

Forfeiture Data Collection

Mobile App with Collector for ArcGIS



Allegan County GIS
www.allegancounty.org/gis

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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

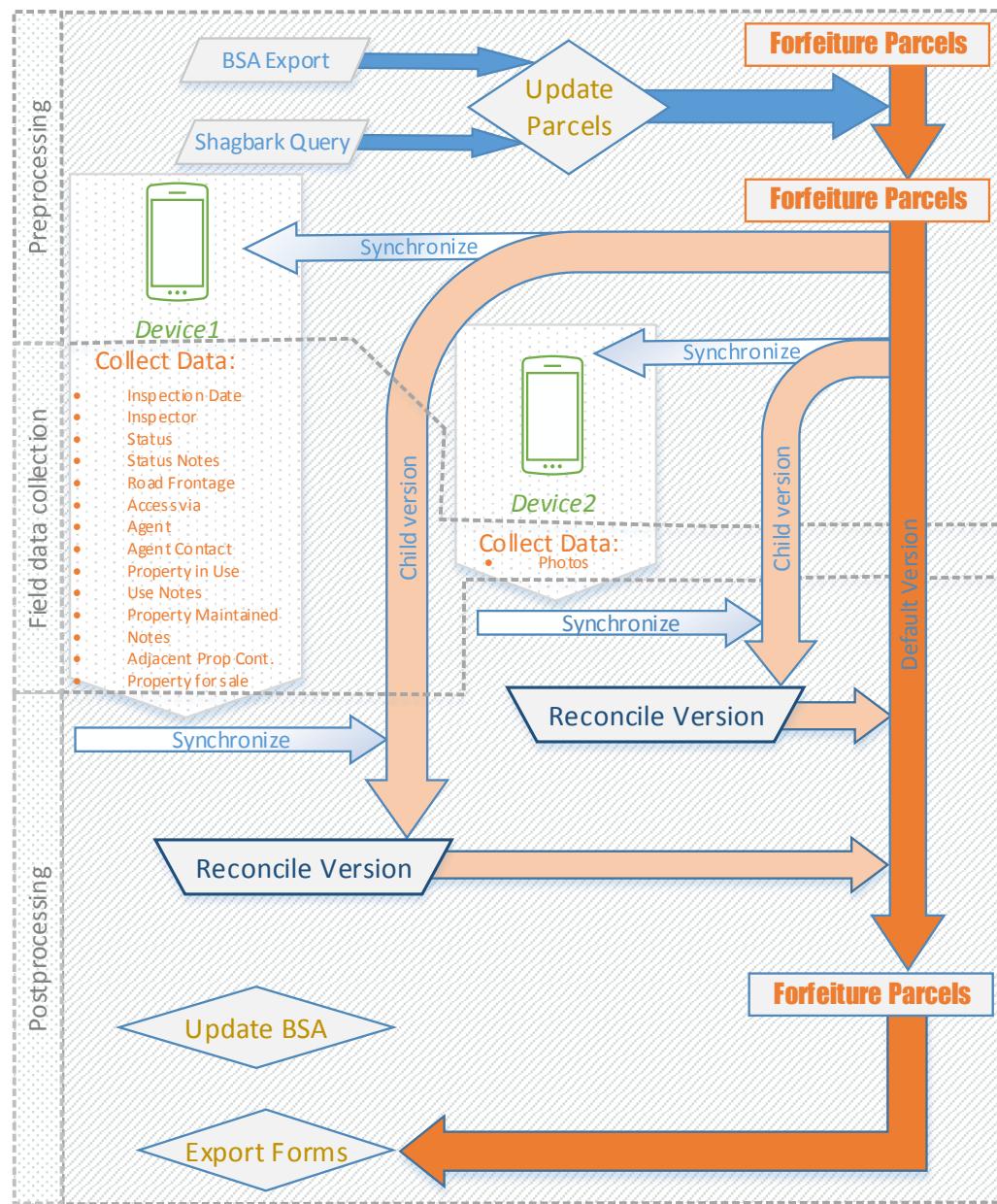


Figure 0.1: Project Design

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.

