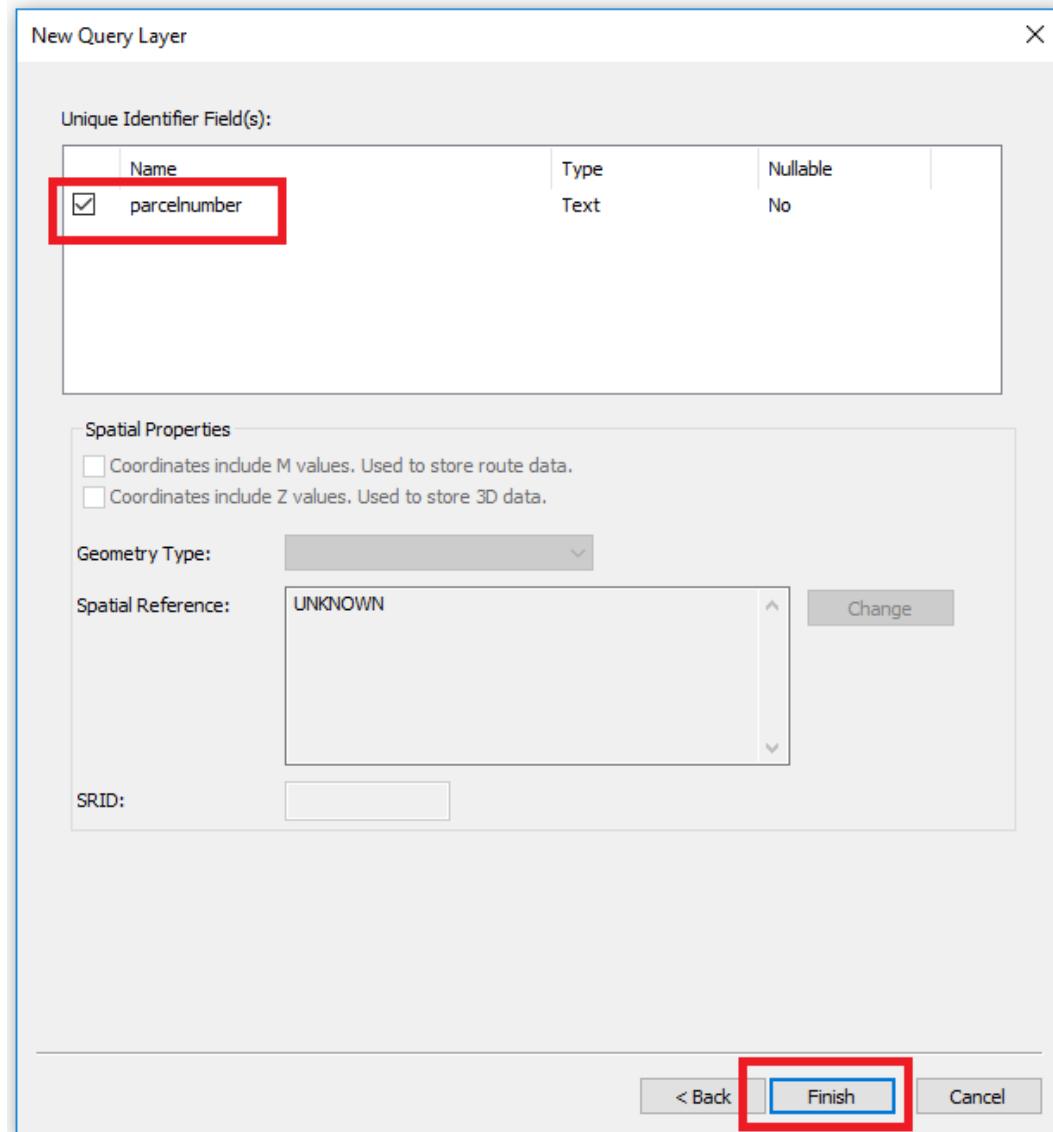


Figure 4.11: Query Layer Unique ID

## Table is added to the map

The screenshot shows the ArcGIS Pro interface with two main windows. On the left is the Table of Contents window, which lists layers. A red box highlights the 'D005ALLEGAN' folder, which contains a sub-layer named 'D005ALLEGAN.DBO.forfeitures'. On the right is the Table viewer window, titled 'D005ALLEGAN.DBO.forfeitures', displaying a table with two columns: 'parcelnumber' and 'ESRI\_OID'. The table lists 836 rows of data, starting with '01-007-012-00' and ending with '02-007-025-00'. The bottom status bar of the Table viewer window shows '(0 out of 836 Selected)'.

| parcelnumber  | ESRI_OID |
|---------------|----------|
| 01-007-012-00 | 1        |
| 01-008-005-00 | 2        |
| 01-016-031-10 | 3        |
| 01-019-001-13 | 4        |
| 01-019-005-97 | 5        |
| 01-025-017-00 | 6        |
| 01-026-020-00 | 7        |
| 01-030-014-10 | 8        |
| 01-030-019-00 | 9        |
| 01-031-031-00 | 10       |
| 01-034-009-00 | 11       |
| 01-034-014-10 | 12       |
| 01-034-055-00 | 13       |
| 01-034-067-00 | 14       |
| 01-034-087-00 | 15       |
| 01-034-108-00 | 16       |
| 01-035-015-00 | 17       |
| 01-035-020-20 | 18       |
| 01-035-030-00 | 19       |
| 01-035-044-00 | 20       |
| 01-035-044-10 | 21       |
| 01-120-004-00 | 22       |
| 01-120-010-00 | 23       |
| 01-120-031-00 | 24       |
| 01-120-032-00 | 25       |
| 01-220-010-00 | 26       |
| 01-250-001-00 | 27       |
| 01-300-004-00 | 28       |
| 01-320-020-00 | 29       |
| 01-320-021-00 | 30       |
| 01-370-016-00 | 31       |
| 01-740-009-00 | 32       |
| 02-001-012-31 | 33       |
| 02-003-018-00 | 34       |
| 02-005-004-20 | 35       |
| 02-007-025-00 | 36       |

Figure 4.12: Forfeiture Table Added

---

## Add Parcels Layer to the map

Add ACParcelsCombined to the map to provide parcel geometry and attributes

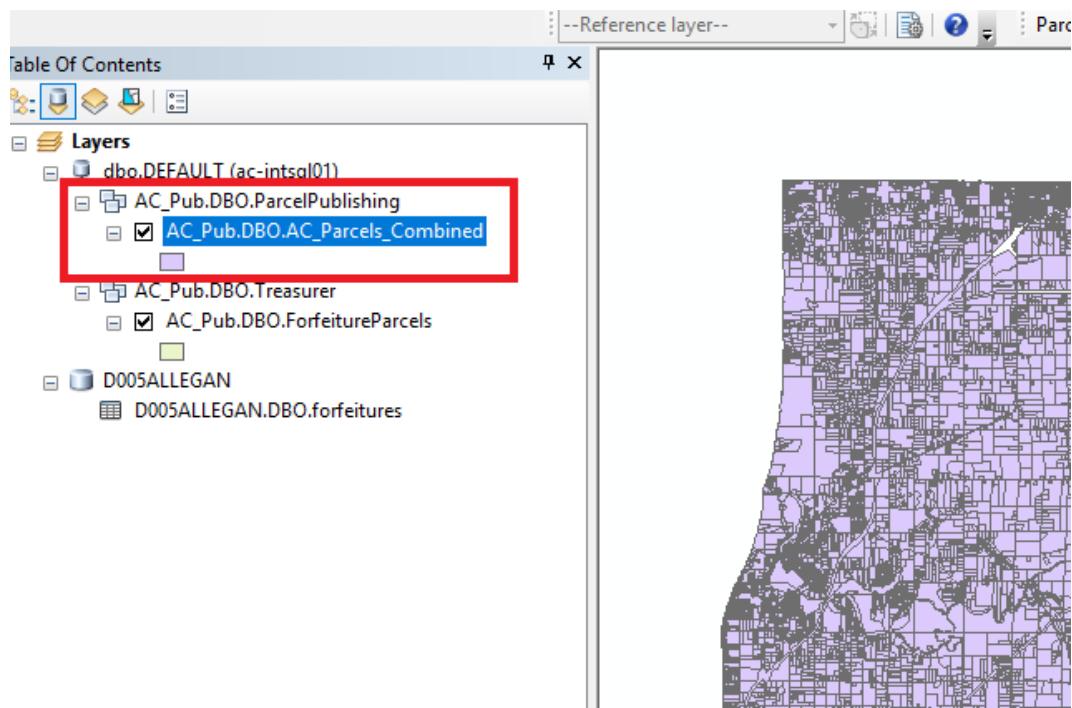


Figure 4.13: Parcels Layer Added

## Create Join

Create new join to ACParcelsCombined of forfeitures based on parcel numbers

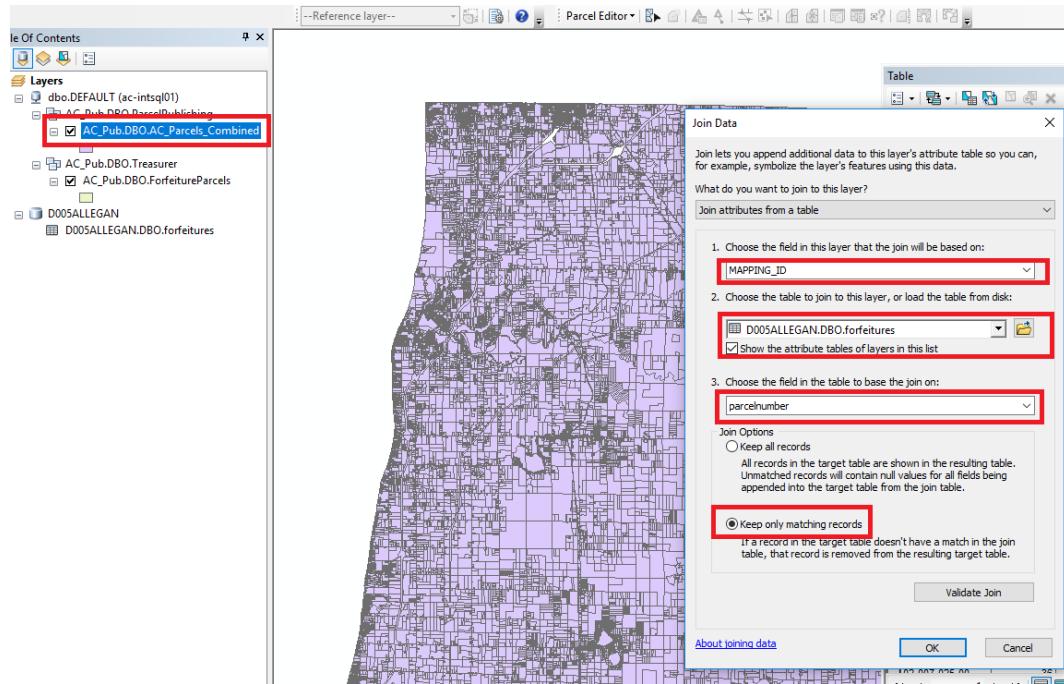


Figure 4.14: Join Parcels

## Export Joined Features to a temp location

- Right click ➔ on joined feature class in TOC and choose export

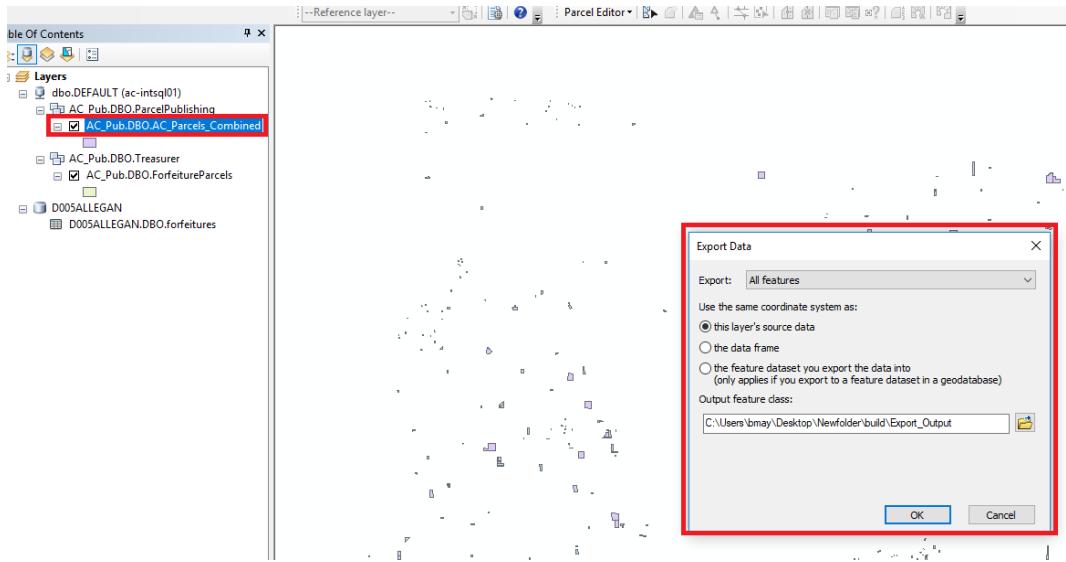


Figure 4.15: Export Joined Features

- choose location and press OK

## Load data from temp location to forfeitureParcels

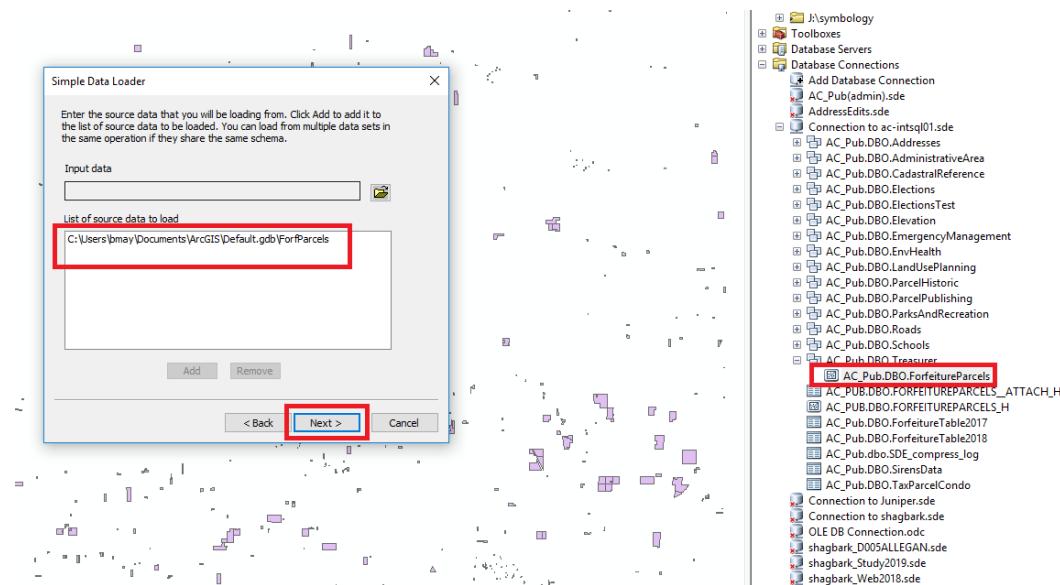


Figure 4.16: Load Data 1

## push next

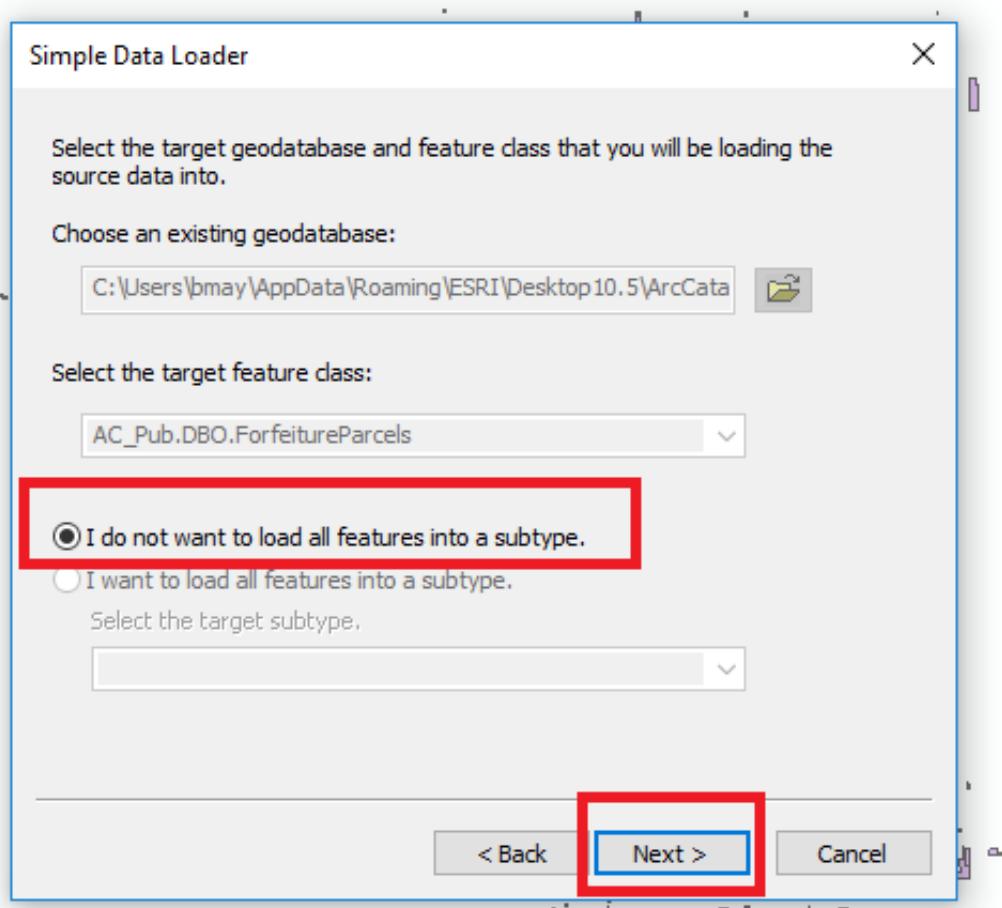


Figure 4.17: Load Data 2

## Match these fields

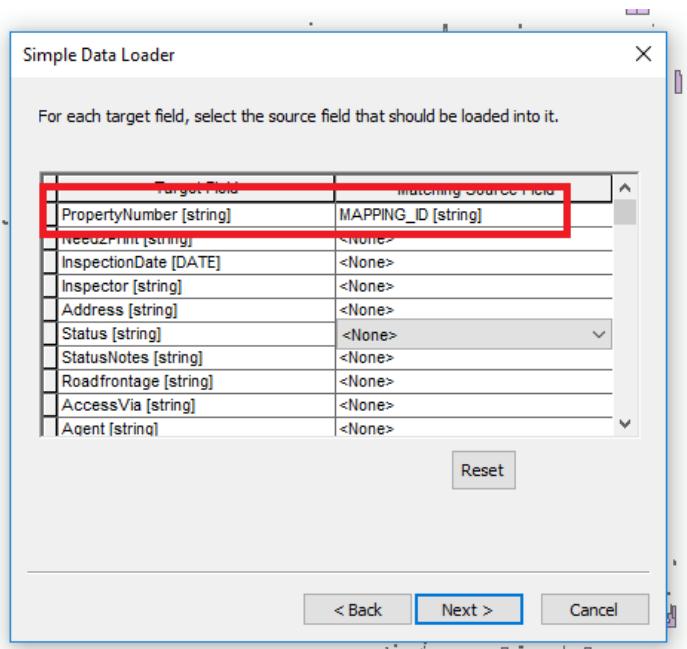


Figure 4.18: Match Fields 1

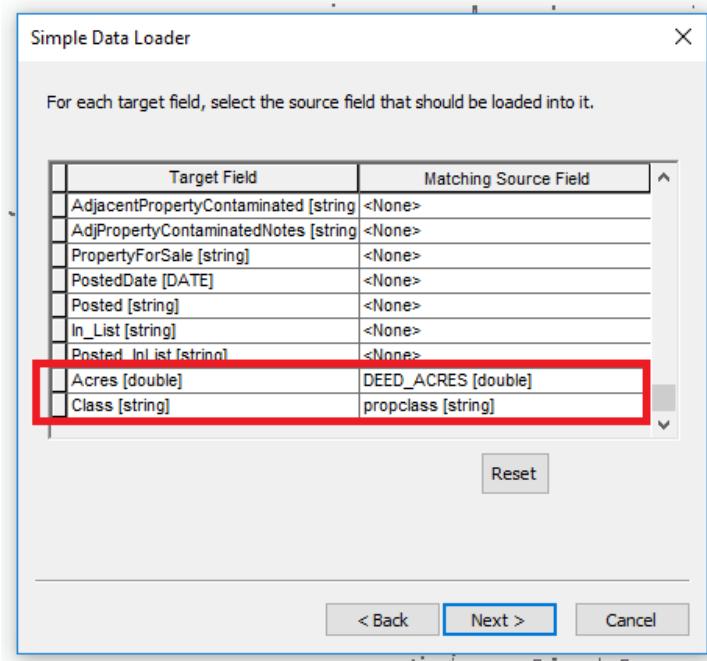


Figure 4.19: Match Fields 2

**push next**

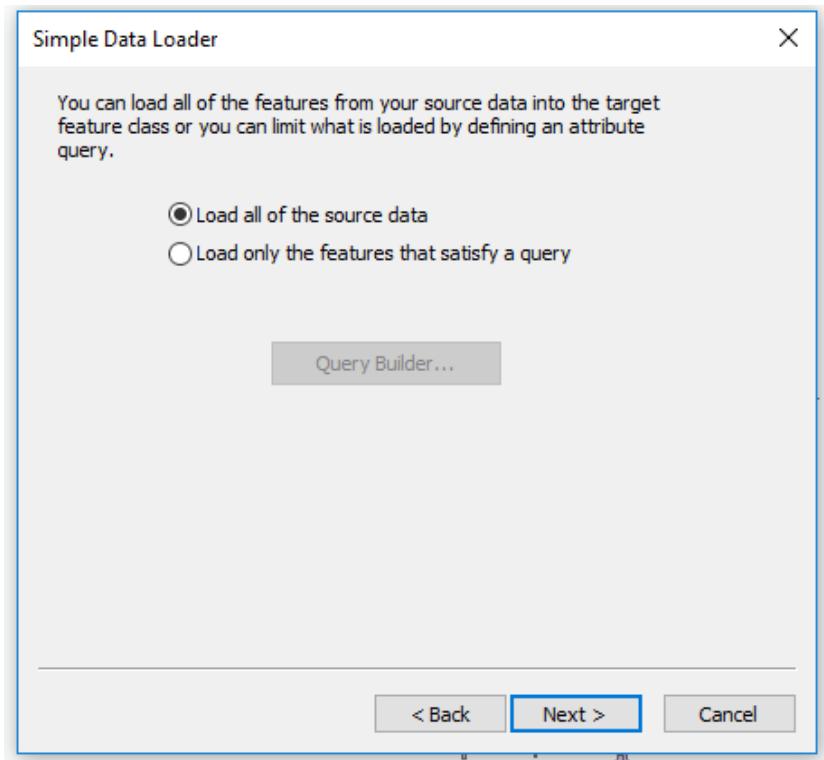


Figure 4.20: Load Data 3

**Push Finish**

## Data Setup

Register as versioned and Add Global IDs

Right Click ⇒ Manage ⇒ Register as Versioned

and

Right Click ⇒ Manage ⇒ Add Global IDs

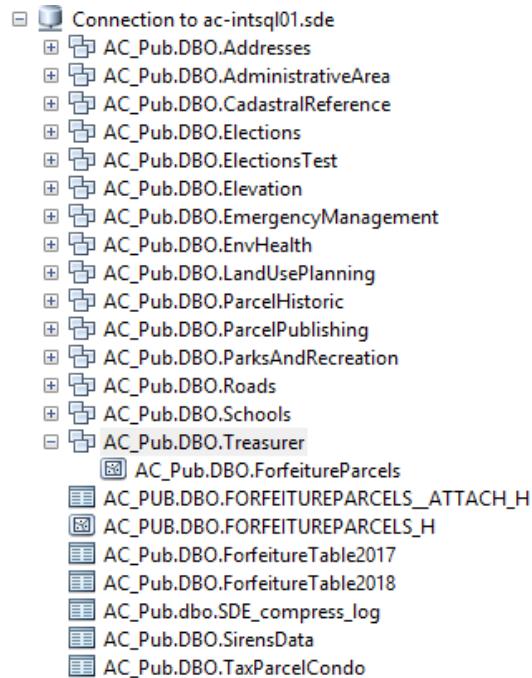


Figure 4.21: Setup Data

## Create Attachments

Right Click ⇒ Manage ⇒ Add Attachments

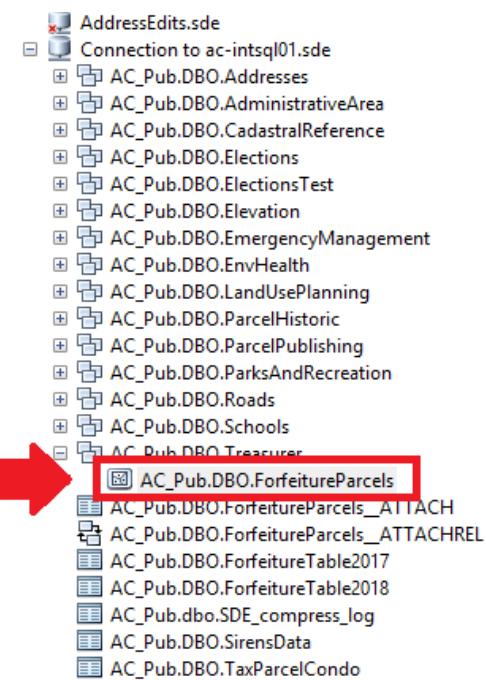


Figure 4.22: Create Attachments

## Setup Users in ArcGIS

Users that will run Pre and Post processing scripts must be created and given privileges on ACPub Treasurer Feature Data Set.

For any new users of the geoprocessing tools, use the create Database User tool or

In Catalog ⇒ Right click on ACpub ⇒ Administration ⇒ Add User

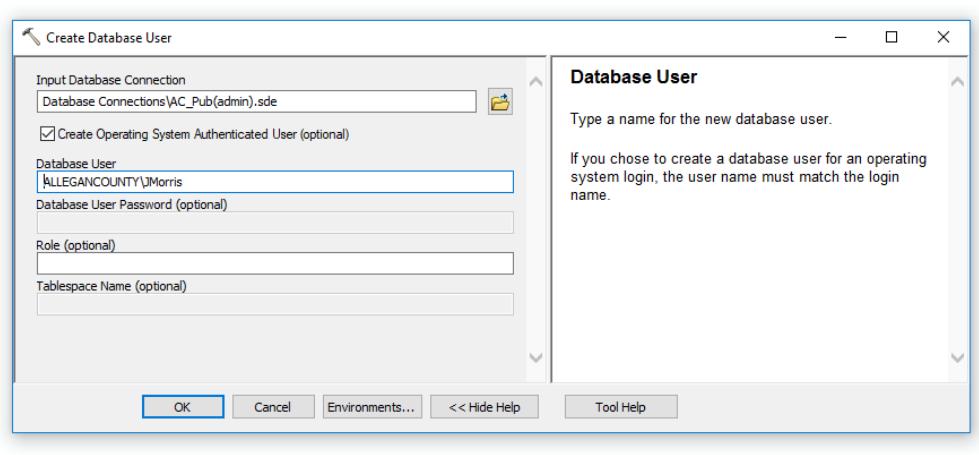


Figure 4.23: Add Db User

## Add New User to Feature Dataset

In Catalog, ⇒ right click on Treasurer Feature Data Set ⇒ Manage ⇒ Privileges  
⇒ Add ⇒ Type new user ⇒ ok

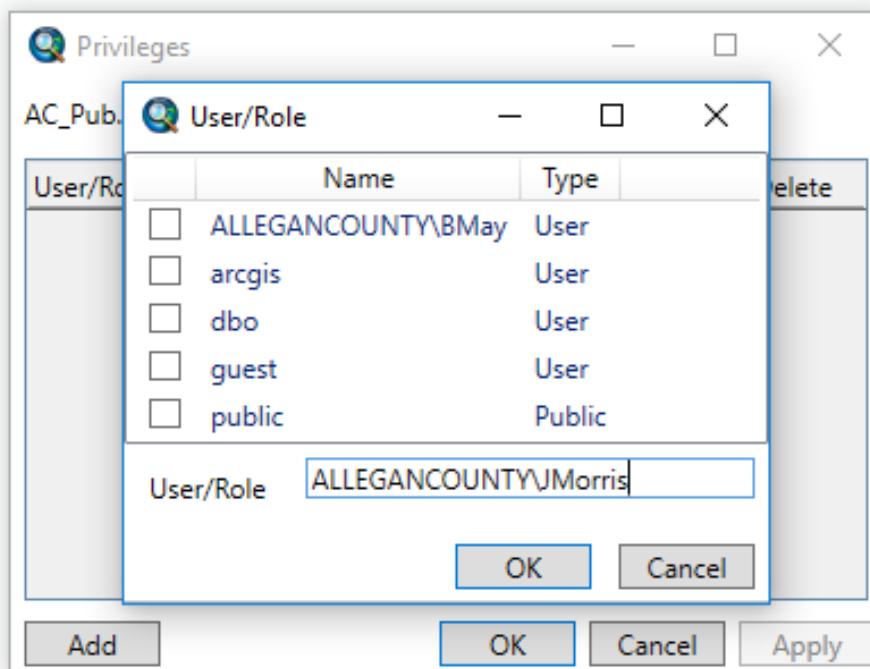


Figure 4.24: Add Feature Dataset User

## Extend Privileges for New User

In Catalog ⇒ right click on Treasurer FDS ⇒ Manage ⇒ Privileges ⇒ check boxes

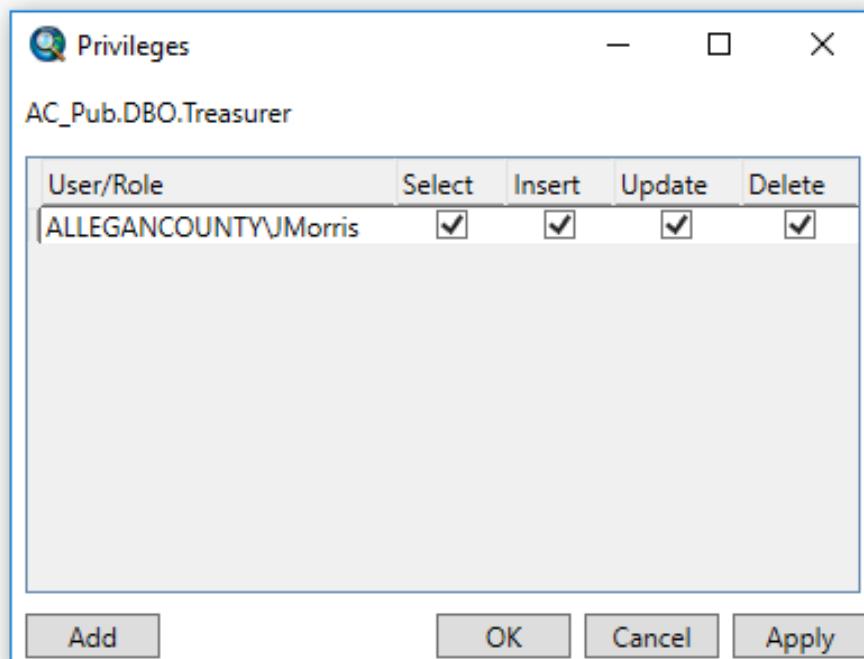


Figure 4.25: Extend Feature Dataset Privileges

## Setup Users in Portal for ArcGIS

Users that will use the Collector for ArcGIS must have profiles added to and managed in the Allegan County GIS Portal site.

In Portal go to My Organization

The screenshot shows the 'My Organization' page of the Allegan County GIS Services portal. At the top, there's a navigation bar with links like Home, Gallery, Map, Scene, Groups, My Content, and My Organization. Below that is a search bar. The main content area has a blue header with the portal's logo and name. It displays a table of current members:

| Name              | Username  | Last Login   | Level | Role          | Action |
|-------------------|-----------|--------------|-------|---------------|--------|
| Bryan May         | bmay531   | Nov 2, 2018  | 2     | Administrator | [Edit] |
| Christina Andress | CAndress  | Sep 19, 2018 | 2     | Administrator | [Edit] |
| Jennifer Morris   | JMorris   | Oct 18, 2018 | 2     | Administrator | [Edit] |
| Neil Besteman     | nbesteman | Oct 29, 2018 | 2     | Administrator | [Edit] |
| Paula Reed        | preed6    | Feb 7, 2017  | 1     | Viewer        | [Edit] |

To the right of the table is a sidebar titled 'Membership' with the following information:

- Members per level:
  - 1 of 30
  - 2 of 5
- Total Members: 5 of 35
- Find...
- The most viewed items
- The last items added
- Groups
- The organization's registered apps

Figure 4.26: Portal Add User 1

## Add Members to Portal

Push add members ⇒ built in member

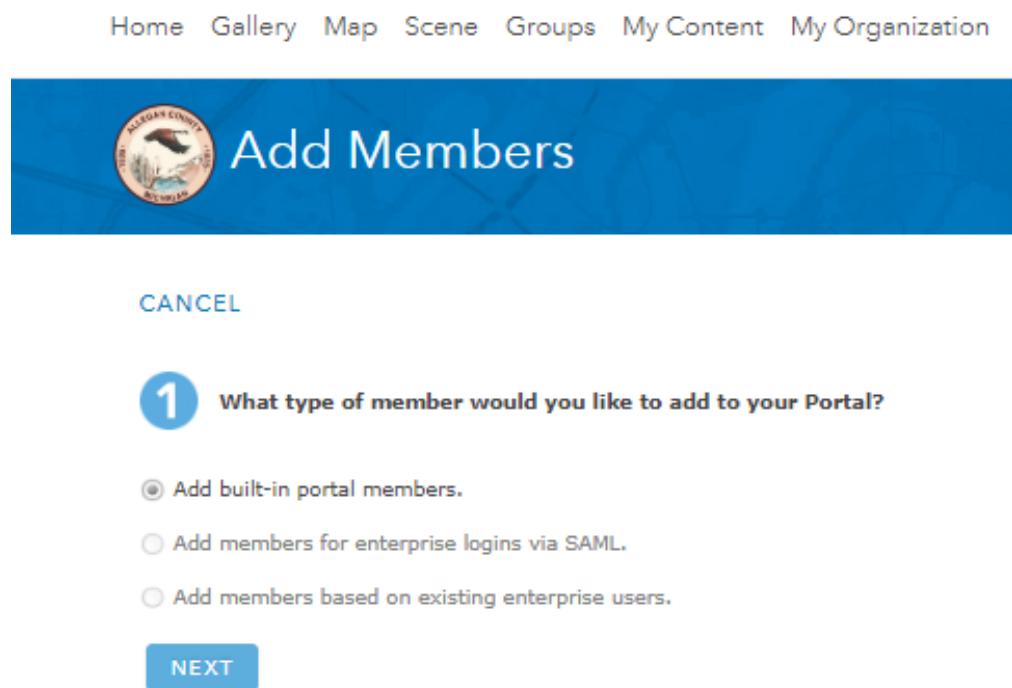


Figure 4.27: Portal Add User 2

## Enter required info

The screenshot shows a web-based application titled "Add Members". At the top left is the Allegan County GIS Services logo. To its right, the title "Add Members" is displayed in large white font on a blue header bar. Below the header, there is a "CANCEL" link on the left. A large blue circular icon containing the number "2" is positioned on the left side of the main content area. The main content area contains instructions: "Create new Allegan County GIS Services logins one at a time or in batch from a file. Select any role for the member to be a part of. You must inform the member of their user name and password. If you do not have an email address for a particular user, use the administrator's email address." A red error message "Password may not be less than 8 characters." is visible above the password input field. There are two tabs at the top of the form: "One at a time" (selected) and "From a file". The form fields include: Email (text input), First Name (text input), Last Name (text input), Username (text input), Password (text input), Level (radio buttons 1 and 2, with 2 selected), and Role (dropdown menu set to "Publisher"). At the bottom are three buttons: "BACK", "ADD ANOTHER" (highlighted in green), and "REVIEW ADDITIONS".

Figure 4.28: Portal Add User 3

## Manage Treasurer Group

In Portal ⇒ Go to groups ⇒ Invite new user to the group

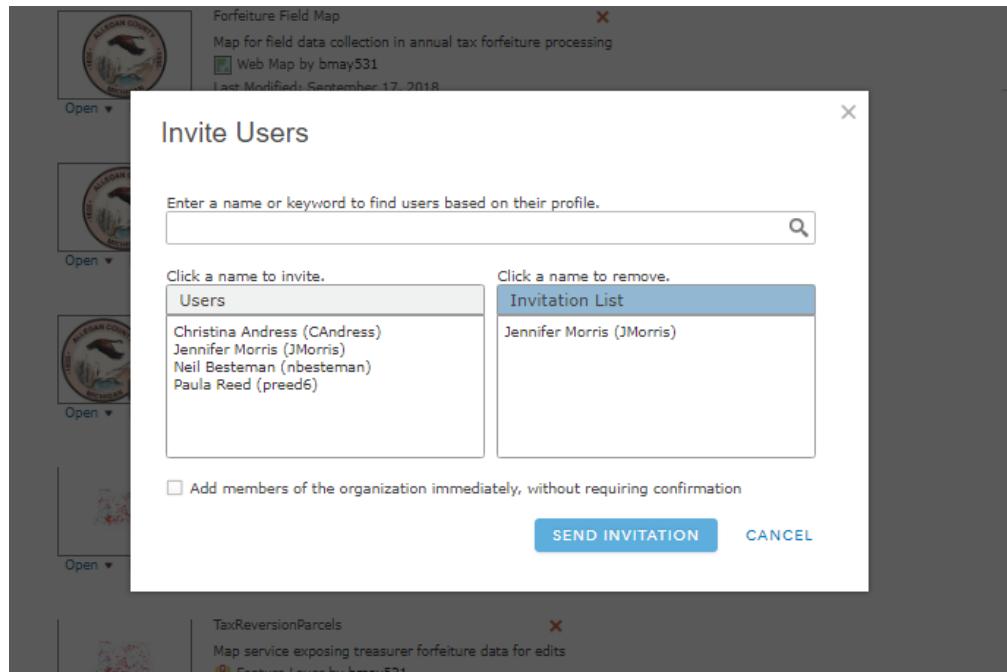


Figure 4.29: Portal Add User 4

## Share Content To The Group

Any content used by the group needs to be shared to the group

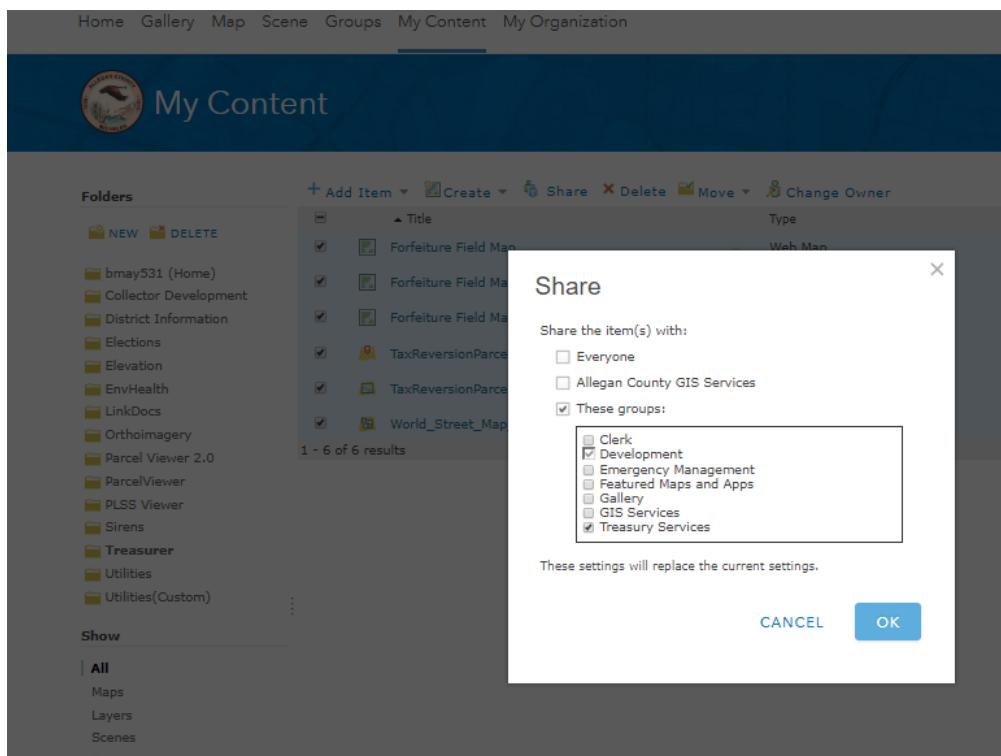


Figure 4.30: Portal AddUser 5

## Schema Change Procedure

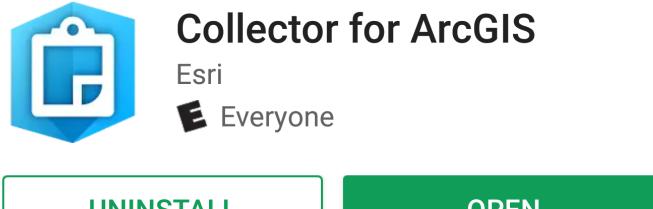
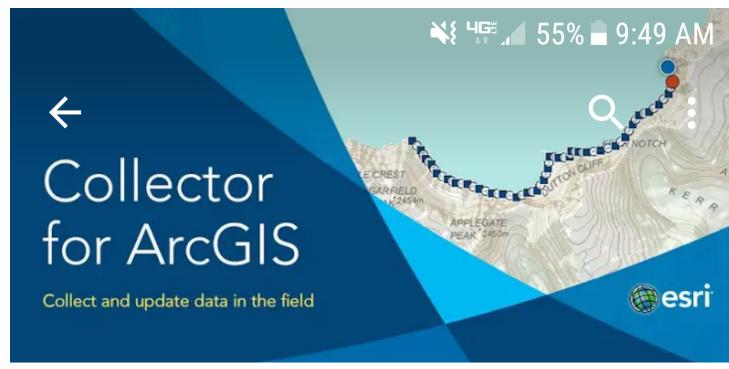
## Form Edits Procedure

## USER MANUAL

### Collection Device Setup

#### Install Collector for ArcGIS

- Available from the Google Play Store



Accurate Data Collection Made Easy



#### WHAT'S NEW

- Various bug fixes and improvements

[READ MORE](#)

Figure 4.31: Download the App

## Configure Collector

for Organization Website, Type:

```
{\textcolor{HeaderOrangeC}{HeaderOrangeC}}
https://gis.allegancounty.org/
portal_webadaptor}
```

then:

Press Continue

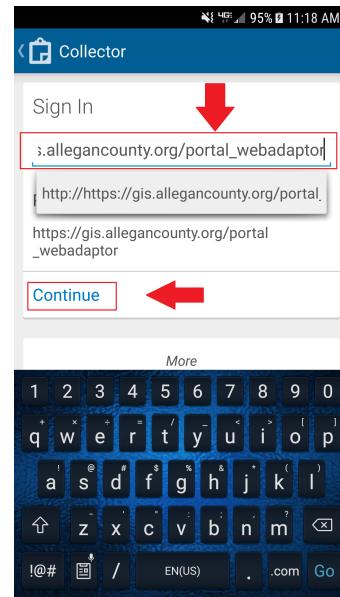


Figure 4.32: Collector Connection

## Enter Credentials

then:

Press SIGN IN

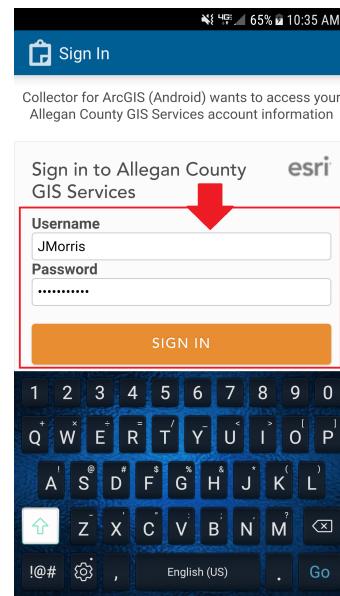


Figure 4.33: Enter Credentials

## Download the Forfeiture Field Map

There are 3 different versions of the map

- Forfeiture Field Map
- Forfeiture Field Map For Photos
- Forfeiture Field Map For Attributes

The Download option indicates it is not on the device but is available for offline use

Choose a Map

Press Download

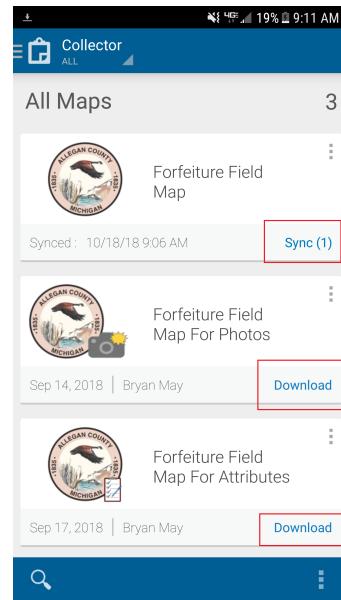


Figure 4.34: Collector Maps Menu

Specify work area

and press

map detail

Note that a larger area takes longer to download but the basemap only needs to be downloaded once

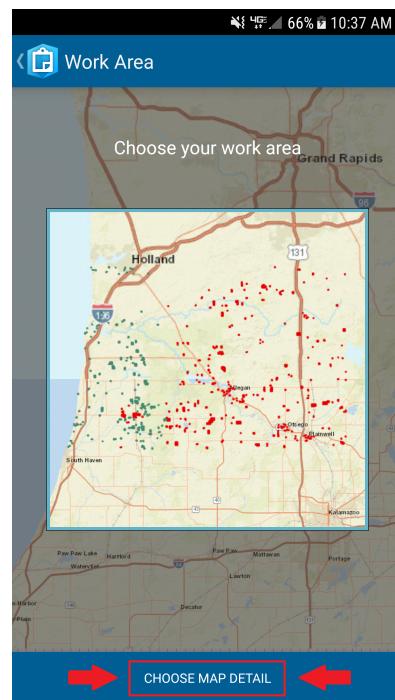


Figure 4.35: Choose Work Area (large)

## Choose Map Detail

Zoom into the level of detail desired.

Press Download

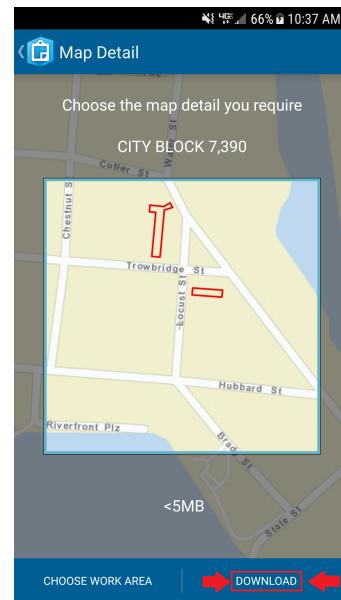


Figure 4.36: Choose Map Detail

---

This area is ready for field data collection.

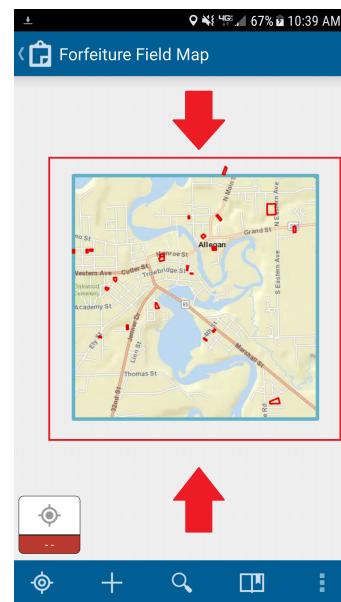


Figure 4.37: Map on Device

---

## Open Camera Application Setup Details

### Install Open Camera

- Available from the Google Play Store

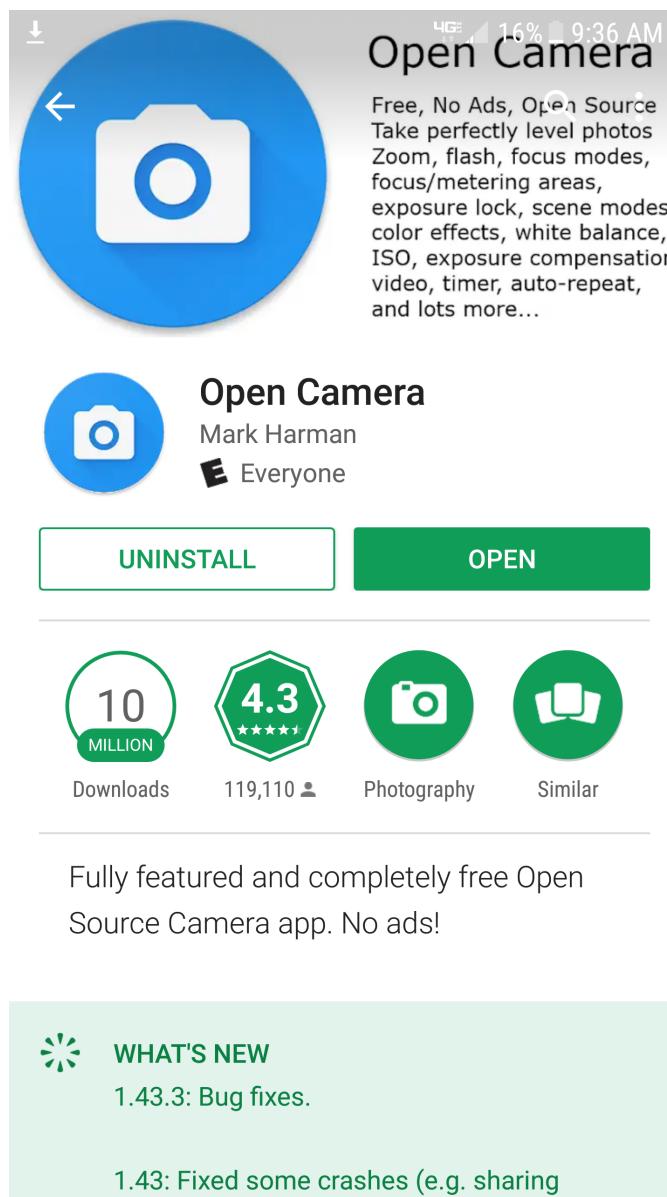


Figure 4.38: Open Camera from Google Play Store

## Configure Open Camera

In the Open Camera Application:

Press the gear shaped Settings button to go into the settings menu

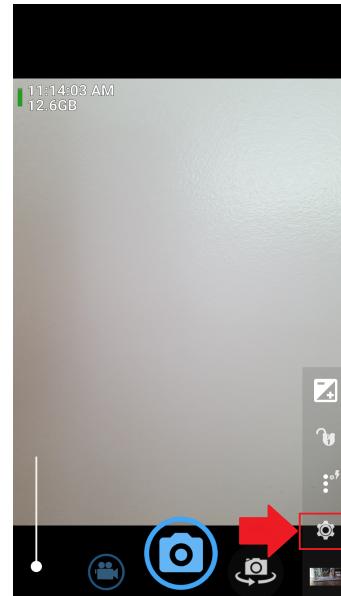


Figure 4.39: Find Settings Menu

---

Press the Photo Settings button

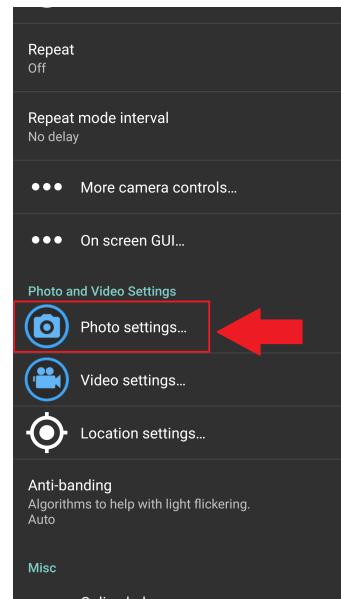


Figure 4.40: Setting Screen

## Set Photo Resolution

In photo settings:

Press the Camera resolution button

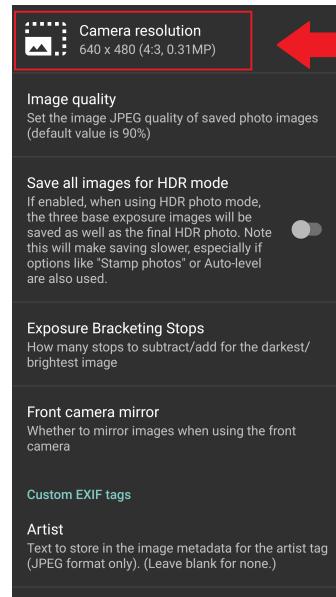


Figure 4.41: Photo Settings Menu

Select **640 x 480**

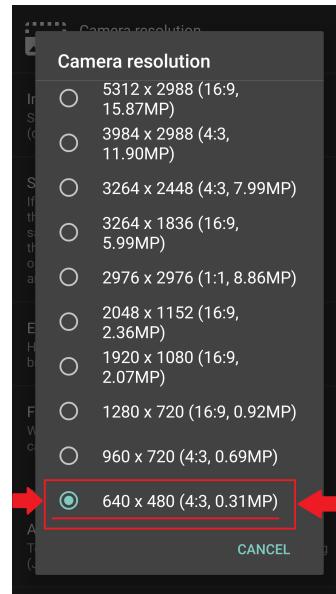


Figure 4.42: Camera Resolution Setting

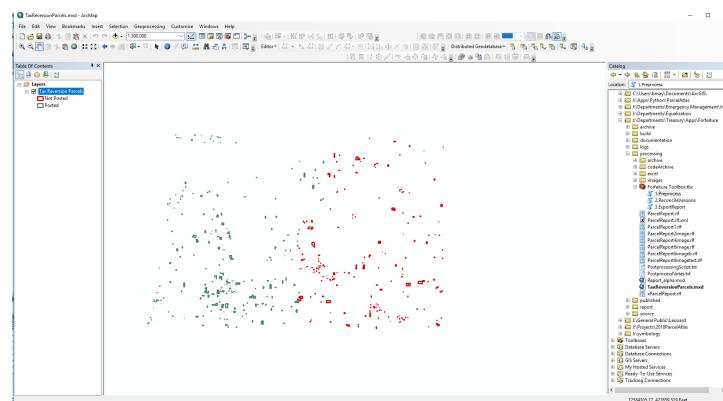
## Daily Preprocessing Routine

### Execute Preprocessing Script

A tool in ArcGIS that:

- Exports current forfeiture list from BSA
- Updates webmap layers with results from BSA export

In Catalog:



Open the tool-box

Figure 4.43: Processing Tools

Open tool 1

## Synchronize the Forfeiture Field Map

Note the date and time:

Press Sync

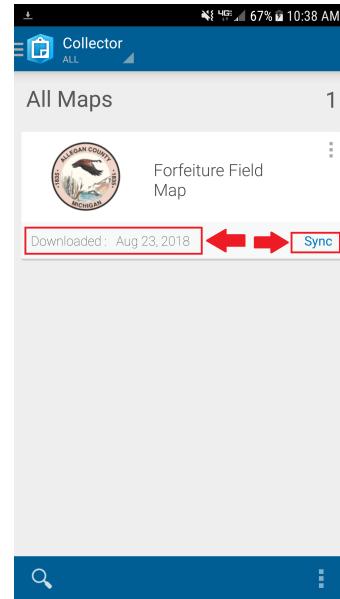


Figure 4.44: Map Downloaded

Note the date and time

---

Map is synchronized

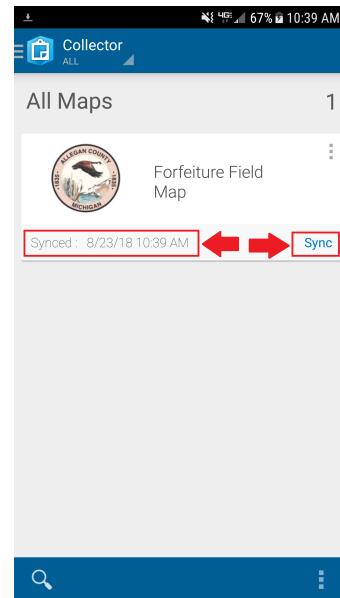


Figure 4.45: Map Synchronized

## Forfeiture Data Collection

### Forfeiture Parcels Data Details

Attributes are of four entry types:

- prefilled
- autofill
- dropdown
- text box

For each site visited, select the desired parcel, push the edit button and collect attributes.