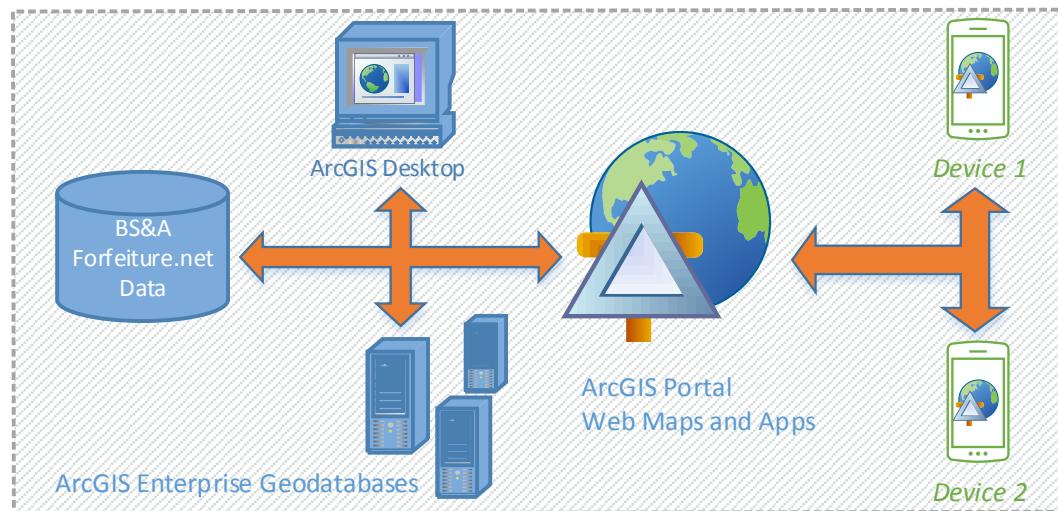


Figure 0.2: Technology Design

DATA DETAILS

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

Forfeiture Parcels Data

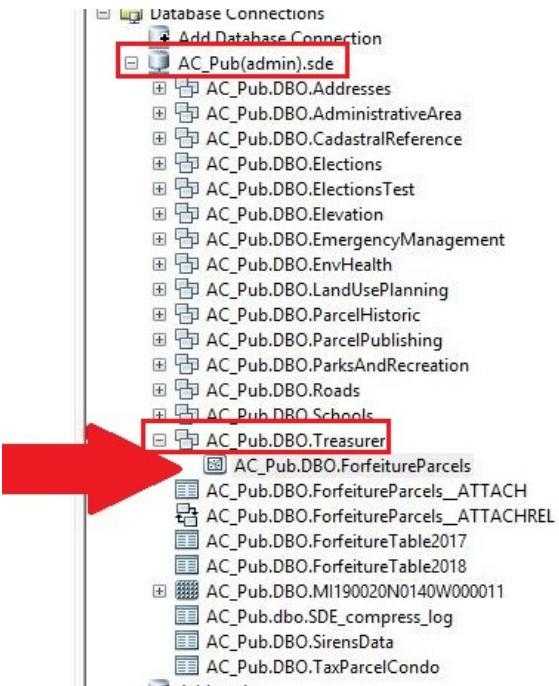


Figure 0.3: Live Data Location

Contamination Data

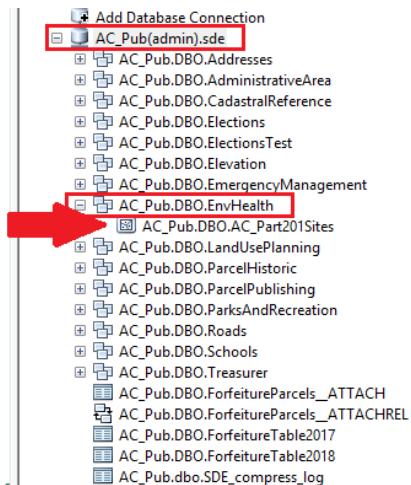


Figure 0.4: Contamination Feature Class

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 0.1: 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 an 'Edit Thumbnail' section containing 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', 'World_Street_Map', 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 0.5: 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 0.5, with a blue header bar, 'Overview' selected, and tabs for 'Data' (selected), 'Visualization', and 'Settings'. The 'Edit Thumbnail' section features a thumbnail of a map with red parcels. To its right, the service is described as '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 'Data' tab contains sections for 'Description' (placeholder 'Add an in-depth description of the item.'), 'Layers' (listing 'Tax Reversion Parcels' with options to 'Open In' or view 'Service URL'), and 'Access and Use Constraints' (placeholder 'Add any special restrictions, disclaimers, terms and conditions, or limitations on using the item's content.').

Figure 0.6: 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