## Device 1 Field Operation

Select a parcel

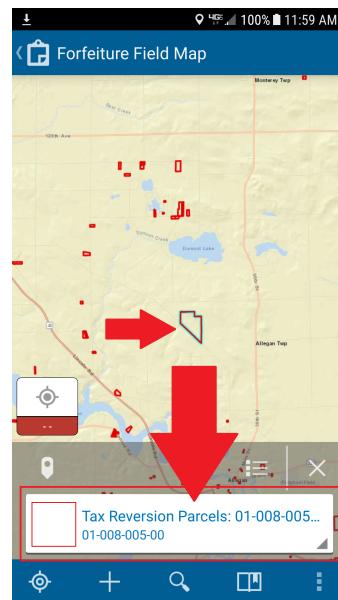


Figure 4.46: Select Parcel

---

Push the edit button

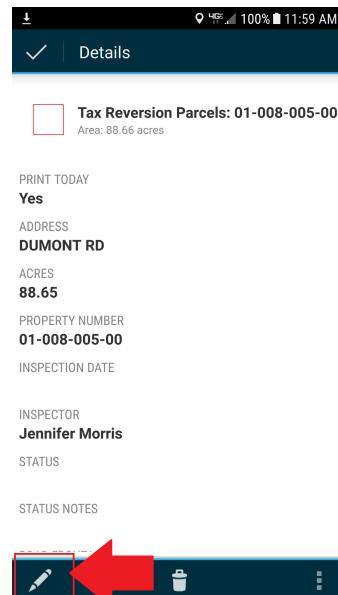


Figure 4.47: Parcel Details

## Device 1 Field Operation Cont.

Select Yes for Print Today

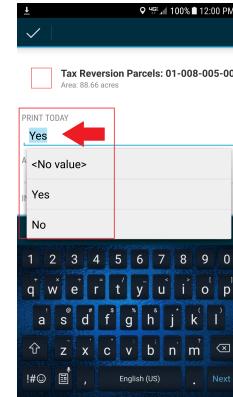
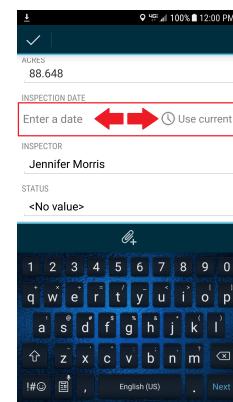


Figure 4.48: Yes or No

Select Use Current or enter any date



Select Inspector From Dropdown



Figure 4.50: Select Inspector

## Device 1 Field Operation Cont.

Select Occupied or Not Occupied

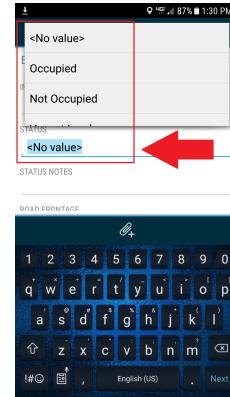
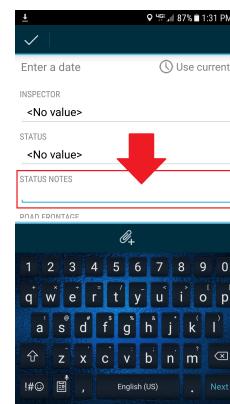


Figure 4.51: Status

Enter status notes up to 120 characters



Select Yes or No for Road Frontage

Figure 4.52: Status Notes

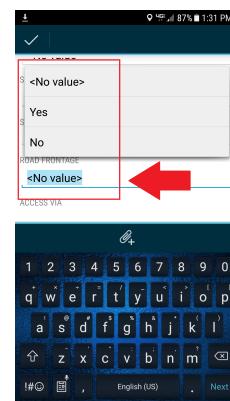
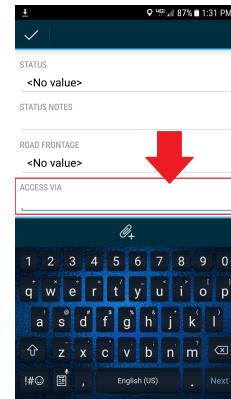


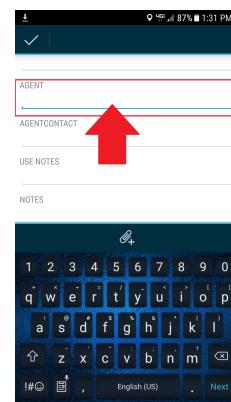
Figure 4.53: Road Frontage

## Device 1 Field Operation Cont.

Enter road used for access



Enter Agent Name



Enter Agent Contact Info

Figure 4.54: Access Via

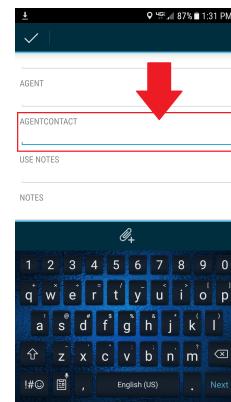


Figure 4.55: Agent

## Device 1 Field Operation Cont.

Enter Use Notes up to 120 characters

Enter Notes up to 120 characters

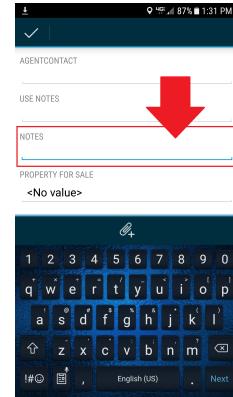


Figure 4.57: Use Notes

Enter property for sale yes or no

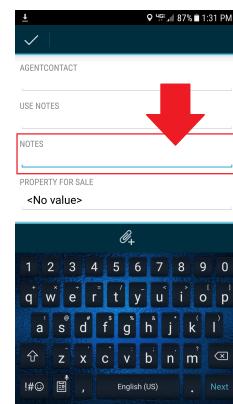


Figure 4.58: Notes

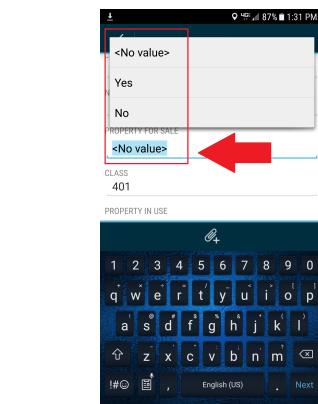
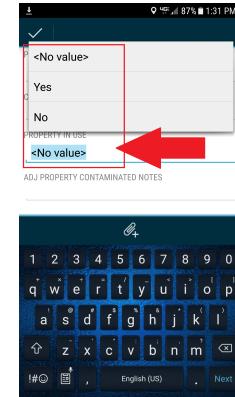


Figure 4.59: Property for Sale

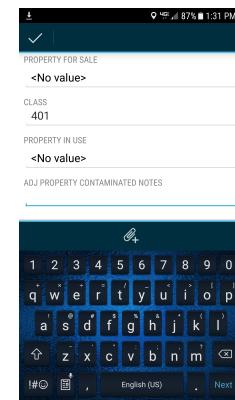
## Device 1 Field Operation Cont.

Property in Use Yes or No



Placeholder  
Property in Use

Figure 4.60: Property in Use Placeholder



prefilled

Figure 4.61: Placeholder

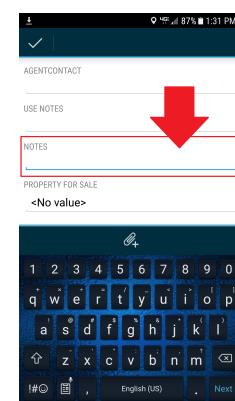


Figure 4.62: Property Contami-nated

## Device 1 Field Operation Cont.

Enter notes up to 120 characters

Adjacent Property Contaminated prefilled

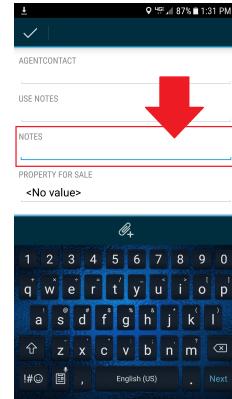


Figure 4.63: Notes up to 120 characters

Property Contaminated notes prefilled

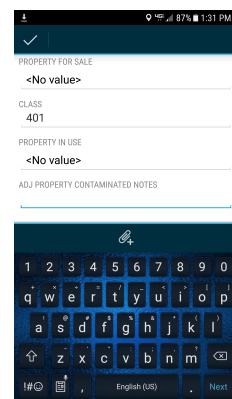


Figure 4.64: Adjacent Property Contaminated

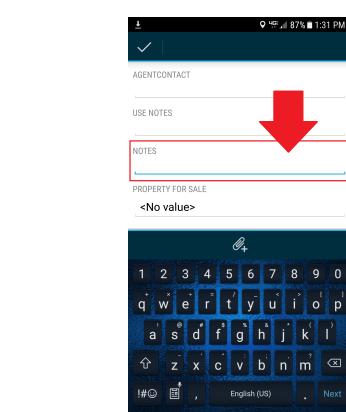


Figure 4.65: Property Contaminated

## Device 1 Field Operation Cont.

Property Maintained Yes or No

Picture Comments up to 120 characters

Placeholder

The screenshot shows a mobile application interface. At the top, there is a status bar with signal strength, battery level (96%), and time (1:32 PM). Below the status bar is a header with a checkmark icon. The main screen displays a dropdown menu under the heading 'PROPERTY MAINTAINED'. The dropdown shows three options: '<No value>', 'Yes', and 'No'. The option '<No value>' is highlighted with a red border. A red arrow points from the left towards this highlighted option. Below the dropdown is a section labeled 'ATTACHMENTS' which is currently empty. At the bottom of the screen is a virtual keyboard.

Figure 4.66: Property Maintained

The screenshot shows a mobile application interface. At the top, there is a status bar with signal strength, battery level (86%), and time (1:32 PM). Below the status bar is a header with a checkmark icon. The main screen displays a text input field under the heading 'PICTURE COMMENTS'. The input field contains the text '<No value>'. A red arrow points downwards from the top towards this text. Above the input field, there is a section labeled 'POSTED' with the value 'No'. Below the input field is a section labeled 'ATTACHMENTS' which states 'No attachments found'. At the bottom of the screen is a virtual keyboard.

Figure 4.67: Picture Comments

The screenshot shows a mobile application interface. At the top, there is a status bar with signal strength, battery level (87%), and time (1:31 PM). Below the status bar is a header with a checkmark icon. The main screen displays a text input field under the heading 'NOTES'. The input field contains the text 'NOTES'. A large red arrow points downwards from the top towards this text. Below the input field is a section labeled 'PROPERTY FOR SALE' with the value '<No value>'. At the bottom of the screen is a virtual keyboard.

Figure 4.68: Placeholder

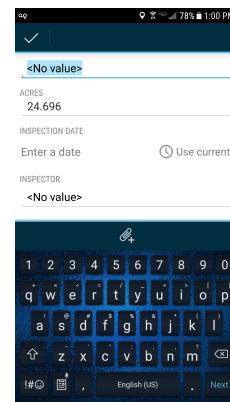
## Device 2 Field Operation

Select a parcel from the map



Push Attachment Button

Figure 4.69: Select Parcel



Select Gallery

Figure 4.70: Push Attachment Button

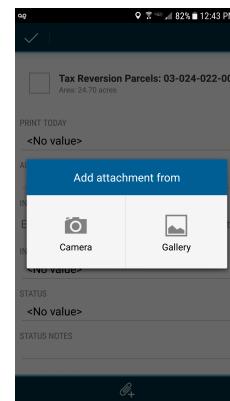


Figure 4.71: Add Attachment From Gallery

## Device 2 Field Operation Cont.

Navigate to the Open Camera Folder

Select the appropriate image

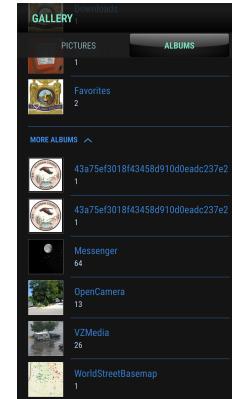


Figure 4.72: Open Camera Folder

Press the check button to save the image to the parcel

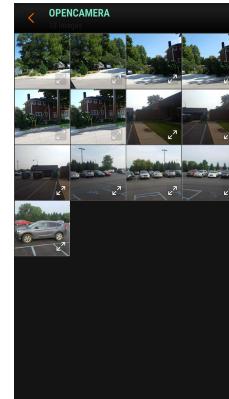


Figure 4.73: In the Open Camera Folder

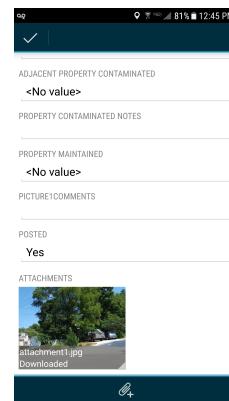


Figure 4.74: Image in the App

## Daily Postprocessing Routine

Back at the office

### Synchronize Webmap

In Collector for ArcGIS, push the sync button on the Forfeiture Field Map

### Execute Postprocessing Script

The Postprocessing Script is A tool in ArcGIS that:  
Reconciles geodatabase versions

Execute the Reconcile Versions  
and Compress Tool

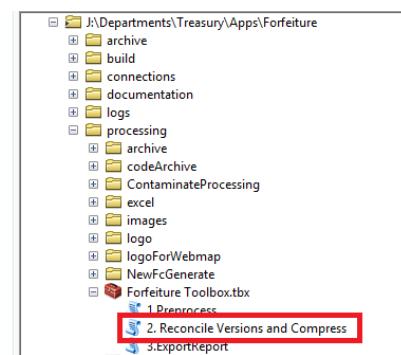


Figure 4.75: Reconcile Versions and Compress Tool

Generates forms for each site visited

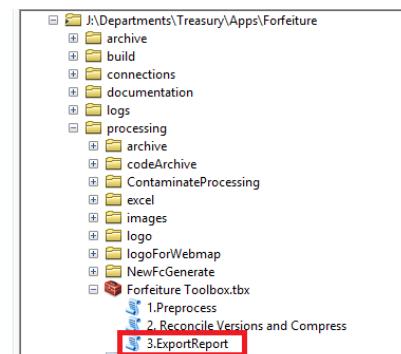


Figure 4.76: Export Report Tool

Execute the Export Report Tool

- Reconciles geodatabase versions
  - Execute the Reconcile Versions and Compress Tool

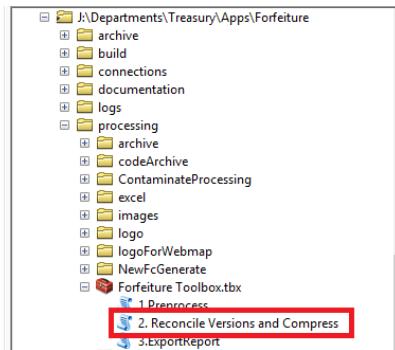


Figure 4.77: Reconcile Versions and Compress Tool

- Generates forms for each site visited
  - Execute the Export Report Tool

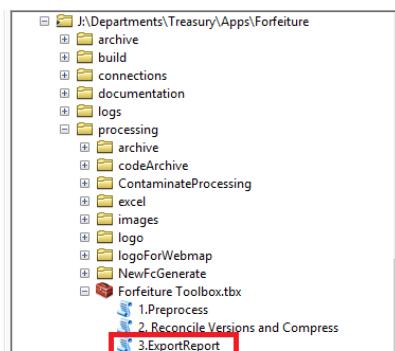


Figure 4.78: Export Report Tool

# SOFTWARE

## ESRI Licensed Products

### ArcDesktop

Users of this application need a license to ArcGIS Standard level.

### Enterprise ArcGIS Deployment

This app uses ArcGIS Server and ArcGIS Portal.

### Collector for ArcGIS

Developed and tested on Android(7.0). Collector is available at the Google Play Store.

## Other Software

### Open Camera for Android



Figure 4.79: Open Camera from Google Play Store



# 5

## Tools

### 5.1 BSA SUPPORT

#### 5.1.1 ADDING A LAYER TO THE BSA GIS

## ADD AN IMAGERY LAYER

### BSA Program Setup

(BSA Settings)

In **Program Setup** ⇒ Select **GIS Settings...**

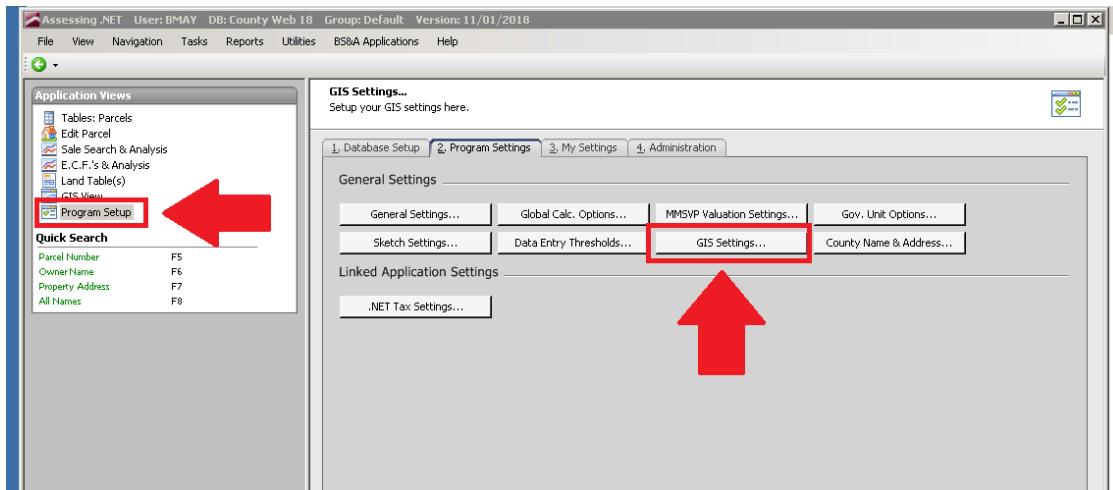


Figure 5.1: BSA Program Setup

## Setup Map Collections

(BSA Settings Cont.)

In GIS Settings ⇒ Map Collections ⇒

Double click on the map that you want to add a layer to

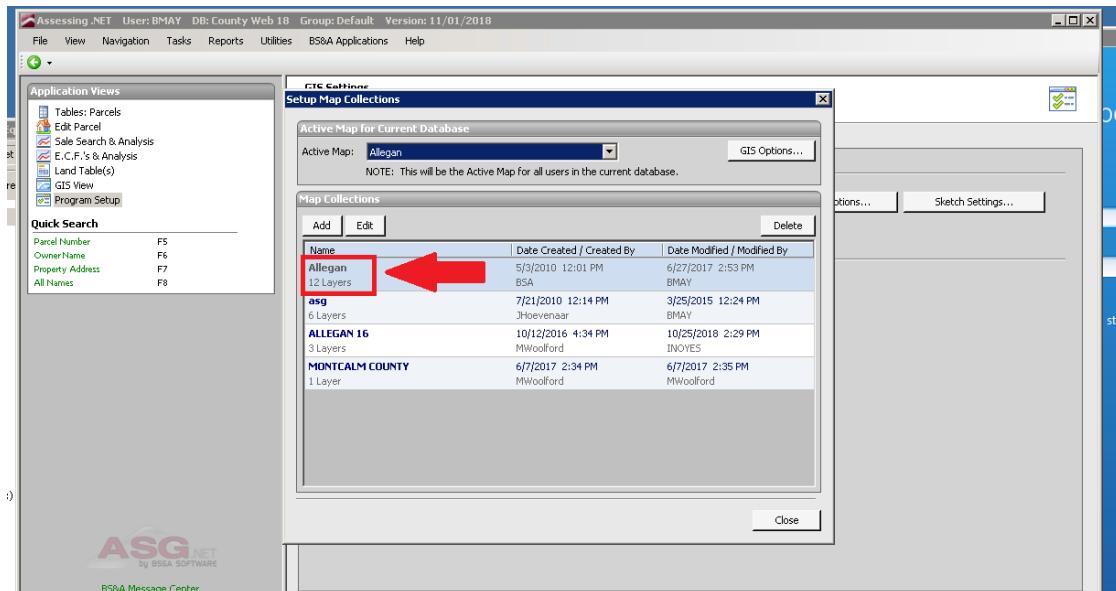


Figure 5.2: GIS Setup

## In Setup Layers

(BSA Settings Cont.)

Setup Layers ⇒ Add

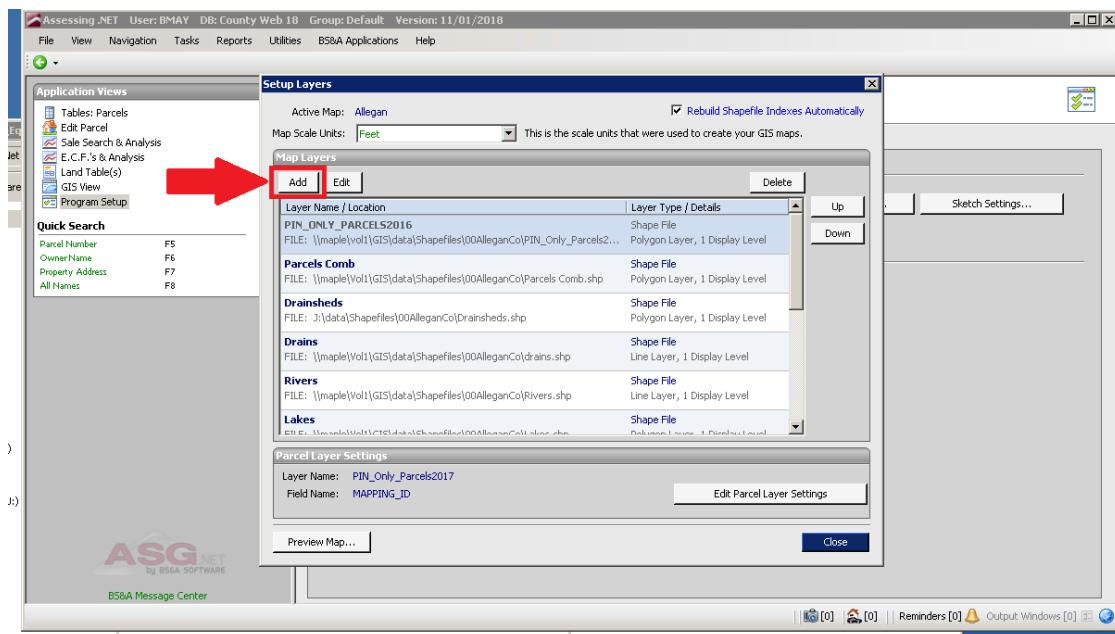


Figure 5.3: Layers Setup

## Select Layer Type

(BSA Settings Cont.)

Setup Layers ⇒ Select Image ⇒ OK

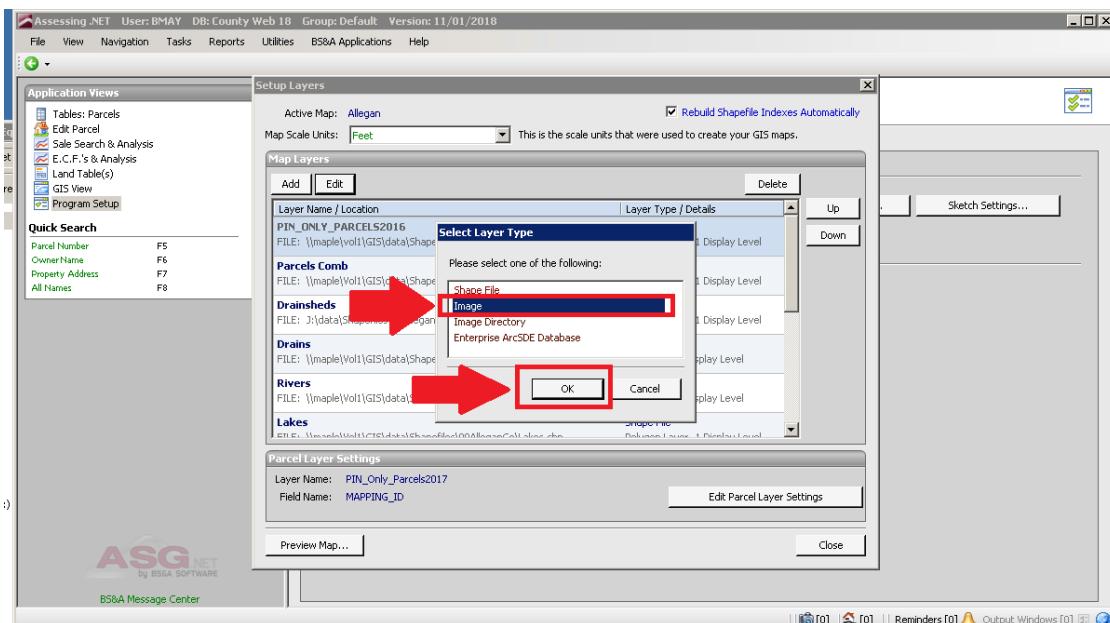


Figure 5.4: Select Layer Type

## Add Layer From Local Drive

(BSA Settings Cont.)

Navigate to Image File ⇒ Open

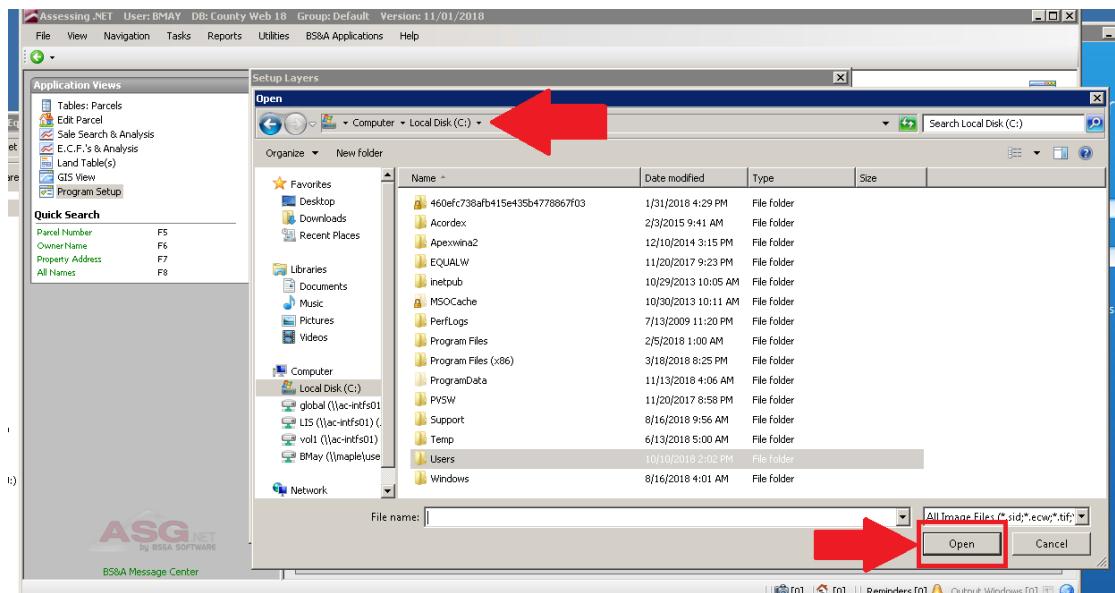


Figure 5.5: Add Layer From Drive

The new image is in the map

## 5.2 CORE DATA

### 5.2.1 CONTROL POINTS

# MAINTAINING CADASTRAL CONTROL POINTS

## Install the Fabric Point Move to Feature Addin

⇒ Push the Configure Button

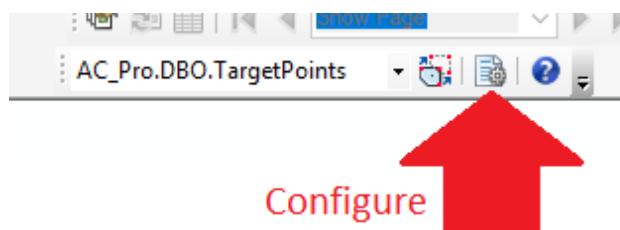


Figure 5.6: Fabric Point Move to Feature Addin

## Configure Addin

- Set Reference Feature Layer to TargetPoints
- Use point to point matching
- Use point layer field: PointID

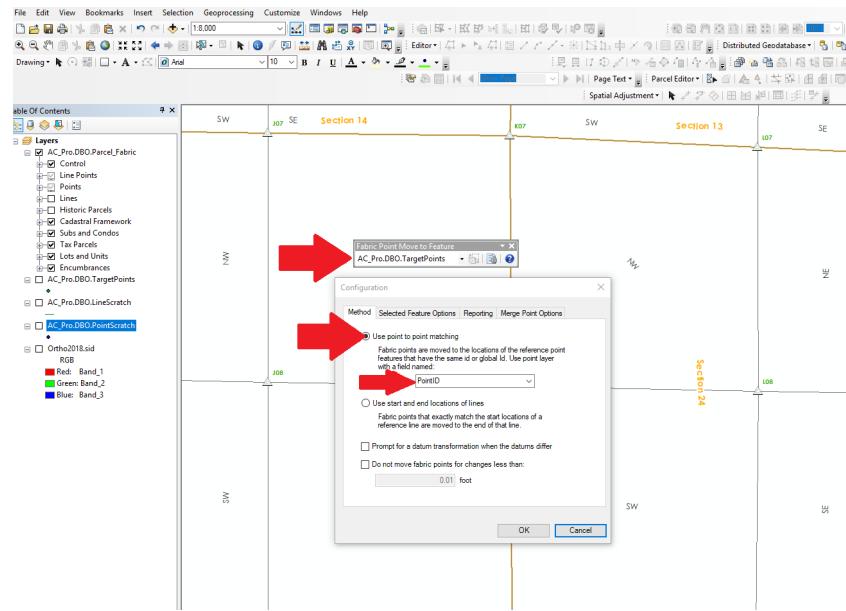


Figure 5.7: Addin Configuration Method

2

Configure Fabric Point Move to Feature addin Selected Feature Options  
Move Fabric Points of the Selected Parcels

Push OK

FabricPointMoveToFeatureConfigSelectedFeatures.png

3

Identify position of new control point

Select TargetPoints in Create Features Templates

Create Target Point at location for new Control Point

createTargetPoint.png

4

Use Identify tool to find ObjectId of Control Point that is to be moved

Select the Target point PointID of the point its moving to

Edit Target Point pointID attribute to match associated fabric control point OID

updateTargetPointPointID.png

4.5

Push move point button

moveControlPoint.png

5

Open maintain control point tool

Select control Point

push edit button

maintainControlPointTool.png

6

Use Identify Tool to View X and Y vals for the point

copy x and y value from point(attribute window) to Control (maintain control tool)

push update

Save Edits

transferCoordinates.png

Identify position of new control point

Place Target Point

Update Target Point attributes to associated fabric point OID

Push move point button

Zoom to Control point

Open maintain control point tool

---

Select control Point  
edit button  
copy x and y value from  
identify tool x and y of points  
update button

### 5.3 CORE DATA SCHEMA

## PROBLEM AND ANALYSIS

### Background

Allegan County GIS Services builds and maintains the geographic dataset used in workflows in and out of county government.

Equalization and GIS Services. Data is shared with EH, EQ, Dispatch and the public.

### Statement of Problem

Geographic data must be both maintained and shared. Data is maintained by

### Analysis

Here is where analysis of this problem goes

# DESIGN

## Overview

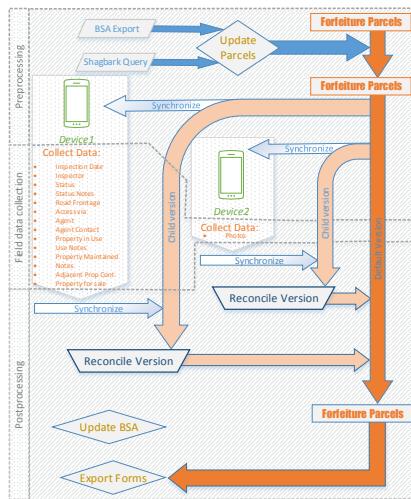


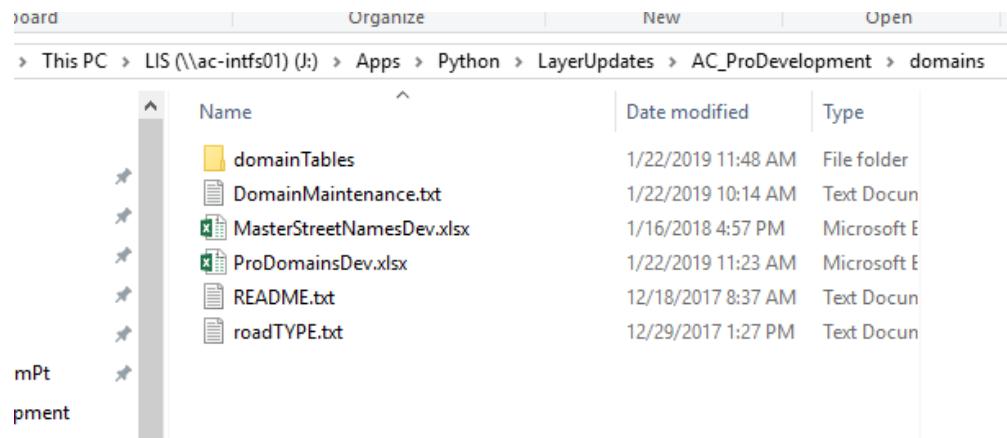
Figure 5.8: Project Design

### 5.3.1 PRODUCTION DATA AC PRO

## DOMAINS

### Directory Location

Managed at this location:



The screenshot shows a Windows File Explorer window with the following details:

Address bar: This PC > LIS (\ac-intfs01) (J:) > Apps > Python > LayerUpdates > AC\_ProDevelopment > domains

File list:

| Name                      | Date modified      | Type            |
|---------------------------|--------------------|-----------------|
| domainTables              | 1/22/2019 11:48 AM | File folder     |
| DomainMaintenance.txt     | 1/22/2019 10:14 AM | Text Document   |
| MasterStreetNamesDev.xlsx | 1/16/2018 4:57 PM  | Microsoft Excel |
| ProDomainsDev.xlsx        | 1/22/2019 11:23 AM | Microsoft Excel |
| README.txt                | 12/18/2017 8:37 AM | Text Document   |
| roadTYPE.txt              | 12/29/2017 1:27 PM | Text Document   |

Figure 5.9: Directory Location of Workspace

### Domain Documentation

This is where...  
⇒ Push the Configure Button

## 5.4 ESRI TOOLS

### 5.4.1 COGO TOOLS IN ARCGIS

TEXT

---

## 5.5 GIS ADMINISTRATION

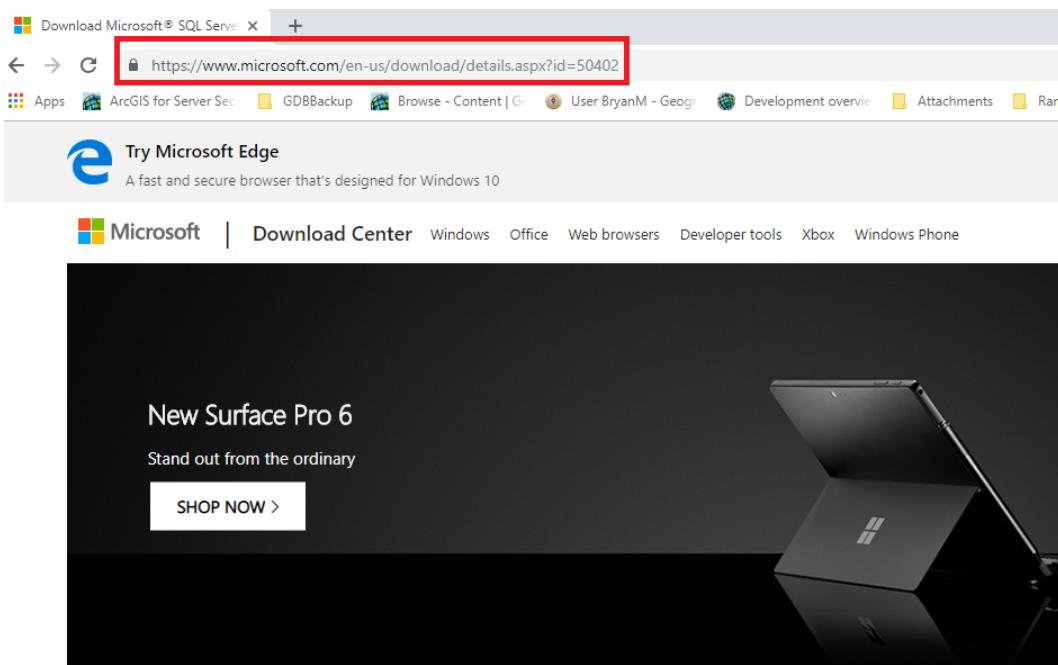
### 5.5.1 NEW CONNECTIONS IN ARCCATALOG

#### INSTALL SQL SERVER ON CLIENT MACHINE

On client machine:

For any machine to connect to the Enterprise Geodatabase, SQL Server Native Client must be installed locally.

Search for sql server native client download on the internet



Microsoft® SQL Server® 2012 Native Client - QFE

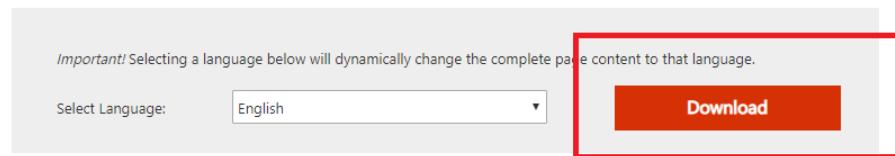
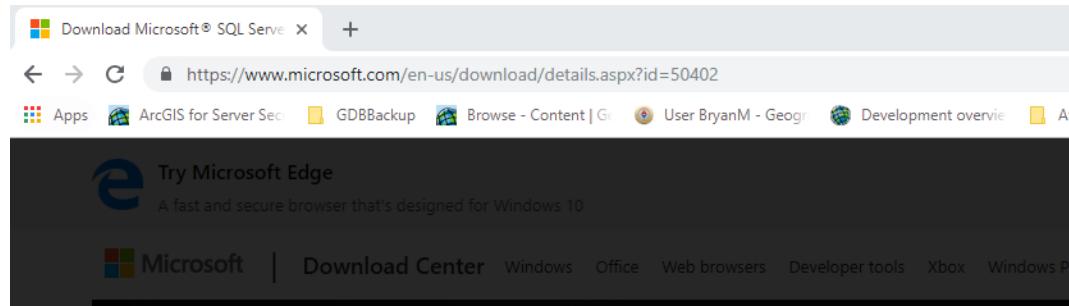


Figure 5.10: SQL Server Client Search

## Select appropriate Version

Decide whether to get the 32bit or 64bit version



Choose the download you want

| File Name          |               | Size   |
|--------------------|---------------|--------|
| ENU\x64\sqlcli.msi | For 64bit OS  | 4.8 MB |
| ENU\x86\sqlcli.msi | For 32 bit OS | 3.0 MB |

Figure 5.11: SQL Server Client Search Choose

Download and Install

## CONNECT ARCGIS TO A SQL SERVER DATABASE In Catalog:

Double click on add database connection

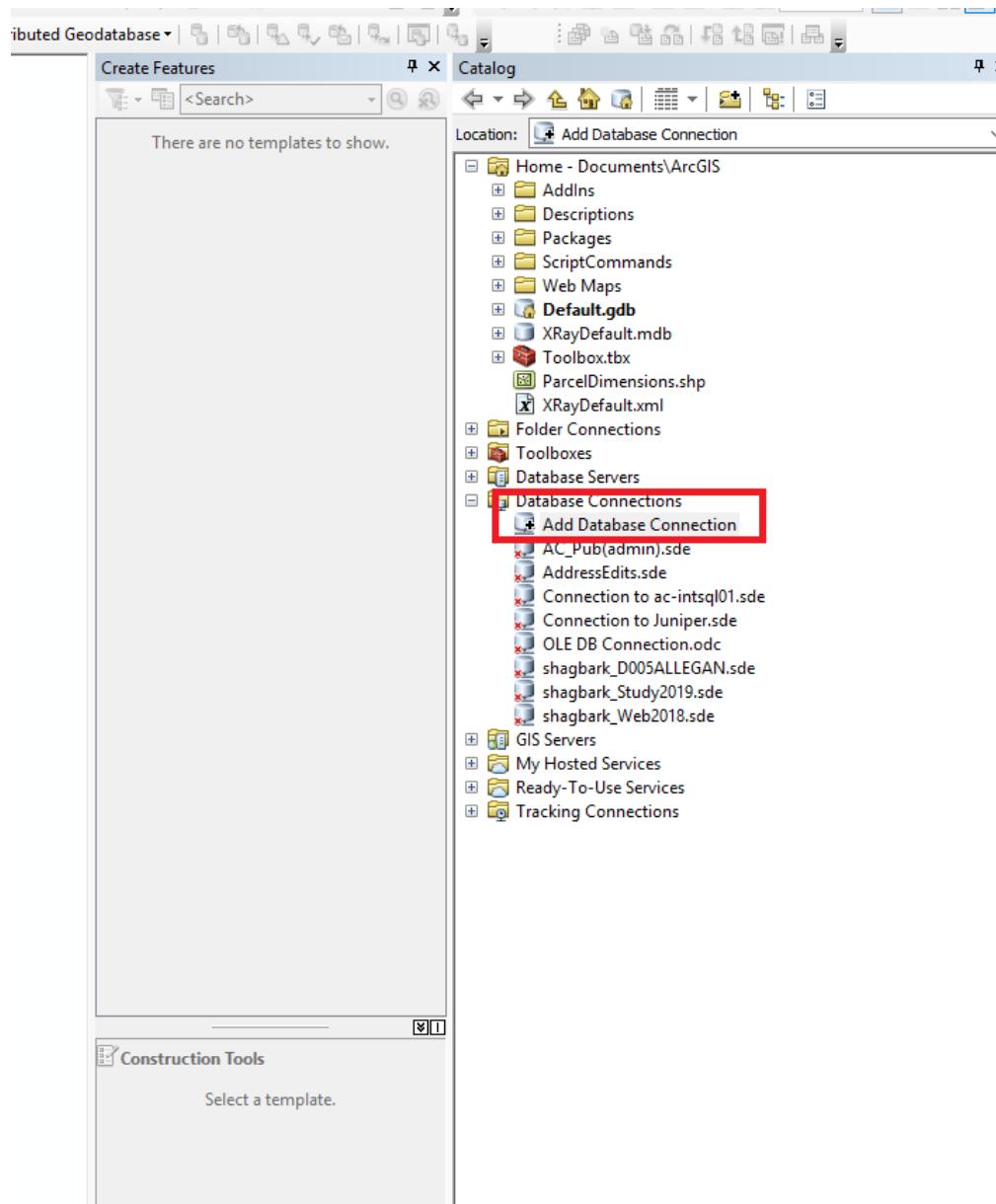


Figure 5.12: Catalog Add Db Connection

## NEW CONNECTION DIALOG

### Enter into the tool

- Select Database Platform
- Enter Instance Name
- Enter user name and password
- Check Save user name and password
- Select Database in dropdown

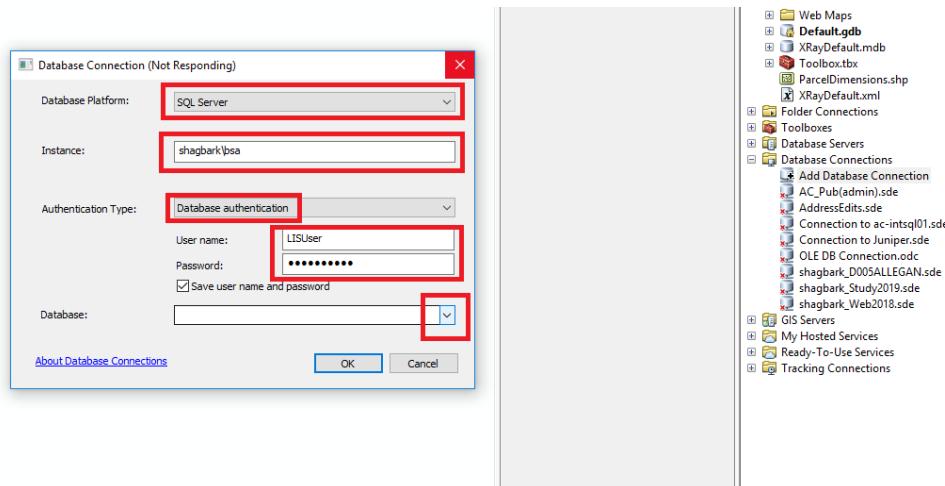


Figure 5.13: Catalog Add Database Connection

## 5.5.2 CREATE QUERY IN ArcGIS TO SQL DATABASE

### ADD QUERY LAYER

#### In ArcMap:

Open the New Query Layer Dialog

Go to  $\Rightarrow$  File  $\Rightarrow$  Add Data  $\Rightarrow$  Add Query Layer In the connection dropdown select your connection

#### NOTE

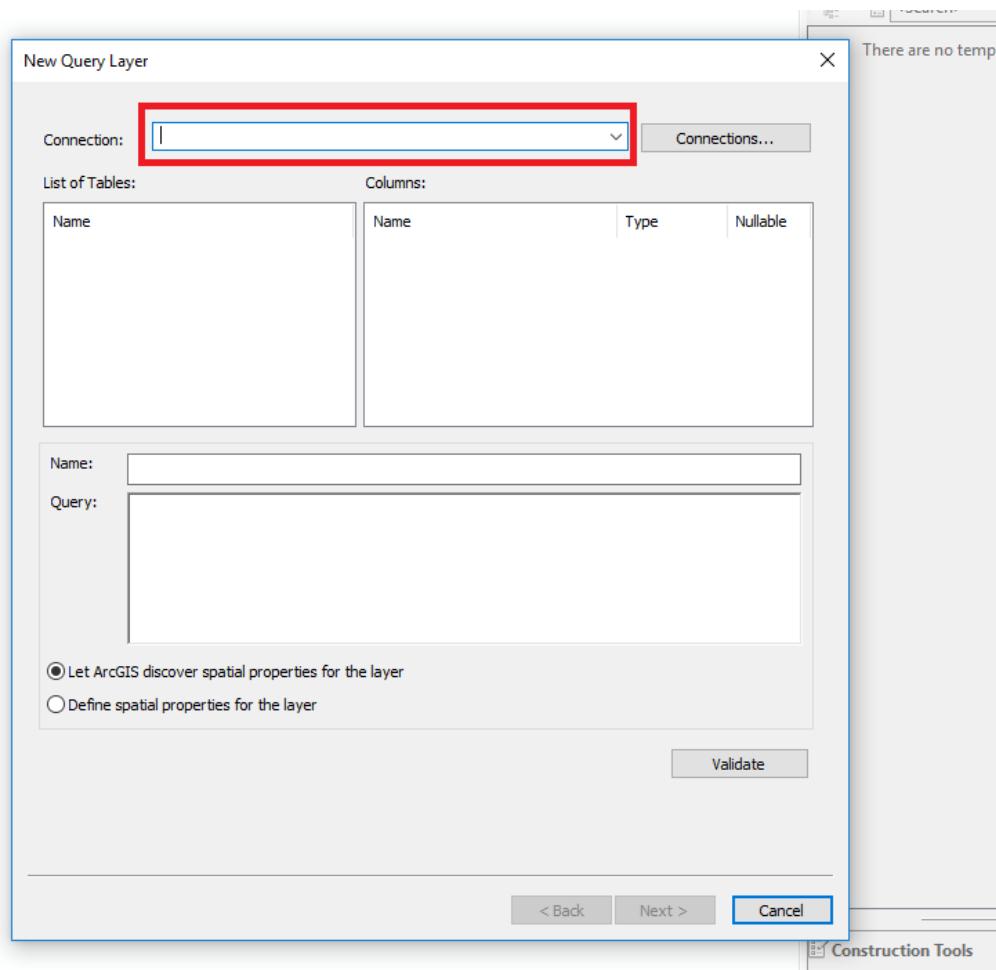


Figure 5.14: New Query Layer Dialog

## DETAILS OF THE QUERY LAYER

### Enter into the tool

- Choose connection
- Name the query
- Enter SQL query
- Press Next

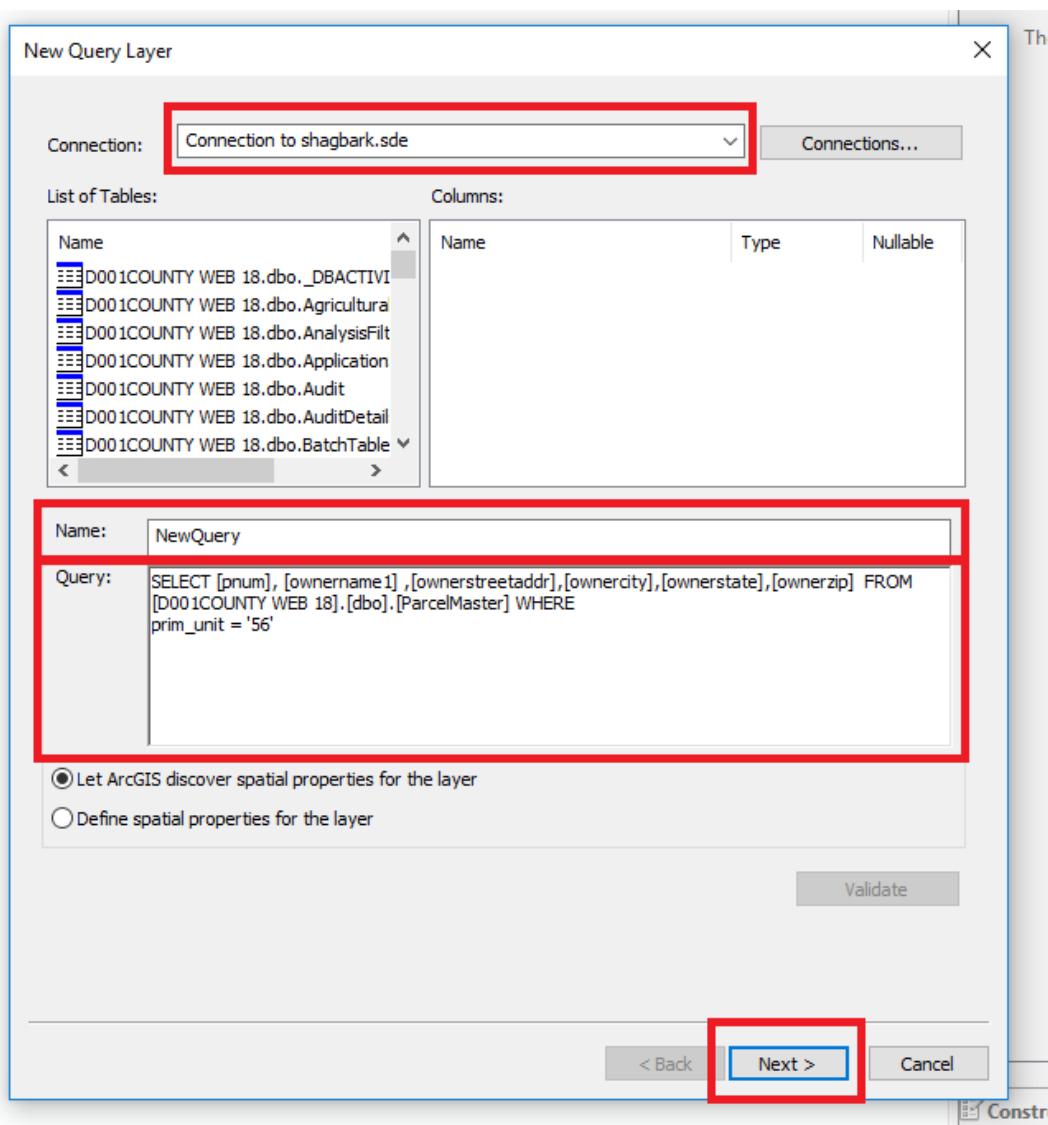


Figure 5.15: Query Layer Dialog Filled

## MORE DETAILS OF THE QUERY LAYER

### Enter into the tool

- Select unique identifier field
- Click Finish

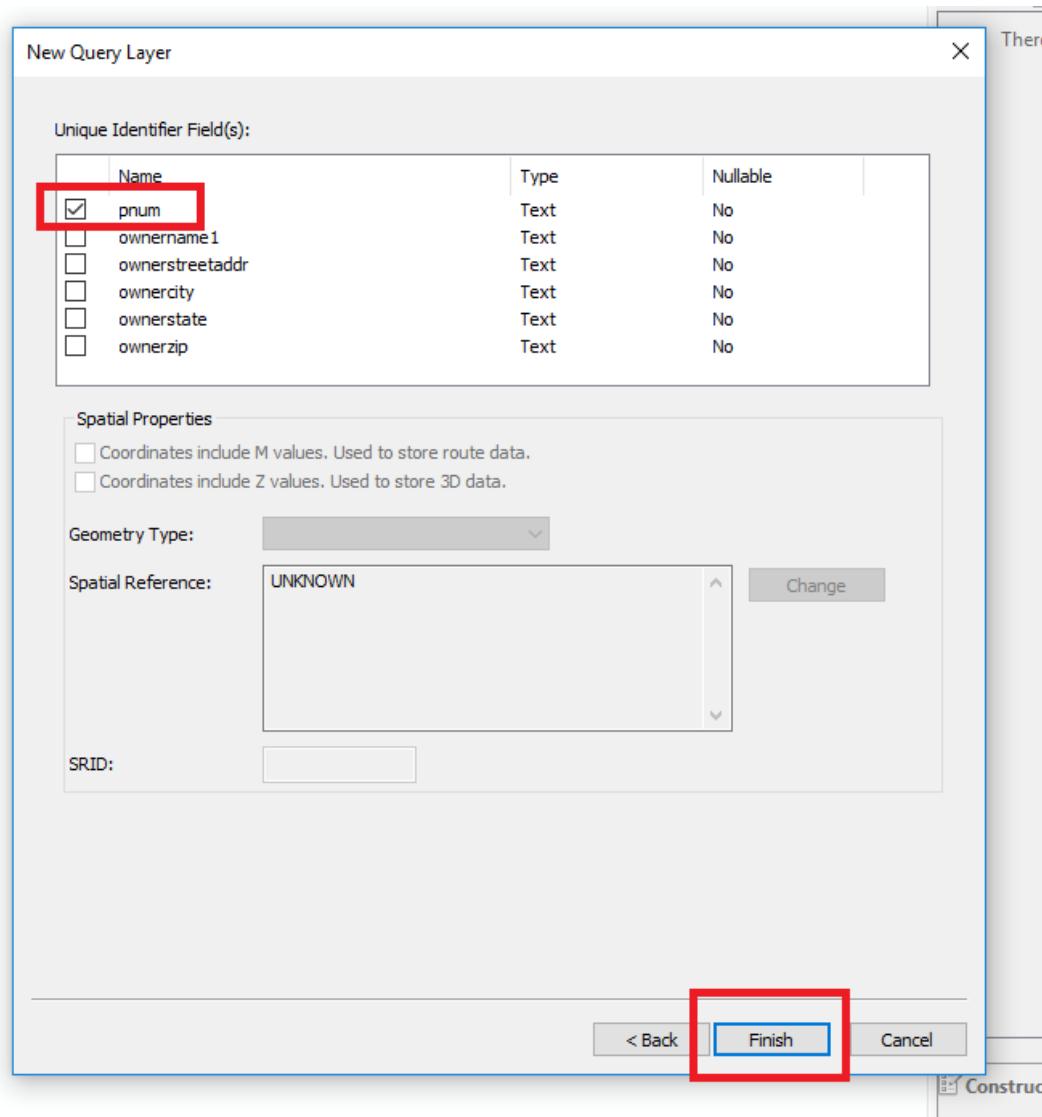


Figure 5.16: Select Unique Identifier

## OPEN RESULTS TABLE

### Verify the Query by Looking at the Table

The screenshot shows the ArcGIS Pro interface with the 'Table Of Contents' pane on the left and the 'Editor' pane on the right. In the Table Of Contents, a folder labeled 'Layers' contains a single item: 'D001COUNTY WEB 18.DBO.NewQuery'. This item is highlighted with a red rectangle. The Editor pane displays a results table titled 'D001COUNTY WEB 18.DBO.NewQuery'. The table has the following columns:

| prnum         | ownername1                           | ownerstreetaddr         | ownercity    | ownerstate | ownerzip | ESRI_OID |
|---------------|--------------------------------------|-------------------------|--------------|------------|----------|----------|
| 56-004-001-10 | WAGNER LONNE J & EMMA                | 792 135TH AVE           | WAYLAND      | MI         | 49348    | 1        |
| 56-004-002-20 | GUN LAKE COMMUNITY CHURCH            | 12200 WEST M-179        | WAYLAND      | MI         | 49348    | 2        |
| 56-004-003-30 | WAYLAND UNION SCHOOLS                | 850 E SUPERIOR ST       | WAYLAND      | MI         | 49348    | 3        |
| 56-005-001-10 | CITY OF WAYLAND                      | 103 S MAIN ST           | WAYLAND      | MI         | 49348    | 4        |
| 56-005-002-20 | CITY OF WAYLAND                      | 103 S MAIN ST           | WAYLAND      | MI         | 49348    | 5        |
| 56-005-002-20 | MAAS WAYLAND LLC                     | 1845 BIRMINGHAM DR      | LOWELL       | MI         | 49331    | 6        |
| 56-005-002-20 | ELLIOTT BAY HEALTHCARE REALTY II     | 6117 EASTLAKE AVE E     | SEATTLE      | WA         | 98109    | 7        |
| 56-005-002-20 | CITY OF WAYLAND                      | 103 S MAIN ST           | WAYLAND      | MI         | 49348    | 8        |
| 56-005-002-30 | RIPARIAN PROPERTIES LLC              | 879 E SUPERIOR ST       | WAYLAND      | MI         | 49348    | 9        |
| 56-005-002-40 | RIPARIAN PROPERTIES LLC              | 879 E SUPERIOR ST STE A | WAYLAND      | MI         | 49348    | 10       |
| 56-005-002-41 | VIS VENTURES WAYLAND LLC             | 235 140TH AVE           | WAYLAND      | MI         | 49348    | 11       |
| 56-005-002-40 | CITY OF WAYLAND                      | 103 S MAIN ST           | WAYLAND      | MI         | 49348    | 12       |
| 56-005-003-10 | LAWRENCE ANDRE W & JUDITH            | 841 E SUPERIOR ST       | WAYLAND      | MI         | 49348    | 13       |
| 56-005-003-30 | REINER SUZANNE M                     | 841 E SUPERIOR ST       | WAYLAND      | MI         | 49348    | 14       |
| 56-005-006-00 | STORA RODERICK M & MELISSA K         | 841 E SUPERIOR ST       | WAYLAND      | MI         | 49348    | 15       |
| 56-005-006-10 | ARY DOUGLAS & JULE                   | 104 MARLO LN            | WAYLAND      | MI         | 49348    | 16       |
| 56-005-006-20 | DUBAY DOUGLAS                        | 102 MARLO LN            | WAYLAND      | MI         | 49348    | 17       |
| 56-005-007-00 | CONNOR MOLLY                         | 815 EAST SUPERIOR       | WAYLAND      | MI         | 49348    | 18       |
| 56-005-007-10 | BENNETT JILL & CARRON BIANCE         | 2514 BRIDGEPORT LN      | GRAND RAPIDS | MI         | 49508    | 19       |
| 56-005-007-20 | VILELLA MATTHEW                      | 101 MARLO LN            | WAYLAND      | MI         | 49348    | 20       |
| 56-005-007-21 | JENSEN KRISTEN S                     | 103 MARLO LN            | WAYLAND      | MI         | 49348    | 21       |
| 56-005-008-00 | WAYLAND CHRISTIAN REF CHURCH         | 303 E ELM STREET        | WAYLAND      | MI         | 49348    | 22       |
| 56-005-008-00 | CITY OF WAYLAND                      | 103 S MAIN ST           | WAYLAND      | MI         | 49348    | 23       |
| 56-005-010-00 | FINANCING VI HEALTHCARE PROPERTY/LLC | 8181 WORTHINGTON ROAD   | WESTERVILLE  | OH         | 43082    | 24       |
| 56-005-011-00 | CITY OF WAYLAND                      | 103 S MAIN ST           | WAYLAND      | MI         | 49348    | 25       |
| 56-005-011-10 | FERGUSON ROBERT K                    | 5770 VENTURE PARK       | KALAMAZOO    | MI         | 49009    | 26       |
| 56-005-012-00 | REDSTONE LAND DEVELOPMENT LLC        | 3330 GRAND RIDGE DR NE  | GRAND RAPIDS | MI         | 49525    | 27       |
| 56-005-012-10 | VANDEROVORD JOHN C & NANCY L         | 542 FORREST ST          | WAYLAND      | MI         | 49348    | 28       |
| 56-005-013-10 | L AND M LLC                          | 2645 24TH AVE           | HUDSONVILLE  | MI         | 49426    | 29       |
| 56-005-013-10 | JESTER LLC                           | 137 124TH AVE           | SHELBYVILLE  | MI         | 49344    | 30       |
| 56-005-014-00 | OPPERMAN JOHN C                      | 125 OAK ST              | WAYLAND      | MI         | 49348    | 31       |
| 56-005-015-00 | REDSTONE LAND DEVELOPMENT LLC        | 3330 GRAND RIDGE DR NE  | GRAND RAPIDS | MI         | 49525    | 32       |
| 56-005-016-00 | WALKER MICHAEL                       | 131 OAK ST              | WAYLAND      | MI         | 49348    | 33       |
| 56-005-017-00 | FLUIT MARK & MARYELLEN               | 137 OAK ST              | WAYLAND      | MI         | 49348    | 34       |
| 56-005-018-00 | GUTTERREZ SAUL O & ORTIZ CHRISTINA   | 119 OAK ST              | WAYLAND      | MI         | 49348    | 35       |
| 56-005-019-00 | MICHIGAN STATE POLICE #56            | 544 N MAIN ST           | WAYLAND      | MI         | 49348    | 36       |
| 56-005-020-00 | WILLIAMS TERESA A                    | 540 N MAIN ST           | WAYLAND      | MI         | 49348    | 37       |
| 56-005-021-00 | KEMP HOLDINGS LLC                    | 304 108TH ST            | CALEDONIA    | MI         | 49316    | 38       |
| 56-005-022-00 | SLOAN JOHN L & AMY L                 | 329 WILLOW RUN DR       | WAYLAND      | MI         | 49348    | 39       |

Below the table, status indicators show '(0 out of 1666 Selected)' and 'D001COUNTY WEB 18.DBO.NewQuery'.

Figure 5.17: Query Results Table

### 5.5.3 ENTERPRISE GEODATABASE MAINTENANCE

## ENTERPRISE GEODATABASE COMPRESSION ROUTINE

### Disconnect All Users

To disconnect the GIS Server, stop all services

- In ArcGIS Server Manager ⇒ Site ⇒ GIS Server ⇒ Machines ⇒ Stop all Services

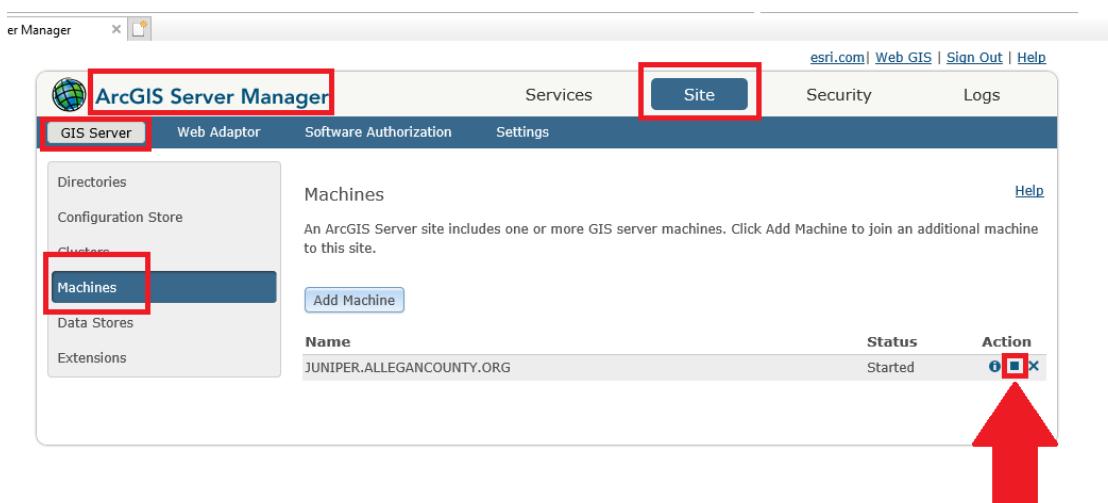


Figure 5.18: Stop ArcGIS Server

Use the Search tool to find the Rebuild Indexes Tool

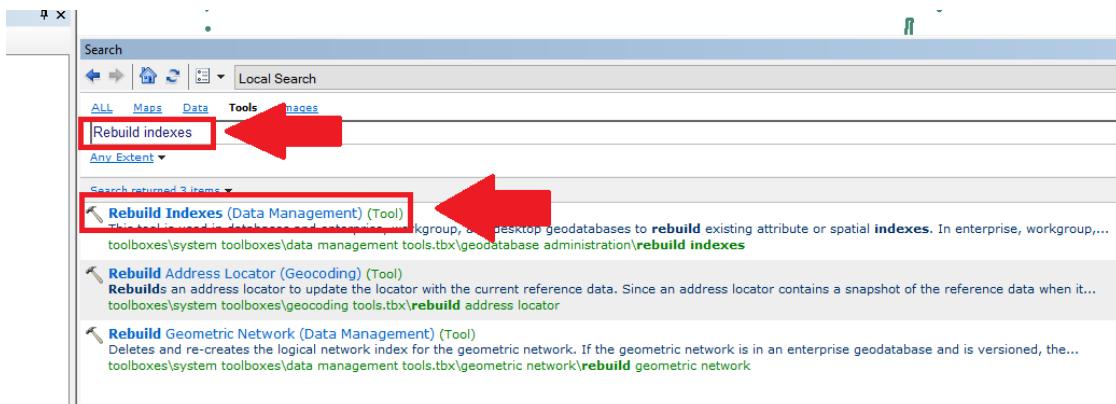


Figure 5.19: Find Rebuild Indexes Tool

## Rebuild Indexes

Select Connection ⇒ Include System Tables ⇒ Select All ⇒ Press OK

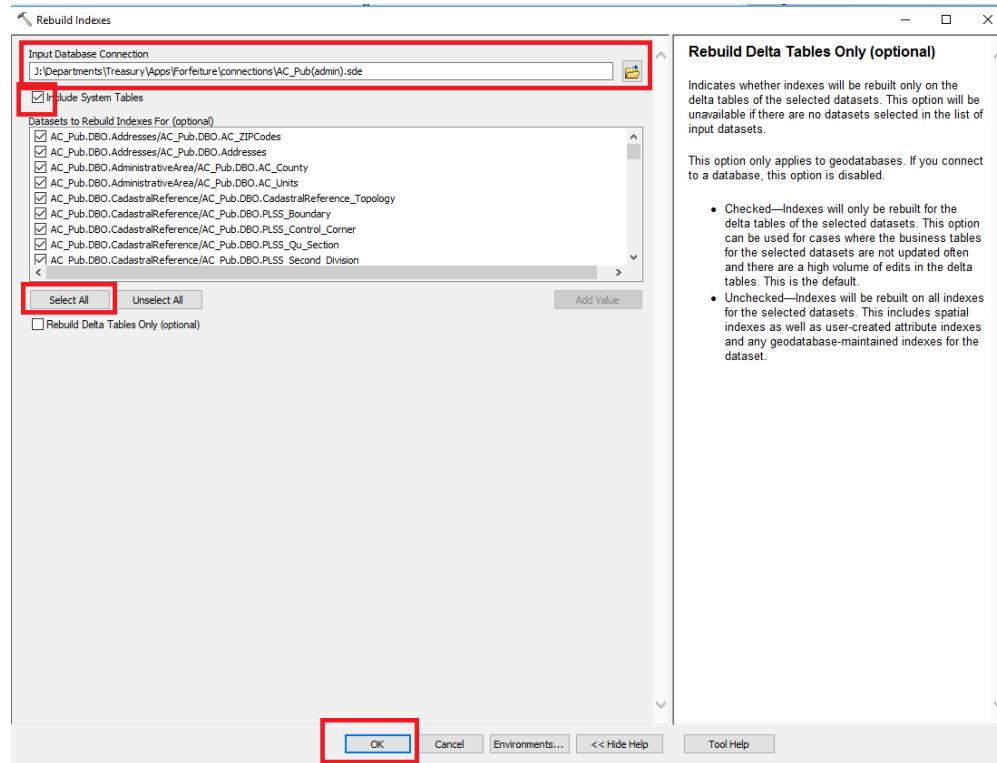


Figure 5.20: Rebuild Indexes Tool Operation

## Recalculate Statistics

In the Analyze Datasets Tool:

Select Connection ⇒ Include System Tables ⇒ Select All ⇒ Press OK

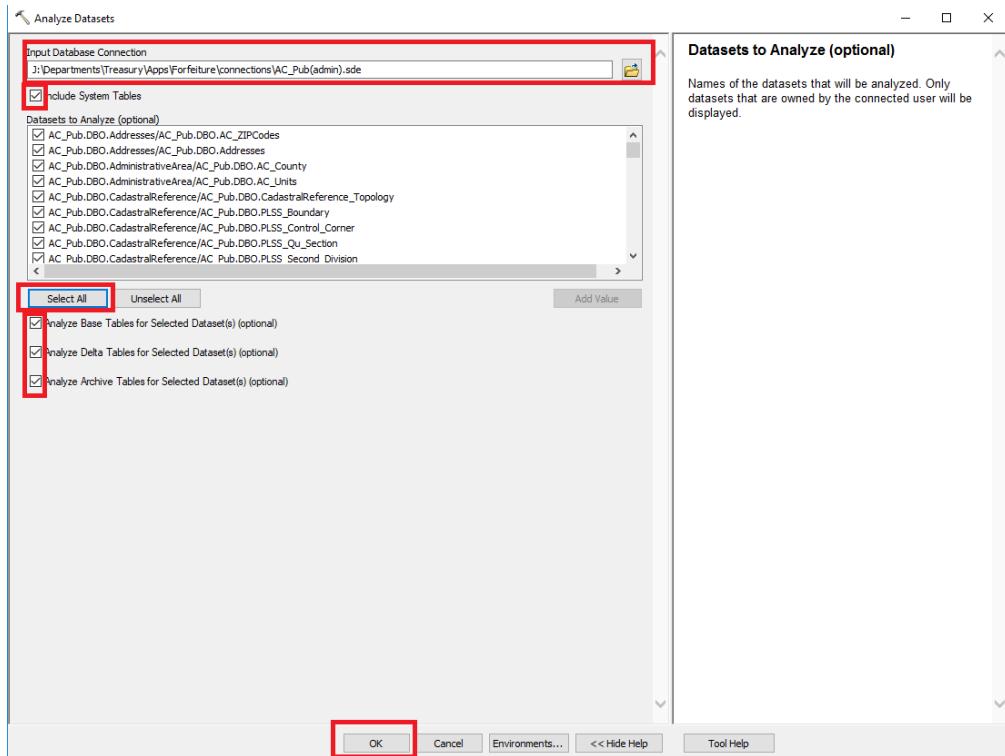


Figure 5.21: Recalculate Statistics

## Compress

Select Connection ⇒ Press OK

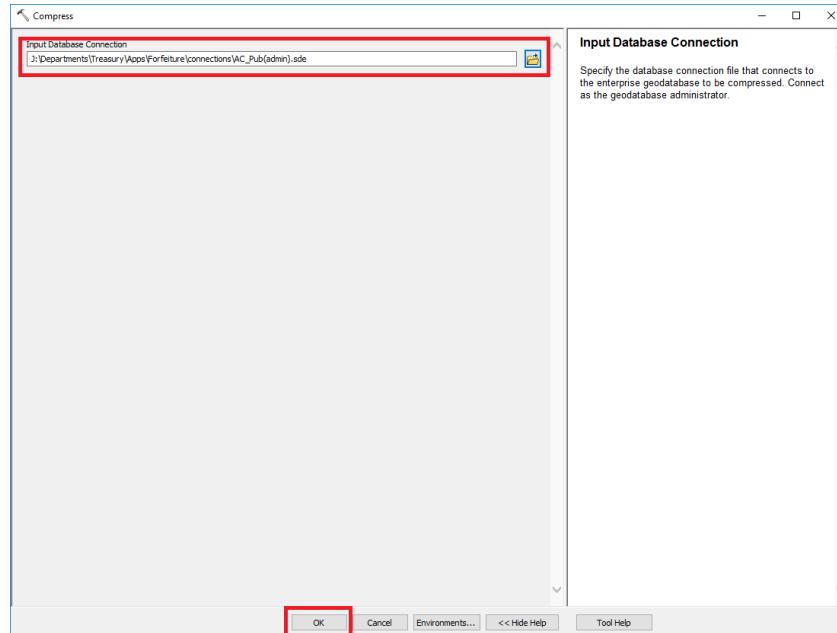


Figure 5.22: Compress

## Rebuild Indexes Again

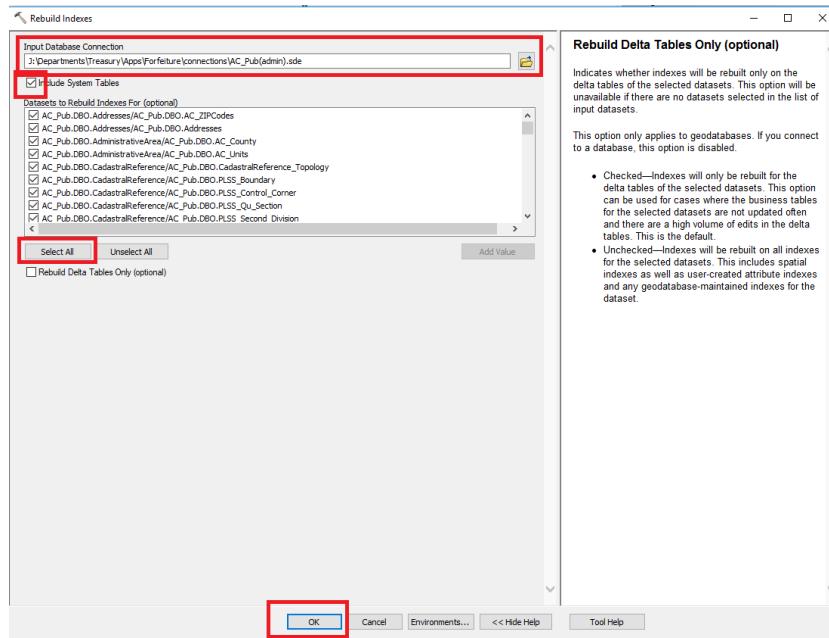


Figure 5.23: Rebuild Indexes Tool Operation

## Recalculate Statistics Again

In the Analyze Datasets Tool:

Select Connection ⇒ Include System Tables ⇒ Select All ⇒ Press OK

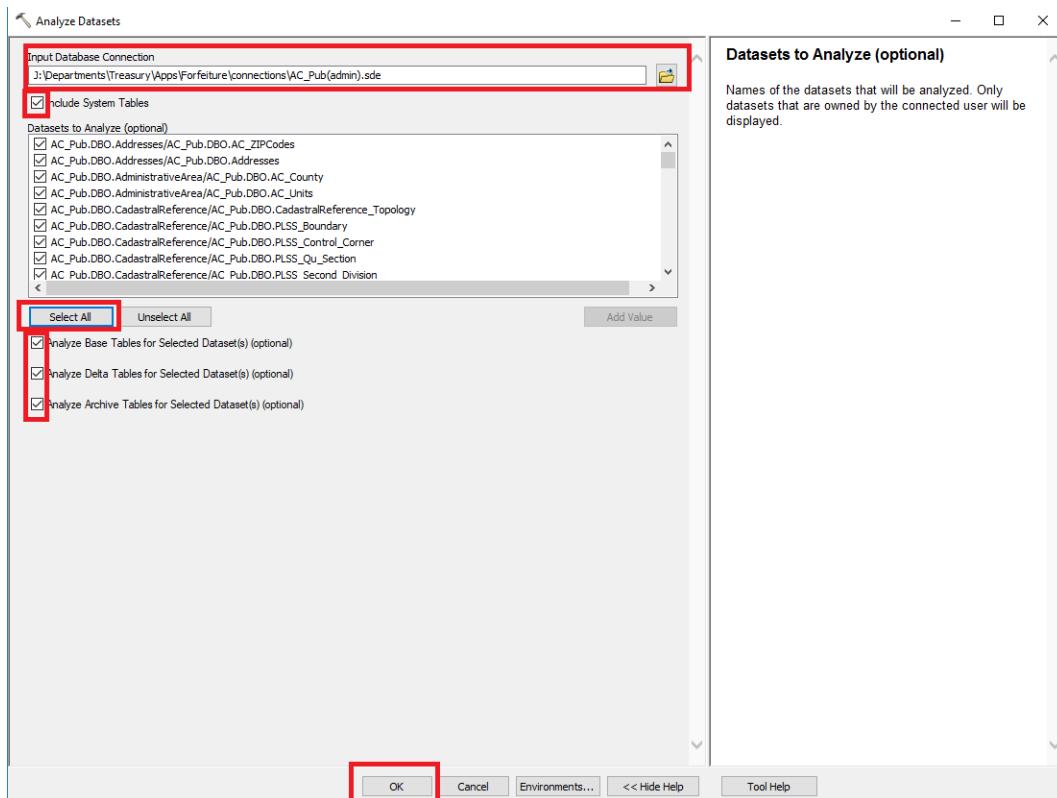


Figure 5.24: Recalculate Statistics

### 5.5.4 MANAGING MAP SERVICES

## TO STOP ARCGIS SERVER

### Launch ArcGIS Server Manager

Site ⇒ GIS Server ⇒ Machines ⇒ Stop the Server

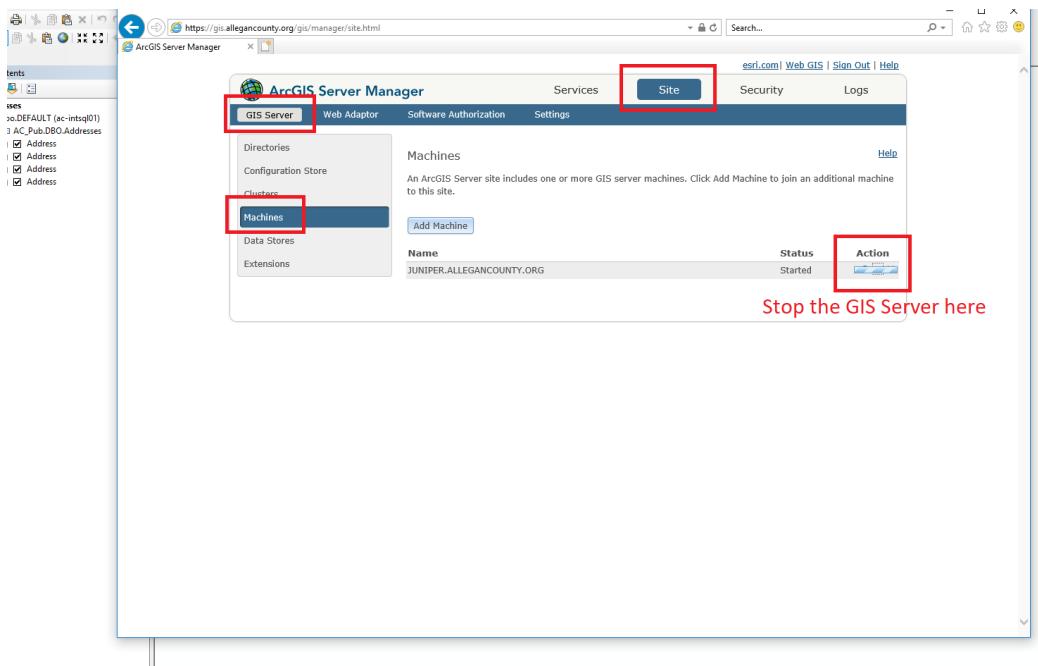


Figure 5.25: Stop the GIS Server

## FIXING DAMAGED SERVICES

### Error:

Service is currently being configured by another administrative operation

### Remedy:

This tech support article applies:

<https://support.esri.com/en/technical-article/000015549>

There are at least 2 ways to fix:

- Use the ArcGIS Server Account Utility
- Remove Lock Files

### Use the ArcGIS Server Account Utility

#### Access the GIS Server

To Log in to Juniper

windows R ⇒ mstsc

⇒ juniper

Use personal network credentials

---

## On the GIS Server (Juniper)

In Windows Search, find:

Configure ArcGIS Server Account Utility

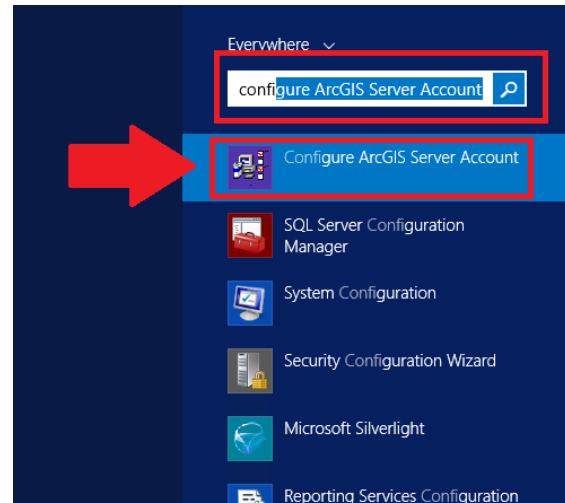


Figure 5.26: ArcGIS Server Account Utility

---

Use credentials:

PW: @lleganGxxxxxx

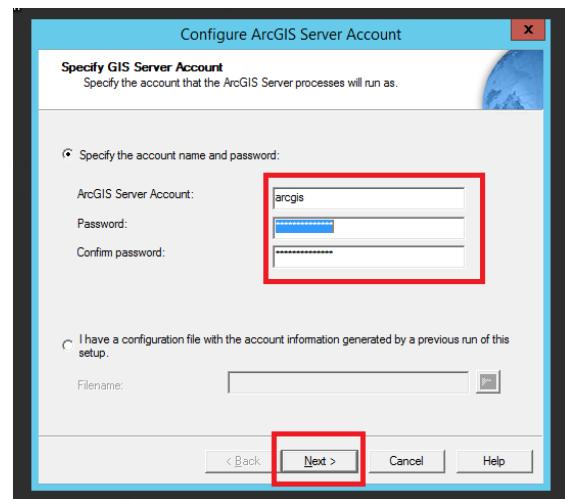


Figure 5.27: Account Utility Login

In the utility, paste these paths:

C:\arcgisserver\directories  
C:\arcgisserver\config-store  
C:\arcgisserver\logs

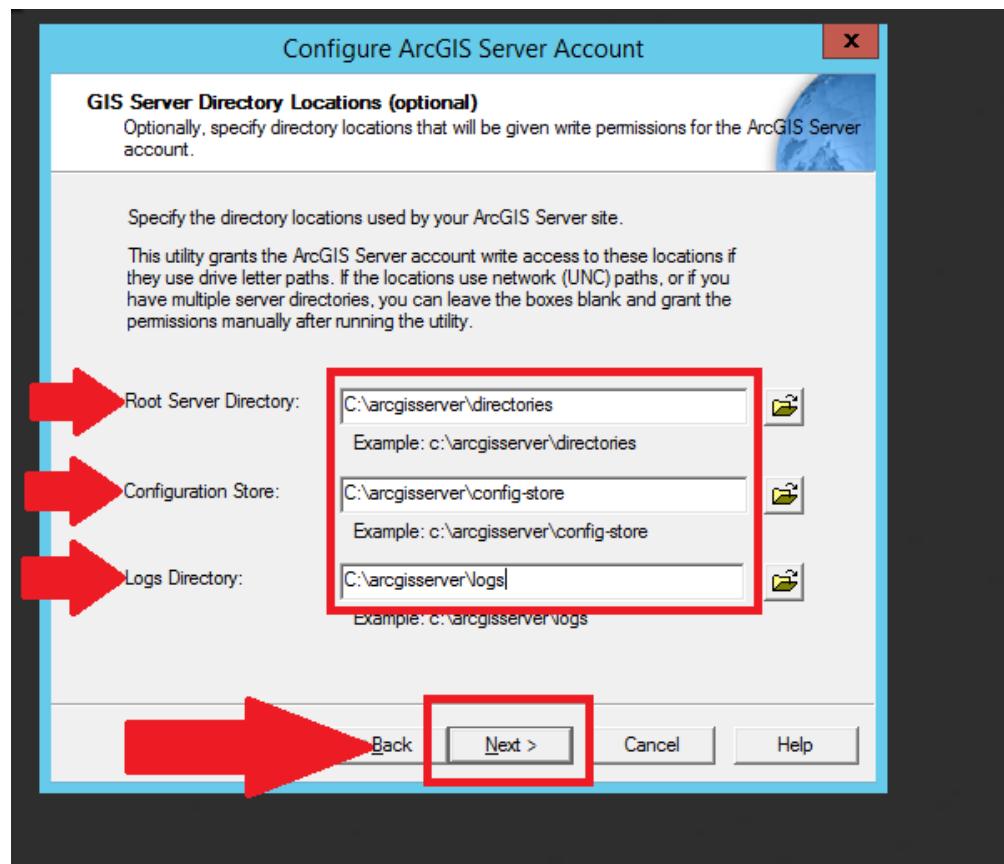


Figure 5.28: GIS Directory Locations Filled

**Push Next**

Select option **Do not export Configuration File**

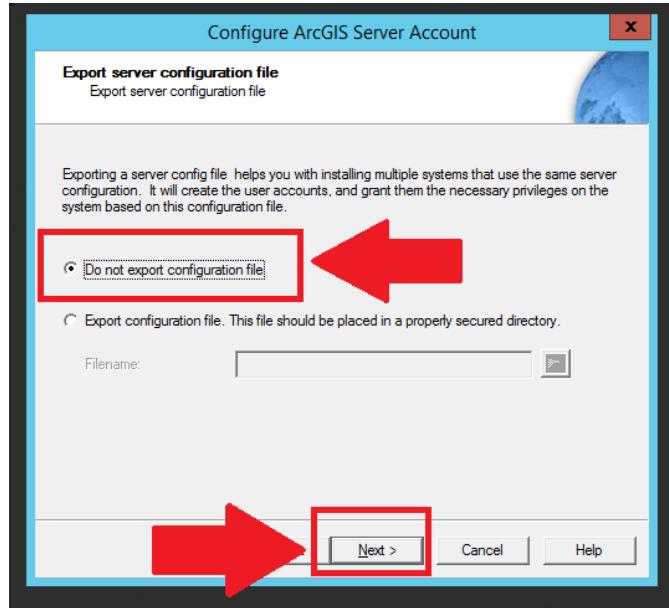


Figure 5.29: Do not Export Config File

**Push Next**

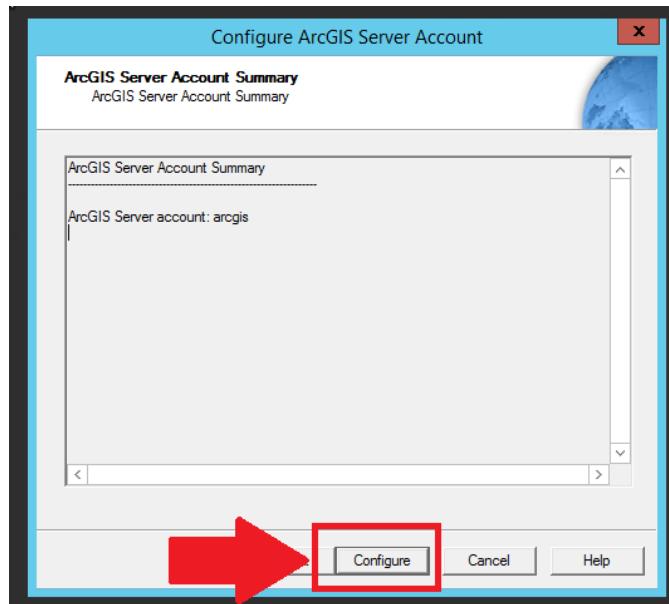


Figure 5.30: Configure Account

**Push Configure**

While the tool runs, open the service manager

In Windows Search, find: **Service Manger**

Launch **Service Manger**

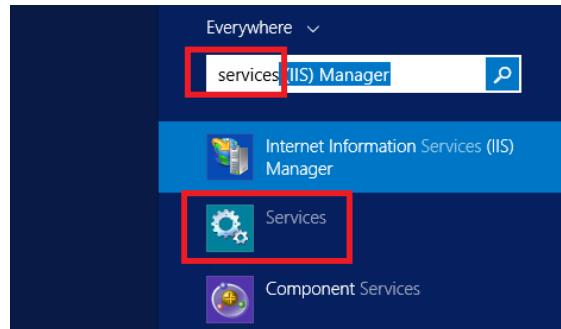


Figure 5.31: Search For Service Manager

When the tool completes, **Press Finish**

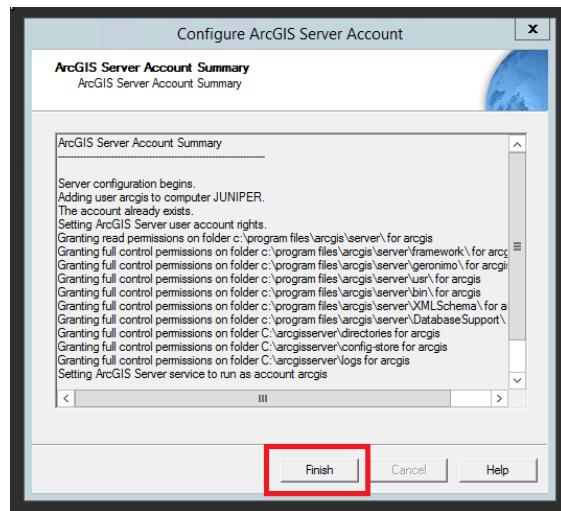


Figure 5.32: Finish On Configure

## Services Manager

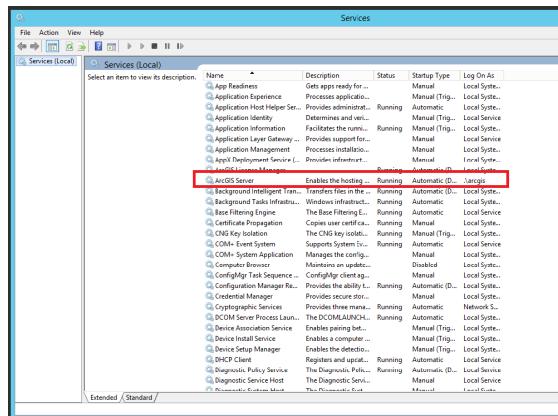


Figure 5.33: Open Services Manager

In services, select the ArcGIS Server service and restart the service. (Randy had to do this)

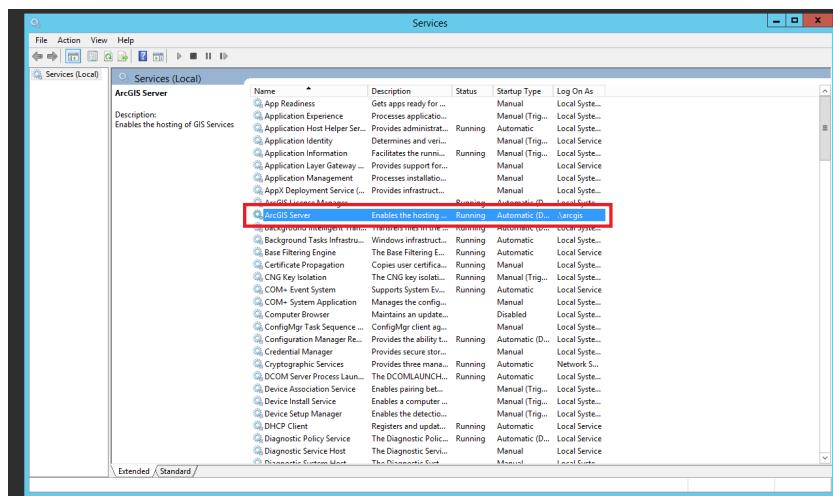


Figure 5.34: arcGis Service In Services Manager

## Quick and dirty fix

When a service get hung up in som admin process, you may get an error like:

### Error:

Service is currently being configured by another administrative operation

### Removing Lock Files

This may work, here is a blog about it

<https://community.esri.com/thread/103710> Network location for an example service

```
on juniper
C:\arcgisserver\config-store\services\ParcelViewer2\
PV2Adresses.MapServer\startup\JUNIPER.ALLEGANCOUNTY.ORG
```

Suggested Steps:

- 1) stop arcgis server services.
- 2) delete the lock files(\*.glock and \*.rlock )  
(in arcgisserver\config-store).
- 3) restart arcgis server service.
- 4) stop the pending stopping service and then start it.

mapservices would not stop so I try this:

<https://support.esri.com/en/technical-article/000012685>

Check permission levels for the arcGIS account ArcGisServerPermissions.PNG

If necessary, add the arcgis user to the permissions on the folders ArcGisServer-PermissionsAddUser.PNG

---

### 5.5.5 MANAGING GEODATABASE REPLICAS

## ADDING A NEW FEATURE CLASS TO A REPLICA

Source: <https://support.esri.com/en/technical-article/000010345>

### Summary

Currently, there is no out-of-the-box tool to add a feature class to an existing replica. With ArcGIS Desktop, one must either recreate the replica or if the workflow allows, replicate the new feature class as a separate replica.

### Steps:

The steps below outline how to recreate the replica using the Register Existing Data option in Desktop. These steps can be applied to both one-way and two-way replicas.

- Synchronize the changes between parent and child replica geodatabases using the existing replica so that the data is identical in each database, then Unregister the replica in both geodatabases. For two-way replicas, ensure that changes are synchronized in both directions and there are no outstanding edits before unregistering the replica.
- Create or import the new feature class into the parent geodatabase, and add the GlobalID.
- Register the newly added data as versioned.
- Copy and paste the new feature class to the child geodatabase using ArcCatalog.
- Note: that the GlobalIDs must have already been added to the feature class.
- For two-way replica or one-way full model, register the newly added data in child geodatabase as versioned.
- Using the parent geodatabase, add all the data that is to be replicated to a map in ArcMap.
- Click the 'Create Replica' tool on the Distributed Geodatabase toolbar.
- Select 'One way replica' or 'Two way replica' and click Next.
- Select 'Register existing data only'.
- Select the child geodatabase and specify a replica name.
- Click Next and click Finish.
- A new replica is created that includes the new data.

## 5.5.6 MANAGING GEODATABASE VERSIONS

### VERSION QUERIES

#### SQL Queries

Four queries of SDEversions, SDEstates, sdestatelineages, and SDEcompresslog

```
use AC_Pub
select name, owner, version_id, state_id, parent_name
, parent_owner from
[AC_Pub].[dbo].[SDE_versions]
select * from [AC_Pub].[dbo].[SDE_states] order by state_id
select * from [AC_Pub].[dbo].[sde_state_lineages] order
by lineage_name,
lineage_id
select TOP(5) * from [AC_Pub].[dbo].[SDE_compress_log] order by
compress_end DESC
```

Query of SDEversions and SDEstates

```
use AC_Pub
SELECT v.version_id,v.creation_time,v.creation_time,
s.state_id, s.creation_time
FROM SDE_versions v
INNER JOIN SDE_states s ON v.state_id = s.state_id
```

## FINDING ORPHANED VERSIONS

### Remove orphaned versions

Follow the procedure: [Link to source](#)

Use SQL Server Management Studio to execute two queries and compare the results.

#### Step 1:

Execute the query:

```
use AC_Pub
SELECT ObjectID, name from dbo.GDB_ITEMS where
TYPE='4ED4A58E-621F-4043-95ED-850FBA45FCBC';
```

#### Step 2:

Execute the query:

```
use AC_Pub
SELECT name from [dbo].[SDE_versions]
order by name
```

Compare the tables

This graphic summarizes elements of the queries. Note the items from step two

```

SQLQuery29.sql - A..._Pub (LISUser (59))  SQLQuery27.sql - A..._Pub (LISUser (54))
use AC_Pub
SELECT ObjectId, name from dbo.Gdb_Items where TYPE='4ED4A58E-621F-4043-95ED-850FBA45FCBC';
code for versions
in gdbItems

SQLQuery28.sql - A..._Pub (LISUser (57))
use AC_Pub
SELECT name from [dbo].[SDE_versions]
order by name

```

| ObjectID | name                           |
|----------|--------------------------------|
| 16497    | ProtoPubParcelPubReplica       |
| 16520    | ProtoPubLandUsePlanningReplica |
| 3        | SchoolsReplica                 |
| 4        | ElReplica                      |
| 5        | EmergencyMgmt                  |
| 6        | AddressesReplica               |
| 7        | EnvHealthReplica               |

|   | name                           |
|---|--------------------------------|
| 1 | CAddress_TrafficRevisionPar... |
| 2 | DEFAULT                        |
| 3 | JMoro_TrafficRevisionParc...   |
| 4 | 011V_SEND/17893/0              |
| 5 | SYNC_SEND/40559/12             |
| 6 | SYNC_SEND/40965/7              |

Figure 5.35: Find Orphan Versions

that have no match in step one.

Orphaned versions can be removed by name in ArcGIS

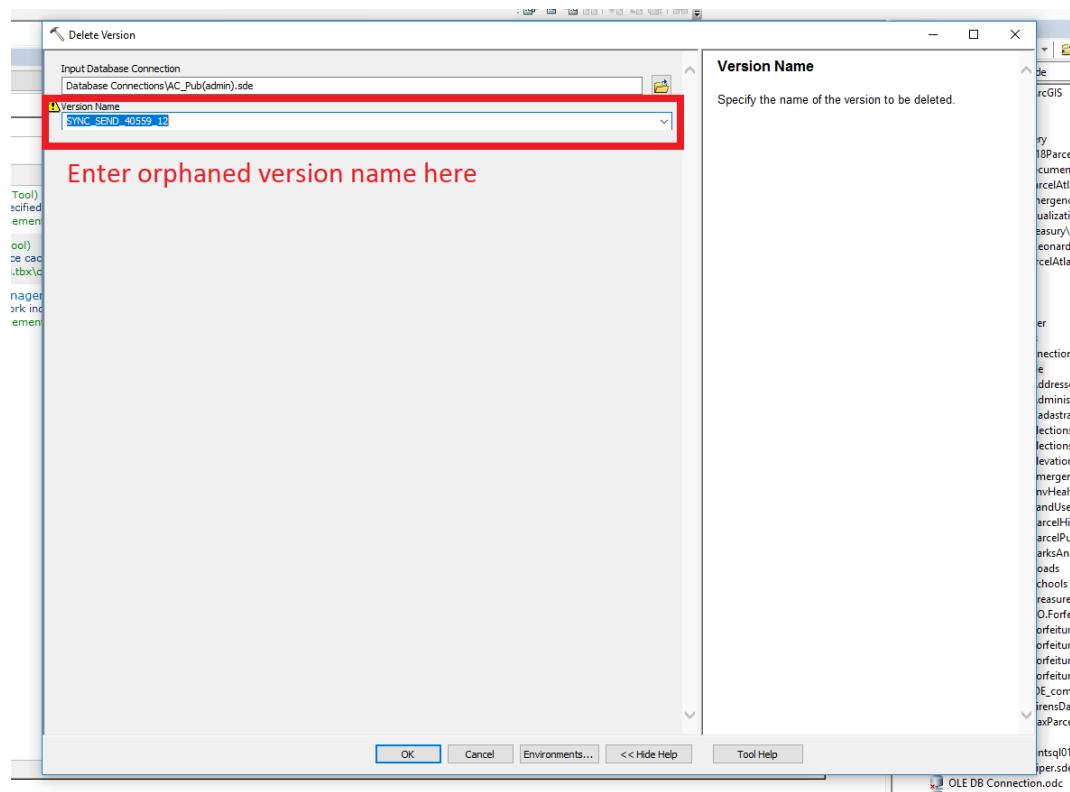


Figure 5.36: Delete Orphan Versions

### 5.5.7 MXD MANAGEMENT

#### FIND/REPLACE TEXT OBJECT

##### Python Code

Python Code for finding and replacing a text object in a ArcGIS .mxd file. A snippet of this code may be found in the LayerUpdates/Zoning/processing folder. It is used to edit the .mxd files located there.

```
import arcpy
from arcpy import env

env.workspace = r"J:\Apps\Python\LayerUpdates\zoning\processing"
for mxdname in arcpy.ListFiles("*.mxd"):
    print mxdname
    mxd = arcpy.mapping.MapDocument(r"J:\Apps\Python\
        LayerUpdates\zoning\processing\\\" + mxdname)
    for elm in arcpy.mapping.ListLayoutElements
        (mxd, "TEXT_ELEMENT"):
        if elm.text.startswith('As ammended'):
            elm.text = elm.text.replace('As ammended',
                'As amended')
            print elm.text
    mxd.save()
del mxd
```

## 5.6 L<sup>A</sup>T<sub>E</sub>X PACKAGES USED BY AC GIS

### 5.6.1 COMMON ERRORS

Source:

<https://www.ocf.berkeley.edu/~latex/files/commonerrors.tex>

If you have every compiled a L<sup>A</sup>T<sub>E</sub>X document, chances are high you have received a few error messages. Sometimes they come from something as stupid and as easy to fix as forgetting a parenthesis or forgetting to end an environment. There are also a lot more cases where you have no idea what you have done wrong and it takes you a long time to find or even understand your error.

The purpose of this is to explain some of the common errors that may happen when compiling a L<sup>A</sup>T<sub>E</sub>X document and suggestions for what is probably going on and how to debug your document.

## THE FORM OF AN ERROR

There are two forms of errors: L<sup>A</sup>T<sub>E</sub>X errors and T<sub>E</sub>X errors. In both types of errors, the part after the error message will tell you where the error occurred. An example:

1.15 <offending text>

The 1.15 tells you what line the error occurred on and the text will tell you the text that caused the error.

## L<sup>A</sup>T<sub>E</sub>X ERRORS

The general form of an error in L<sup>A</sup>T<sub>E</sub>X is shown below:

! LaTeX error: <error message>

See the LaTeX manual or LaTeX Companion for explanation.

Type H <return> for immediate help.

...

The ! lets you know that the error has occurred. The error message will tell you what type of error you have committed. After the ellipses, you will find the line at which the error occurred and the text that caused the error (or at least the text where L<sup>A</sup>T<sub>E</sub>X found the error).

# TEX ERRORS

Errors may also have the following form:

```
! <error message>
```

These errors are formatted differently because they are error messages that came from TeX instead of L<sup>A</sup>T<sub>E</sub>X. After the error, you will still find the line that the error occurred in and the text of the error.

# WARNINGS

There are some error messages that are just warnings and will not stop or change the compilation of the document. Chances are you have seen them many times.

## UNDERFULL

The following error results when a line does not extend the width of the page, something L<sup>A</sup>T<sub>E</sub>X always tries to accomplish:

```
Underfull \hbox (badness 10000) in paragraph at lines
104--107
```

This error message is just a warning and is not something to worry about. For the most part, when a line does not span the width of the page, it is because you have written something that you want to only cover part of the page.

## OVERFULL

The following error results when a line extends beyond the width of the page:

```
Overfull \hbox (16.04988pt too wide) in paragraph at
lines 30--31 [] [] \OT1/cmtt/m/n/12 I'm trying to put
way too much text into a line in my document.
```

Usually this error comes from when you are using the `verbatim` package because it will not move to the next line if your text does not go to the next line. The easiest way to fix this is to find the place in your document where this is occurring and change the text so that it fits to the page.

This error will still show up if the text is still on the page but outside of the width of text that L<sup>A</sup>T<sub>E</sub>X has set. In this case, you are welcome to fix things so that the error does not show up or you can leave the text as it is.

---

## REFERENCES

The following warnings occur when references are changed when L<sup>A</sup>T<sub>E</sub>X was compiled:

```
LaTeX Warning: Label(s) may have changed. Rerun to get  
cross-references right.
```

```
LaTeX Warning: There were undefined references.
```

```
LaTeX Warning: Reference 'name' on page 1 undefined on  
input line 15.
```

The way to fix these errors is to recompile the document again to correct the page numbers. Sometimes it is necessary to recompile the document twice to fix this error. You also may have defined a reference wrong, so you should check to make sure your label is correct.

## BEGINNING AND ENDING BEGIN ENDED BY END

This type of error occurs when each environment is not correctly started and ended. When you are missing an `\end` command, the following error will show up:

```
! LaTeX Error: \begin{enumerate} on input line 23  
ended by \end{document}.
```

To fix this, you need to end the environment mentioned in the error with the appropriate command.

When you are missing a `\begin` command, the following will appear:

```
! LaTeX Error: \begin{document} ended by  
\end{itemize}.
```

To fix this, you basically do the same thing as before, correctly beginning the environment mentioned in the error with the appropriate command.

## END OCCURRED INSIDE A GROUP

The following error message will show up at the end of compiling a file if an environment is begun that is not ended:

---

(\end occurred inside a group at level <n>)

To fix this error, make sure you end the environment that was begun. The previous error is more helpful in finding the \begin statement.

## ENDED BY END OF LINE

The following error will occur when you try to place a command inside a section heading:

```
! LaTeX Error: \verb ended by end of line.
```

See the LaTeX manual or LaTeX Companion for explanation.

Type H <return> for immediate help.

...

There will be many errors of the same type for this mistake. In order to find where you put the command, look in the output file and find the last heading that shows up.

## MISSING BEGIN DOCUMENT

This error is self-explanatory:

```
! LaTeX Error: Missing \begin{document}
```

## ERRORS USUALLY CAUSED BY BAD SPELLING

### UNKNOWN CONTROL SEQUENCE

This error results when you use a command (something that starts with a \) that is not recognized by L<sup>A</sup>T<sub>E</sub>X:

```
! Undefined control sequence.
```

Usually this error results from spelling a command incorrectly. Go to the line that is indicated by the error and fix the command.

---

## ENVIRONMENT UNDEFINED

This error results when you begin an environment with a `\begin` command that is not recognized:

```
! LaTeX Error: Environment verbatim undefined.
```

Usually you have just spelled your environment incorrectly, so you just need to fix it.

## BAD FILE NAME

This error results when you have mistyped the command `latex` or do not have L<sup>A</sup>T<sub>E</sub>X installed on your computer:

```
Bad command or file name
```

To fix this, correctly spell the command to compile your file or make sure that L<sup>A</sup>T<sub>E</sub>X is correctly installed on your computer.

## CANNOT FIND FILE NAME

This error occurs when you try to compile a file that the computer cannot find:

```
! I can't find file 'sample'.
<*> sample
```

Please type another input file name:

To fix this error, make sure you have spelled the file name correctly. You also may be in the wrong directory to compile the file, so check to make sure you are in the same directory as your file.

## FATAL ERRORS

### RUNAWAY ARGUMENT

This error happens when a paragraph ends before a command's argument is done (i.e., L<sup>A</sup>T<sub>E</sub>X thinks that there is a missing `}`):

```
Runaway argument?
```

---

To fix this, you should use a different command to accomplish what you are trying to do. An example of this is to use `\bfseries` instead of `\bftext` to make bold text in more than one paragraph.

This error can also be caused by a missing mandatory argument to a command.

## JUST AN \*

This error normally occurs when you do not end your document with `\end{document}`:

\*

If you are prompted to enter something in, it is best to enter `\end{document}` and hope it works. Be sure to end your document with the appropriate command.

## EMERGENCY STOP

This error happens when L<sup>A</sup>T<sub>E</sub>X will stop trying to compile your document due to a serious error:

`! Emergency stop.`

To fix this error, you will need to figure out what caused it to stop compiling. Chances are you forgot to end your document with `\end{document}`, but there might also be another reason for the emergency stop.

## PLEASE TYPE A COMMAND OR SAY END

This error happens when your file has ended prematurely:

(Please type a command or say ‘`\end`’)

The best way to deal with this type of error is to type

`\end`

or

---

---

```
\end{document}
```

in the case that the absence of that command caused the error. Usually if you have ended your document correctly, the error will result from a missing } or forgetting to end a verbatim environment.

## GRAPHICS ERRORS

### TOO MANY UNPROCESSED FLOATS

This error occurs when figures or tables (i.e., floats) have not been typeset:

```
! LaTeX Error: Too many unprocessed floats.
```

LATEX can only have so many floats waiting to be typeset. In order to fix this error, make sure that you are placing your floats where you want them (with a [h] option) and not wanting too many on one page in sequence. Using the command `\clearpage` can be very useful in distributing floats correctly.

## UNKNOWN GRAPHICS EXTENSION

The following error occurs when you try to use a type of graphic that is not supported by the type of file that you are producing:

```
! LaTeX Error: Unknown graphics extension: .gif
```

In order to fix this error, you should change your graphics to the types that are supported by the type of file you are outputting or you will need to include the correct package to deal with that type of graphic. Sometimes you may have named the graphic poorly so that LATEX will not recognize it as a graphic file.

## DIVISION BY ZERO

The following error occurs when the height of a graphic object is zero:

```
! Package graphics Error: Division by 0.
```

This is usually caused when you rotate an object with zero depth so that its height becomes zero. The best way to fix this is to use the keyword `totalheight` instead of `height`.

---

## MATH ERRORS

### DISPLAY MATH SHOULD END WITH \$\$

This error occurs when the displaymath or equation mode is ended incorrectly:

```
! Display math should end with $$
```

To fix this error, make sure that you end the displaymath or equation mode correctly (ending them with a \$ is not acceptable).

## BAD MATH ENVIRONMENT DELIMITER

This error occurs when you do not have your delimiters correct in math mode:

```
! LaTeX Error: Bad math environment delimiter.
```

Usually this occurs when you forget to match a right delimiter with every left delimiter. This error may also happen when you forget to end an array.

## MISSING RIGHT

This error occurs when you have a missing right parenthesis:

```
! Extra \right.
```

To fix this, you either need to add a \right command or you need to end an array.

## MISSING DELIMITER

This error message occurs when a delimiter is missing:

```
! Missing delimiter (. inserted).
```

To fix this error, you need to make sure that you have a right delimiter for every left delimiter. If you do not want a right delimiter matching a left delimiter, you need to use “.” to not have an error message show up.

---

## MISSING \$ INSERTED

The following error occurs when you try to use a character that can only be used in math mode, like  $_$  or  $^$ :

```
! Missing $ inserted
```

To fix this error, make sure you change the character to what it should be in text mode.

## TABULAR ENVIRONMENT ERRORS

### MISPLACED ALIGNMENT TAB CHARACTER &

This error occurs when you use  $\&$  and when you are not in a tabular environment:

```
Misplaced alignment tab character &
```

To fix this error, you need to use  $\backslash\&$  to make a  $\&$ .

### EXTRA ALIGNMENT TAB

This error occurs when you use too many tabs for the number of columns in a table:

```
! Extra alignment tab has been changed to \cr
```

The result of this error is that a new row is formed where the extra tab was. You should go back and fix your table so that the correct number of items in each row would show up.

### ARGUMENT HAS AN EXTRA }

These errors happen when an incorrect number of arguments to a tabular environment have been specified:

```
! Argument of \cline has an extra }.
```

```
! Argument of \multicolumn has an extra }.
```

To fix this error, make sure your arguments to the tabular environment are correct.

## ERRORS WITH LISTS MISSING ITEM

This error occurs when there is plain text in an environment that takes items:

```
! LaTeX Error: Something's wrong--perhaps a missing
\item.
```

To fix this error, make sure the plain text is changed into an item.

## TOO DEEPLY NESTED

This error occurs when there are too many lists for  $\text{\LaTeX}$  to handle:

```
! LaTeX Error: Too deeply nested
```

$\text{\LaTeX}$  can only handle four levels of one type of list and six levels of different types of lists. To fix this, you need to use less levels of lists or define your own list environment.

## MISCELLANEOUS ERRORS ONLY USED IN THE PREAMBLE

This error occurs when you place a command in the body of a  $\text{\LaTeX}$  document that should be placed in the preamble:

```
! LaTeX Error: Can be used only in the preamble.
```

To fix this error, just move the command to the preamble.

---

## THERE IS NO LINE/PAGE HERE TO END

This error occurs when you incorrectly use the commands that make a new line or a new page:

```
! LaTeX Error: There's a no line here to end.
```

You may just leave the command that is making a new line in place or you can take it out. Here, L<sup>A</sup>T<sub>E</sub>X is just trying to make sure that everything looks nice.

## COMMAND ALREADY DEFINED

This error occurs when you try to define a command that already exists:

```
! LaTeX Error: Command ... already defined.
```

To fix this, you need to define your command differently.

## MISSING NUMBER

This error is made when a number is expected as an argument and one is not provided:

```
! Missing number, treated as zero.
```

To fix this error, you need to find where a number is expected so that you can provide the correct one.

### 5.6.2 FLOAT PACKAGE

#### USEPACKAGE

```
text
```

#### SIMPLE USE

```
text
```

---

## OPTIONS

text

Add optional arguments to the usepackage line:

Useful options:

- **OPTION NAME**  
OPTION NOTE
- **OPTION NAME**  
OPTION NOTE

## USE WITH OPTIONS

text

## COMMANDS

### 5.6.3 GRAPHICS EXAMPLES AND NOTES

## CURLYFRAME EXAMPLE

```
\documentclass[landscape]{article}
\usepackage{wallpaper}
\usepackage{niceframe}
\usepackage{xcolor}
\usepackage{ulem}
\usepackage{graphicx}
\usepackage{geometry}
\geometry{tmargin=.75cm,bmargin=.25cm,lmargin=.8cm,rmargin=.2cm}
\usepackage{multicol}

\begin{document}

\curlyframe[.9\columnwidth]{

TEXTTTTTTTTTTTTTTTTTT

}

\end{document}
```

---

## RECTFRAME EXAMPLE

```
\documentclass[landscape]{article}
\usepackage{wallpaper}
\usepackage{niceframe}
\usepackage{xcolor}
\usepackage{ulem}
\usepackage{graphicx}
\usepackage{geometry}
\geometry{tmargin=.75cm,bmargin=.25cm,lmargin=.8cm,rmargin=.2cm}
\usepackage{multicol}

\begin{document}
\begin{minipage}{.33\textwidth}
\centering
\scalebox{3}{\color{green!30!black!60}
\font\border=umrandb
\generalframe
{\border \char113} % up left
{\border \char109} % up
{\border \char112} % up right
{\border \char108} % left
{\border \char110} % right
{\border \char114} % lower left
{\border \char111} % bottom
{\border \char115} % lower right
\centering
\includegraphics[height=1.25cm]{GIS_Logo_better.jpg}}
\end{minipage}
%\vspace{-8mm}

\end{document}
```

### 5.6.4 GRAPHICX PACKAGE

#### USEPACKAGE

text

#### SIMPLE USE

text

## OPTIONS

`text`

Add optional arguments to the `usepackage` line:

Useful options:

- **OPTION NAME**  
OPTION NOTE
- **OPTION NAME**  
OPTION NOTE

## USE WITH OPTIONS

`text`

## COMMANDS

### 5.6.5 HYPERREF PACKAGE

#### INTRODUCTION

Official *hyperref* package documentation

Notes:

- Add the *hyperref package* to the preamble **last** [2]
- To use Tex in a pdf bookmark: use

`\texorpdfstring{\\"}{}{}`

ie. `\paragraph{Sample Text}\texorpdfstring{\\"}{}{}`

Creates a new line without an error.

`\usepackage[options]{hyperref}`

## SIMPLE USE

Use `\href{URL}{DESCRIPTION}` to add a link with description

`\href{https://www.latex-tutorial.com}{Website with tutorials}`  
produces:

---

Website with tutorials

## OPTIONS

Add optional arguments to the usepackage line:

Useful options:

- **pdftex**

enables other options like breaklines

- **breaklinks**

allow links to be broken across several lines

eg. <https://lists.gnu.org/archive/html/emacs-orgmode/2013-06/msg00776.html>

- **colorlinks**

Colors the text of links and anchors.(default is false)

- **linkcolor**

Color for normal internal links(default is red).

- **anchorcolor**

Color for anchor text.

- **citecolor**

Color for bibliographic citations in text.

- **urlcolor**

Color for linked URLs

## USE WITH OPTIONS

```
\usepackage[breaklinks,colorlinks,citecolor=blue,
urlcolor=green]{hyperref}
```

## COMMANDS

`\href{URL}{text}` Makes text a link to URL.

To put a file path in text:

eg:

[Official hyperref package documentation](#)

(documentation Pt.4 pg.15)

\href [options]{URL}{text}

Options:

➢ absolute

```
\href{C:/AC/jalapeno/documentation/packageDocs/hyperref2017.pdf}
    {Official hyperref doc}
```

➢ relative **Note: relative path must be from final pdf location**

```
\href{../../../../documentation/packageDocs/hyperref2017.pdf}
    {Official hyperref package doc}
```

This path works from main document

```
\href{../../../../documentation/packageDocs/hyperref2017.pdf}
    {Official hyperref package documentation}
```

This path works from subsection document

\hyperref [label]{text}

Makes text a link to where \ref{label} would point.

\hypertarget{name}{text}

Sets an anchor on text with the label name.

\hyperlink{name}{text}

Makes text a link that takes you to the anchor labeled name.

Pair with \hypertarget.

\phantomsection

Used in conjunction with

\addcontentsline

to make the correct link in the Table of Contents.

## 5.6.6 IMPORT PACKAGE

### USEPACKAGE

text

### SIMPLE USE

text

---

## OPTIONS

text

Add optional arguments to the usepackage line:

Useful options:

➢ **OPTION NAME**

OPTION NOTE

➢ **OPTION NAME**

OPTION NOTE

## USE WITH OPTIONS

text

## COMMANDS

### 5.6.7 WRAPFIG PACKAGE

#### USEPACKAGE

text

#### SIMPLE USE

text

#### OPTIONS

text

Add optional arguments to the usepackage line:

Useful options:

➢ **OPTION NAME**

OPTION NOTE

➢ **OPTION NAME**

OPTION NOTE

---

## USE WITH OPTIONS

text

## COMMANDS

## 5.7 L<sup>A</sup>T<sub>E</sub>X TEMPLATES

### 5.7.1 L<sup>A</sup>T<sub>E</sub>X SECTION TEMPLATE

```
\begin{document}
%
\section{SECTION NAME}
%
\subimport{THIS SECTION/}{SOMESubsection.tex}
\subimport{THIS SECTION/}{SOMESubsection.tex}
% etc...
%
\end{document}
```

### 5.7.2 L<sup>A</sup>T<sub>E</sub>X SUBSECTION TEMPLATE

```
%  
%  
%  
%-----  
%      To Do:  
%  
%  
%  
%-----  
%  
% OPTIONAL PREAMBLE FOR LOCAL COMPILE %  
%  
\def\titlename{SubsectionTemplate}  
\def\authorName{Allegan County GIS Services}  
\def\pdfTitle{SubsectionTemplate}  
\def\pdfSubject{GIS Tools} %  
\def\pdfKeywords{latex,documentation}  
%  
\input{../../preamble/subSectionPreamble.tex}  
%-----  
%\begin{document}% document begins  
%  
%-----  
%
```

---



```
\noindent Text  
Text Text Text Text Text Text Text Text Text Text Text Text Text  
%  
\end{adjmulticols}  
%  
\clearpage  
%  
%  
\subsubsection{SUBSUBSECTION HEADING}  
%  
% Single Figure  
%  
%\begin{figure}[h!]  
%\centering  
% \includegraphics[width=1\textwidth]{ProjectDesign}  
%\vspace{-.2in}  
%  
%\caption{Design}  
%\end{figure}  
%  
\clearpage  
%  
%  
\paragraph{Summary}  
%  
\noindent Text  
Text Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text Text  
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Text Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text Text  
  
\clearpage  
%  
%  
\paragraph{PAR HEADING}  
%  
\begin{adjmulticols}{2}{\innerMar}{\outerMar}  
%  
\subparagraph{SUBPAR HEADING}  
%  
\noindent Text Text Text Text Text Text Text Text Text Text
```

```
Text  
Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text  
%  
\paragraph{PAR HEADING}  
\noindent Text  
Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text  
%  
\subparagraph{SUBPAR HEADING}  
\noindent Text  
Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text  
%  
\subparagraph{SUBPAR HEADING}  
\noindent Text  
Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text  
%  
\subparagraph{SUBPAR HEADING}  
\noindent Text  
Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text  
%  
\end{adjmulticols}  
%  
% Single Figure  
%  
\begin{figure}[H]  
\centering  
% \includegraphics[width=1\textwidth]{IMAGE}  
\vspace{-.2in}  
%  
\caption{IMAGE NAME}  
\end{figure}  
\clearpage
```

## 5.8 PDF TOOLS USED BY AC GIS

### 5.8.1 PDF OPTIMIZER

## PUPOSE AND SUMMARY

**Workflow Purpose:** Optimization of a large number of pdf docs.

**Workflow Summary:** Uses Python to create a list of .pdf docs in a folder and creates a batch file to optimize the pdfs in the list to another location. The batch process calls ghost script for the optimization.

## REQUIREMENTS

Opensource software:

- ghostscript
- python 2.7 and a Python IDE
- A text editor

paragraphPython(2.7)

### Note:

The output of this script is bdoc.txt, Save as a .bat to execute the optimize.

### Script that creates a batch file

```
import os, sys

project = os.path.dirname(os.path.dirname(__file__))
processing = os.path.join(project, 'processing')
#source = os.path.join(project, 'source')
build = os.path.join(project, 'build')
sourcepdf = os.path.join(build, '20180716')

inString1 = "gswin32 -sDEVICE=pdfwrite -dCompatibilityLevel=1.4
-dPDFSETTINGS=/ebook -dNOPAUSE -dQUIET -dBATCH
-sOutputFile=J:\\\\Projects\\\\2018ParcelAtlas\\\\build\\\\optimized\\\\"

inString2 = " J:\\\\Projects\\\\2018ParcelAtlas\\\\build\\\\20180716\\\\"
```

```

batchdoc = os.path.join(processing,"bDoc.txt")

# Main
#####
#####

if __name__ == "__main__":
    list1 = os.listdir(sourcepdf)
    l = open(batchdoc,'w')
    for i in list1:
        newi = i[1:]
        print newi
        t = inString1 + newi + inString2 + i + "\n"
        print t
        l.write(t)

    l.close()

```

## GHOSTSCRIPT

### About

ghostscript is used for the optimization. ghostscript is an interpreter for the PostScript language and for PDF [1].

### Licensing

ghostscript is available opensource under AGPL conditions. more information can be found [here](#).

### Download

ghostscript can be downloladed [here](#).

## WINDOWS BATCH FILES

A line from the batch file looks like:

---

```
gswin32 -sDEVICE=pdfwrite -dCompatibilityLevel=1.4  
-dPDFSETTINGS=/ebook -dNOPAUSE -dQUIET -dBATCH  
-sOutputFile=J:\Project\2018ParcelAtlas\build\optimized\  
02-001-001-00.pdf J:\Projects\2018ParcelAtlas\build\20180716  
\_02-001-001-00.pdf
```

## 5.9 QGIS TOOLS

### 5.9.1 QGIS AZIMUTH AND DISTANCE PLUGIN

# PROBLEM AND ANALYSIS

QGIS has some tools built in and others can be added via the Plugin architecture.

## Background

QGIS is in need of a COGO toolset

## Analysis

QGIS is an open source software that provides a COGO toolset.

## Statement of Problem

Text Text Text Text Text Text Text  
Text Text Text

# AZIMUTH AND DISTANCE PLUGIN INSTALLATION

## Install Azimuth and Distance Plugin

Plugins (1) ⇒ Topography Group

Select the Azimuth and Distance Plugin (2)

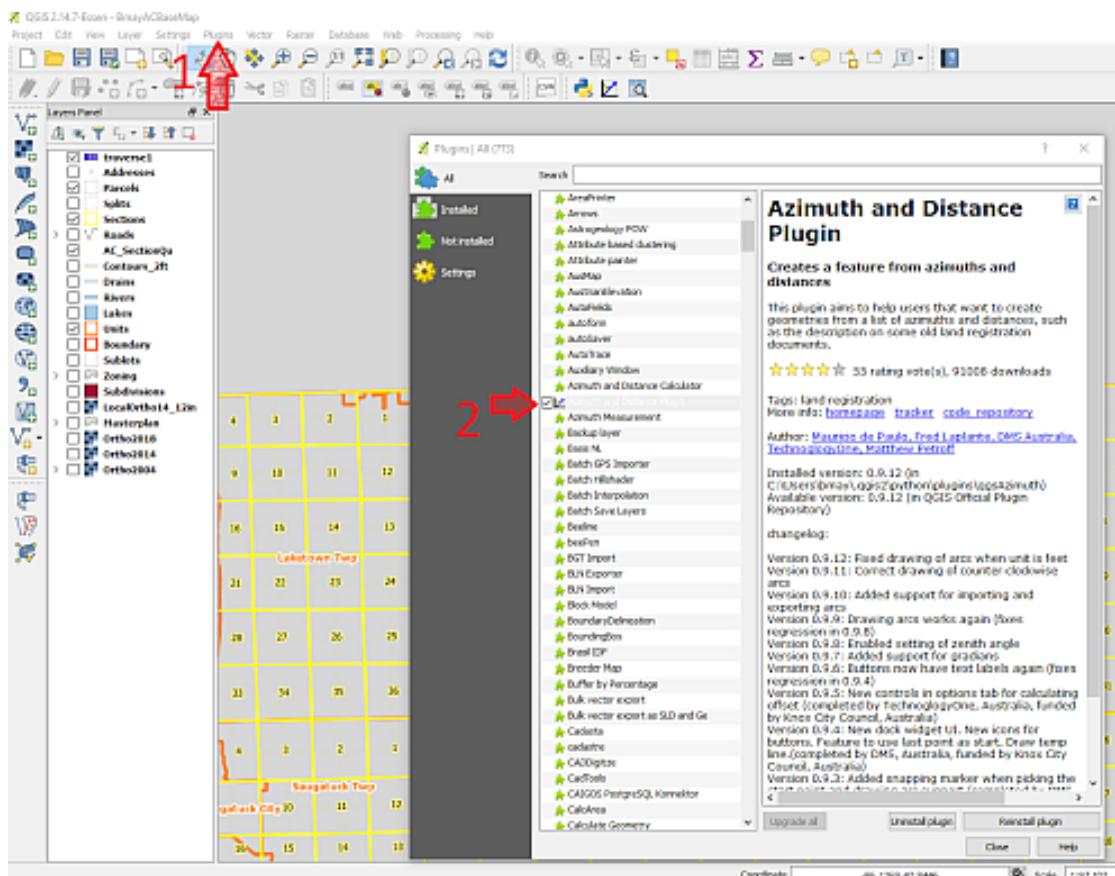


Figure 5.37: Launch Plugin

## Azimuth and Distance Plugin Tool is Added to Toolbar



Figure 5.38: COGO Icon

## 5.9.2 COGO TOOLS IN QGIS

# PROBLEM AND ANALYSIS

Transfers of real property typically involve a Metes and Bounds description:

**Commencing at Southeast corner of Section 1, Town 2 North, Range 11 West, Martin Township, Allegan County, Michigan; thence North 88 degrees 32 minutes 05 seconds West 1338.44 feet along the south line of said section to the point of beginning; thence North 01 degrees 27 minutes 55 seconds East 388 feet; thence South 88 degrees 32 minutes 05 seconds East 584 feet, more or less, to the centerline of the Gun River; thence southerly along said centerline to the south section line; thence West along said section line to the point of beginning.**

Figure 5.39: Description From Deed

## Background

In GIS, *Coordinate Geometry* or **COGO** tools convert written descriptions of real property into digital map features.

Users in several county departments use COGO tools in their regular workflow.

In the past ACGIS provided COGO tools from the MapInfo Suite.

## Statement of Problem

A tool is needed to convert between written descriptions of real property and digital map data.

MapInfo is no longer supported within the county.

The COGO tools in ArcGIS require an advanced license.

## Analysis

QGIS is an open source software that provides a COGO toolset.

The Azimuth and Distance Plugin provides the COGO functionality in QGIS.

QGIS works in shapefiles, a common GIS data type.

**Following are instructions for using QGIS for COGO**

---

To use COGO tools in QGIS, follow these steps

## Step 1:

Launch and Configure the Azimuth and Distance Plugin

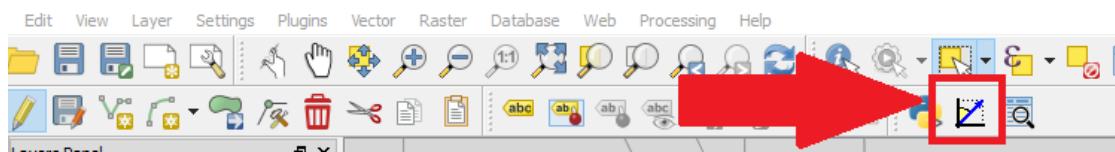


Figure 5.40: COGO Icon

\*This tool draws in a temporary layer or in an active map layer.

Select **traverse1** as active layer in the tool.

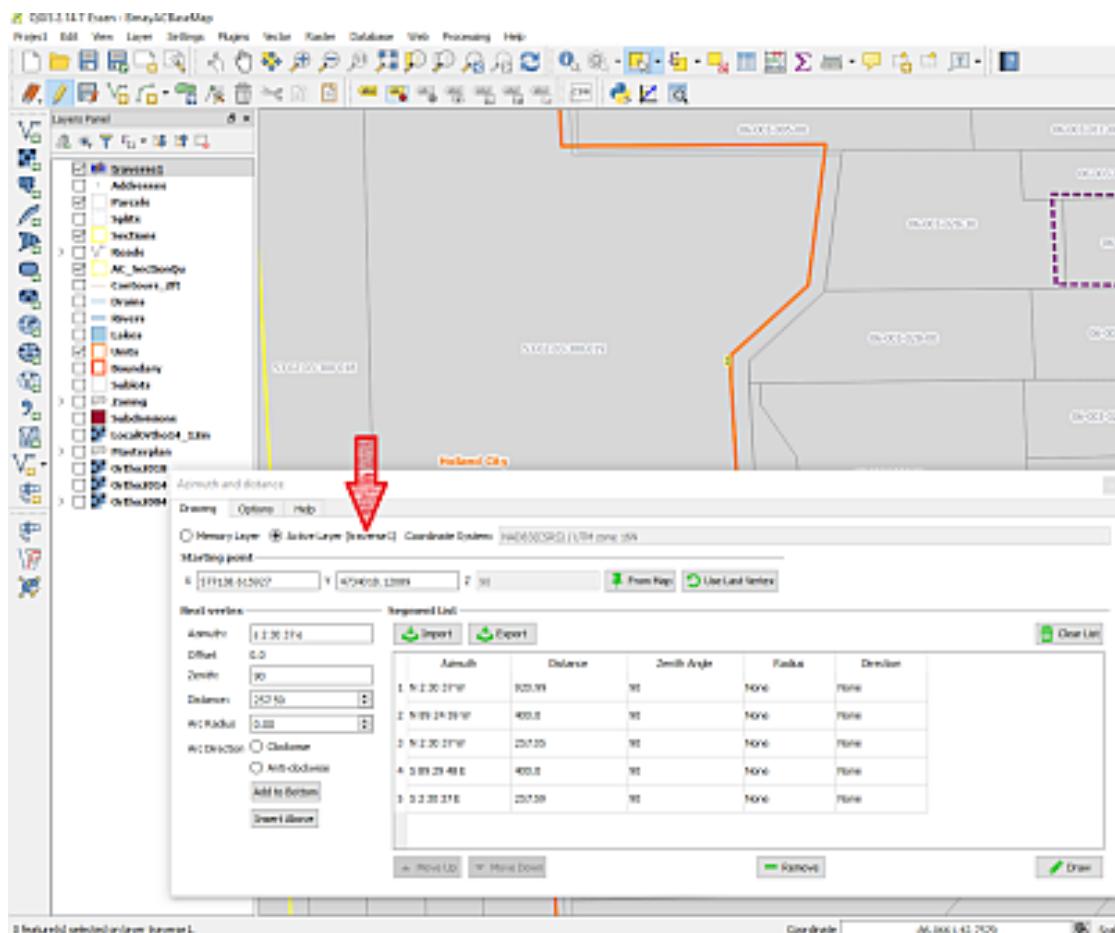


Figure 5.41: Check Active Layer

## Configure Options in Plugin

On the Options Tab: Select these radio buttons;

- Boundary
- Bearing
- Feet
- Degree

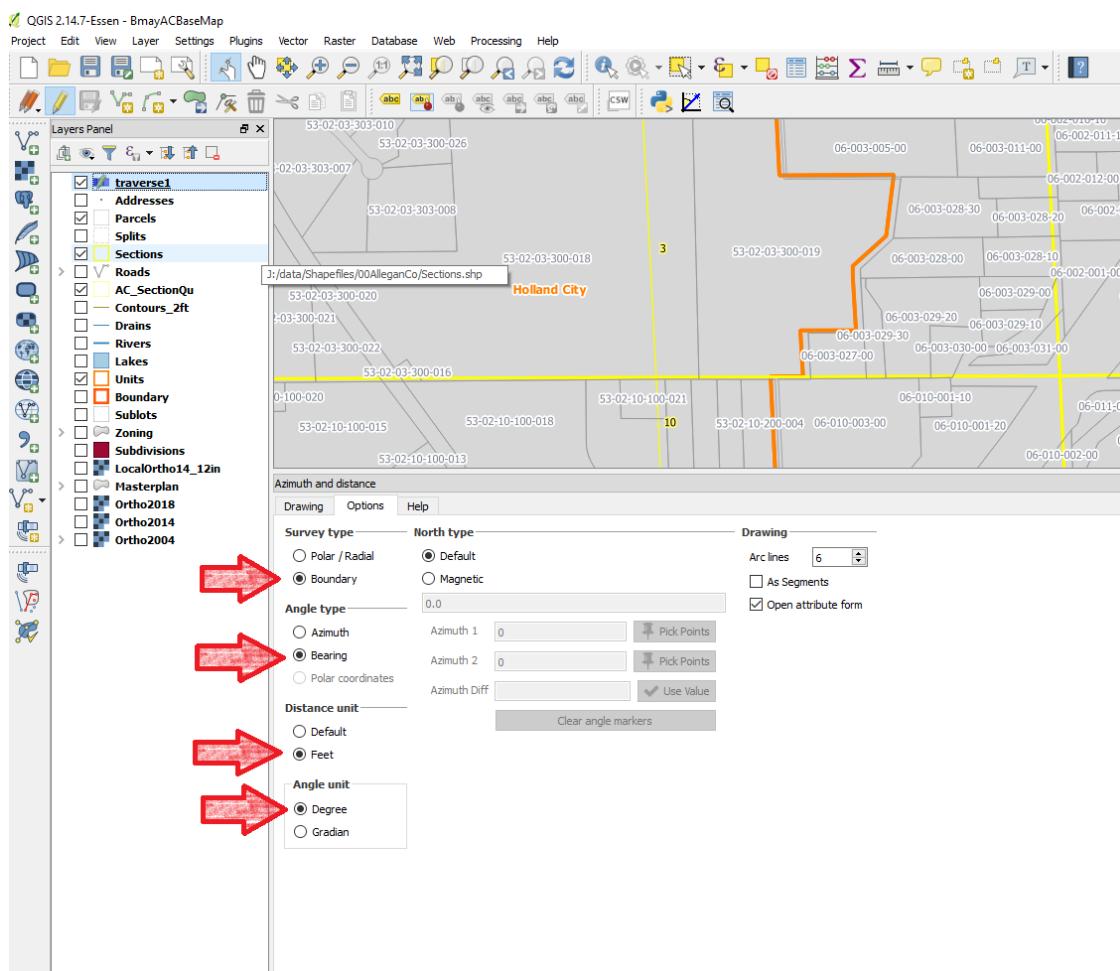


Figure 5.42: Plugin Options

## Step 2: Activate traverse layer in map

\*For a map layer to be editable, it must be activated in the Layers Panel.

(If necessary) left click the layer **traverse1** in Layer Panel to activate it.

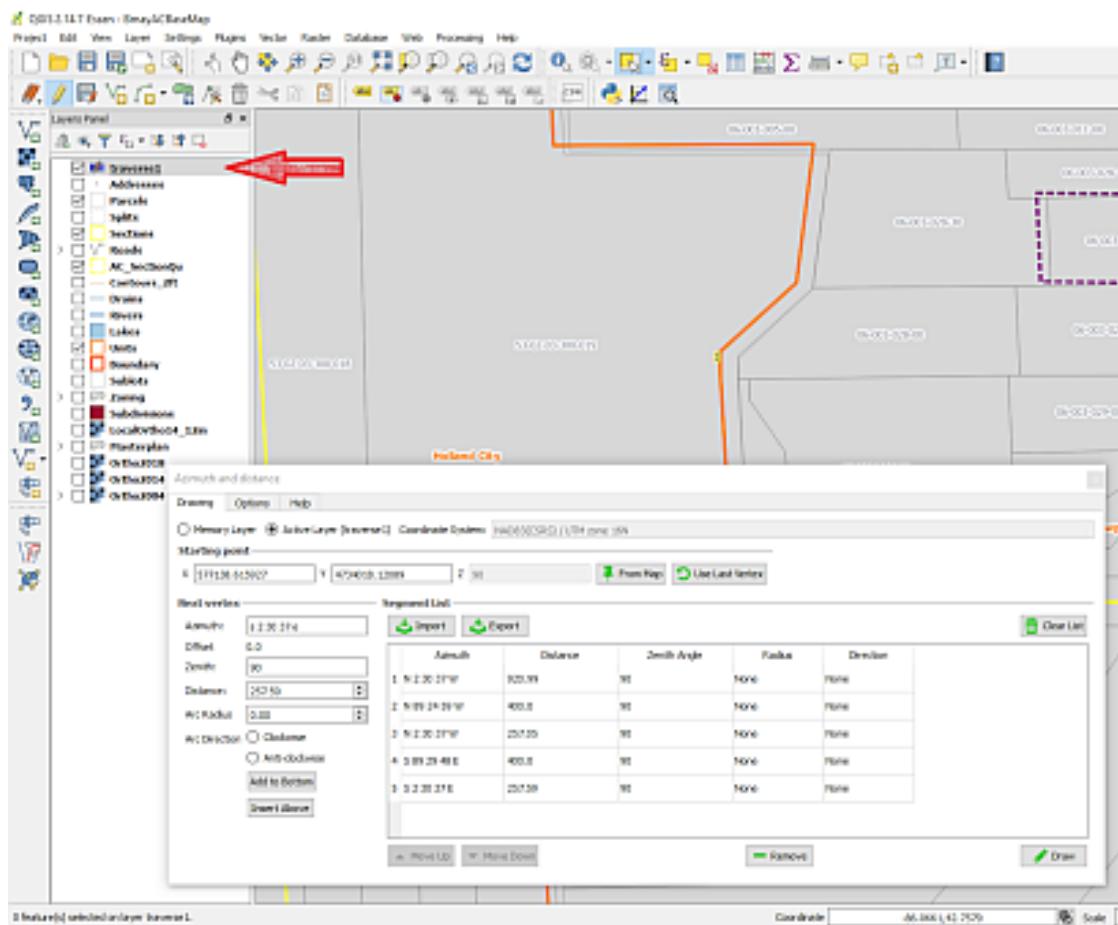


Figure 5.43: activate layer

## Step 3: Locate the Point of Commencement

To get to the Point of Commencement,

Use **any combination** of the following methods:

- Use Reference Layers such as Units, Sections, Quarter Sections, and Parcels.

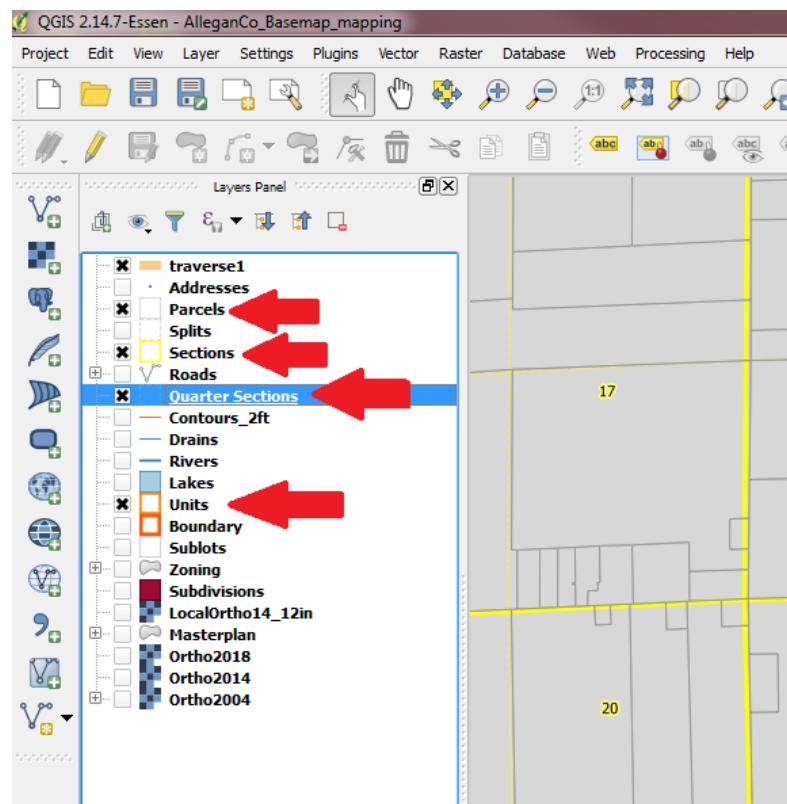


Figure 5.44: Select Reference Layers

- Use the Measuring Tool

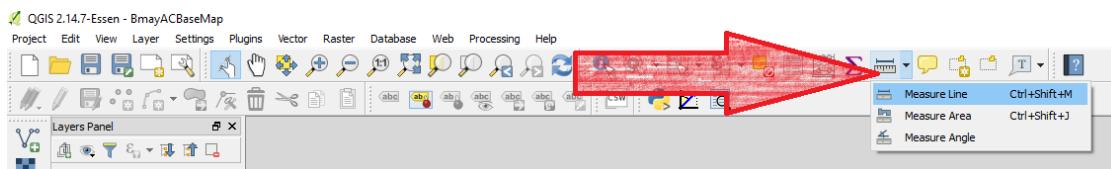


Figure 5.45: Measuring Tool

- Search by Parcel Number (Search Layers Plugin)



Figure 5.46: Search Layer Icon

- Draw COGO lines (Azimuth and Distance Plugin)

## Step 4: Draw a Line With Azimuth and Distance

On the Drawing Tab:

- Azimuth (bearing): Enter Bearing in format: *N 2 30 37 W*
- Distance: Enter Feet Distance in numbers only
- Offset: Set to *0*
- Zenith: Set to *90*

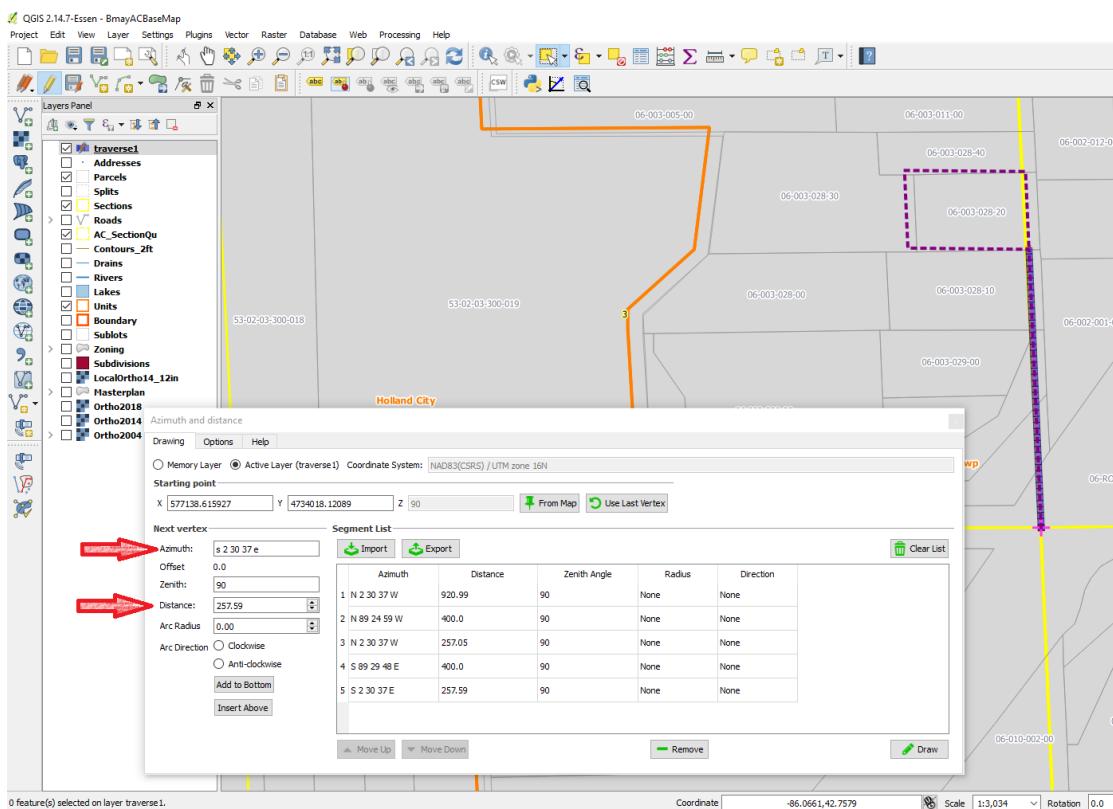


Figure 5.47: Entering Bounds

### 5.9.3 SEARCH LAYERS PLUGIN

## PROBLEM AND ANALYSIS

QGIS has some tools built in and others can be added via the Plugin architecture.

### Background

QGIS is an open source GIS and search by feature attributes is needed.

### Analysis

The Search Layers Plugin can be added to any installation of QGIS.

## Statement of Problem

Users need a tool to search for features by attribute.

# PLUGIN SETUP

## Install Search Layers Plugin

- To install: Plugins ⇒ Search Layers Plugin ⇒ Install

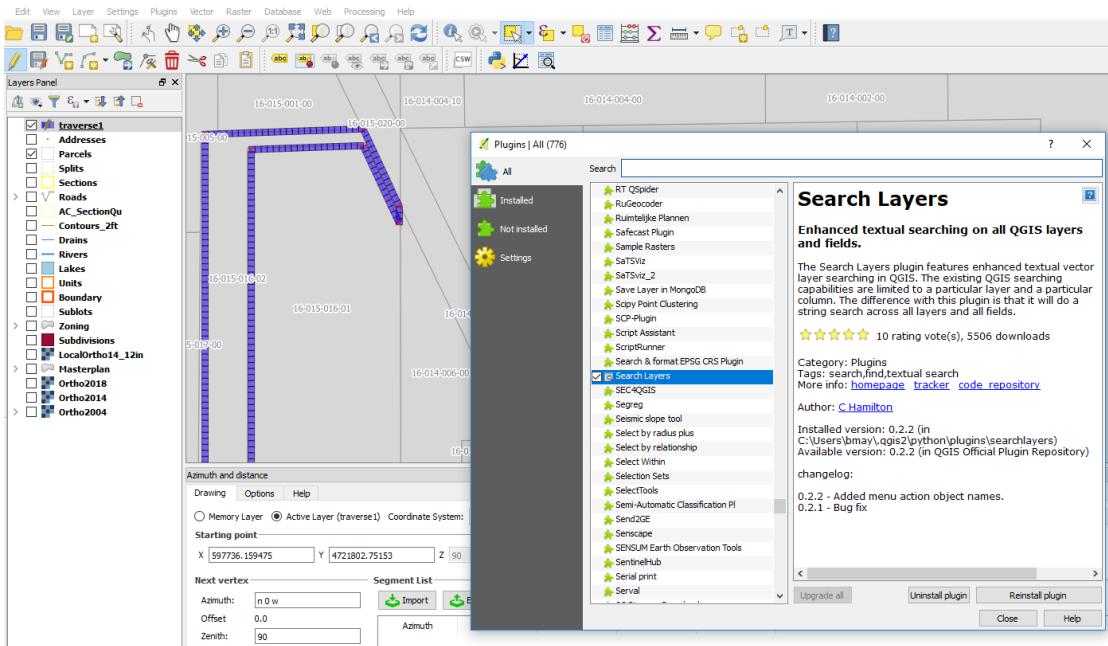


Figure 5.48: Search Layers Plugin

## Search Layers Plugin Tool is Added to the Toolbar



Figure 5.49: Search Layer Icon

# USING THE PLUGIN

## Enter Parcel Search Data

### In The Search Layers Plugin:

- Enter **parcel number** (with dashes) into *Search String*
- Select **Parcels** in *Search Layers*
- Select **PARCELID** in *Search Fields*

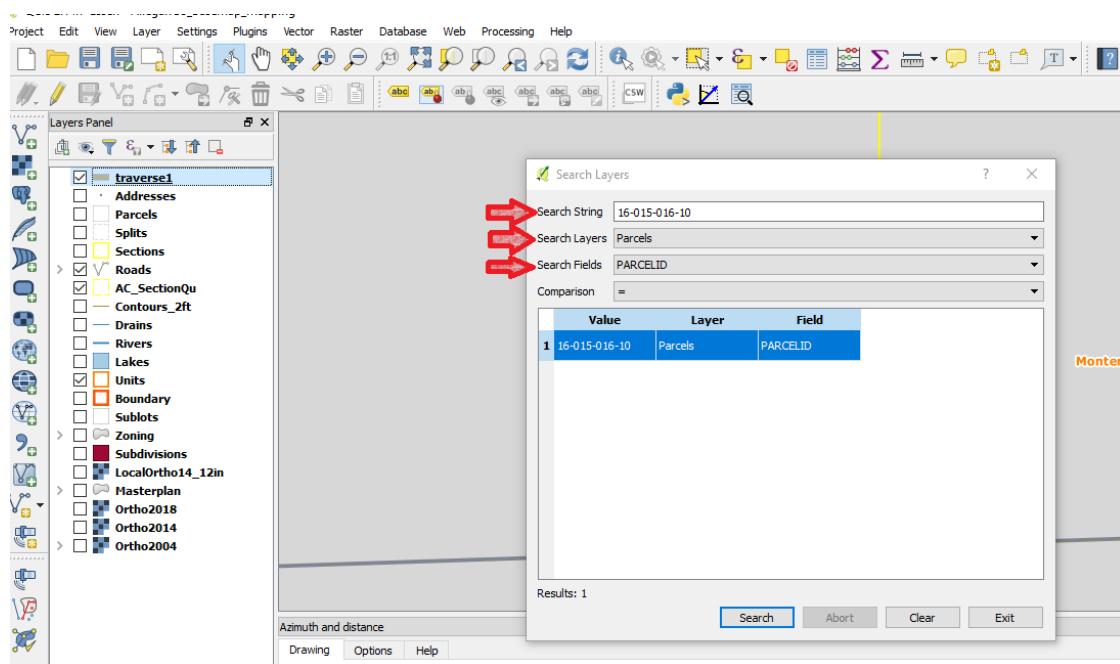


Figure 5.50: Search Layers Setup

- click on result in table

### Screen zooms into the selection

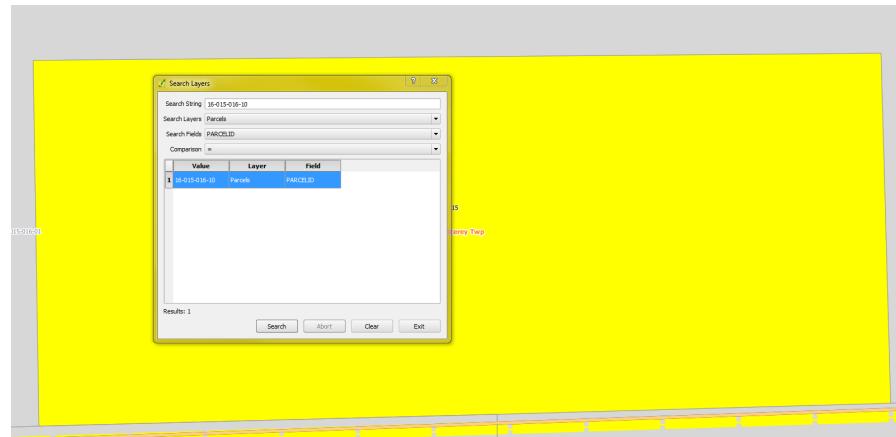


Figure 5.51: Search Results

### Zoom out far enough to find a reference point



Figure 5.52: Search Results Zoomed Out

Part IV

## Resources



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# Geography 101

---

## SURVEYS AND PLANS

### NORTHING AND EASTING

### HOW TO USE NORTHING AND EASTING

**Using a spreadsheet to convert the dimensions**

To use Northing and Easting from survey plans: In a spreadsheet, adjust the data to be relative to the 1st point

So if a survey gives you:

| Pt  | Northing  | Easting   |
|-----|-----------|-----------|
| 1   | 995.9952  | 9766.6    |
| 2   | 994.3049  | 9112      |
| 3   | 989.234   | 7150      |
| 4   | 1194.3099 | 9114      |
| 5   | 1193.266  | 8710.2059 |
| 6   | 1193.0954 | 8644.2016 |
| ... | ...       | ...       |
| 32  | 1617.7856 | 8827.4296 |

Table 1: Survey Plan Northing and Easting

Calculate Relative North and Relative Easting of the points to Point 1 by subtracting the point 1 values from each of the other points.

Use formulas:

|     | A   | B         | C         | D           | E           |
|-----|-----|-----------|-----------|-------------|-------------|
| 1   | Pt  | Northing  | Easting   | Relative NS | Relative EW |
| 2   | 1   | 995.9952  | 9766.6    | 0           | 0           |
| 3   | 2   | 994.3049  | 9112      | =B3-B\$2    | =C3-C\$2    |
| 4   | 3   | 989.234   | 7150      | =B4-B\$2    | =C4-C\$2    |
| ... | ... | ...       | ...       | ...         | ...         |
| 6   | 32  | 1617.7856 | 8827.4296 | =B9-B\$2    | =C9-C\$2    |

Table 2: Survey Plan Northing and Easting

Giving you:

|     | A   | B         | C         | D           | E           |
|-----|-----|-----------|-----------|-------------|-------------|
| 1   | Pt  | Northing  | Easting   | Relative NS | Relative EW |
| 2   | 1   | 995.9952  | 9766.6    | 0           | 0           |
| 3   | 2   | 994.3049  | 9112      | -1.6903     | -654.6      |
| 4   | 3   | 989.234   | 7150      | -6.7612     | -2616.6     |
| ... | ... | ...       | ...       | ...         | ...         |
| 6   | 32  | 1617.7856 | 8827.4296 | 621.7904    | -939.1704   |

Table 3: Relative Northing and Easting

So to place pt 32:

From pt 1:

Use distances 621.7904' N and 939.1704'W

## A PRIMER ON COORDINATE SYSTEMS COMMONLY USED IN MICHIGAN

[Document Link](#)

---

## ESRI Information

---

### ESRI PRODUCT DOCUMENTATION

#### FUNCIONALITY MATRICES

arcgis 10.5 Enterprise Functionality Matrix Document Link  
arcmap 10.5 Functionality Matrix [Document Link](#)



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## References

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- [1] Artiflex. [ghostscript.com](http://ghostscript.com), 2018. 142
- [2] na. *The hyperref Package*. CTAN, na edition, na na. 132



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## Glossary

---

**IDE** Integrated Development Environment. 163

**map projection** Representing a sphere on a flat surface. 17, 163

**sample** an example. 163



---

## Index

---

coordinate systems, 160  
georef, 160  
map projections, 17  
Michigan, 160  
State Plane, 160