The screenshot shows the ArcGIS Online interface for the 'World Street Map (for Export)' service. 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, followed by a 'Overview' tab. The main content area features a thumbnail map of a city with a red bounding box, a detailed description of the layer, and a creation date of Oct 15, 2013. To the right, there are three 'Open in' buttons: 'Map Viewer', 'Scene Viewer', and 'ArcGIS Desktop'. Below these buttons is a 'Details' section with information about the source being a 'Map Service', its size (1 kb), and a five-star rating. It also includes social sharing icons for Facebook, Twitter, and LinkedIn. The 'Owner' section shows Esri as the owner and Esri as the manager. Finally, the 'Tags' section lists various geographical and thematic terms.

ArcGIS Pricing Map Scene Help

Sign In

World Street Map (for Export)

Overview

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.

Tile Layer by Esri

Created: Oct 15, 2013 Updated: Aug 15, 2018 View Count: 39,772

Authoritative Subscriber

Open in Map Viewer

Open in Scene Viewer

Open in ArcGIS Desktop

Details

Source: Map Service

Size: 1 kb

★★★★★

Owner

Esri

Managed by:

esri

Tags

World, Global, Europe, North America, United States, Southern Africa, Asia, South America, Australia, streets, street map, tile package, basemap, highways, roads, transportation, landmarks, parks, community, community basemap, map, AFA250_base, current, esri_basemap, general availability, export

Figure 0.7: Basemap Source Description

HARD COPY RECORD

screenshots: arcmap map arcmap tools portal screenshots sql server mgt screen
shots 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

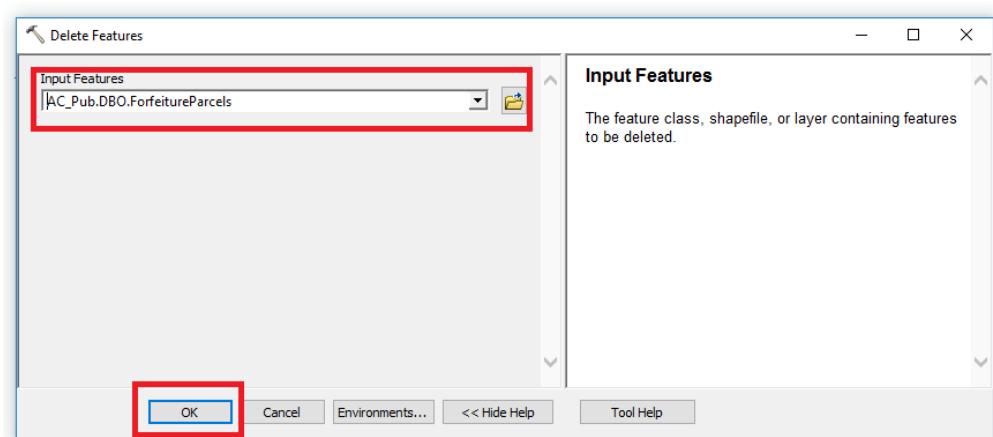


Figure 0.8: Delete Features

Press OK

Add Query Layer

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

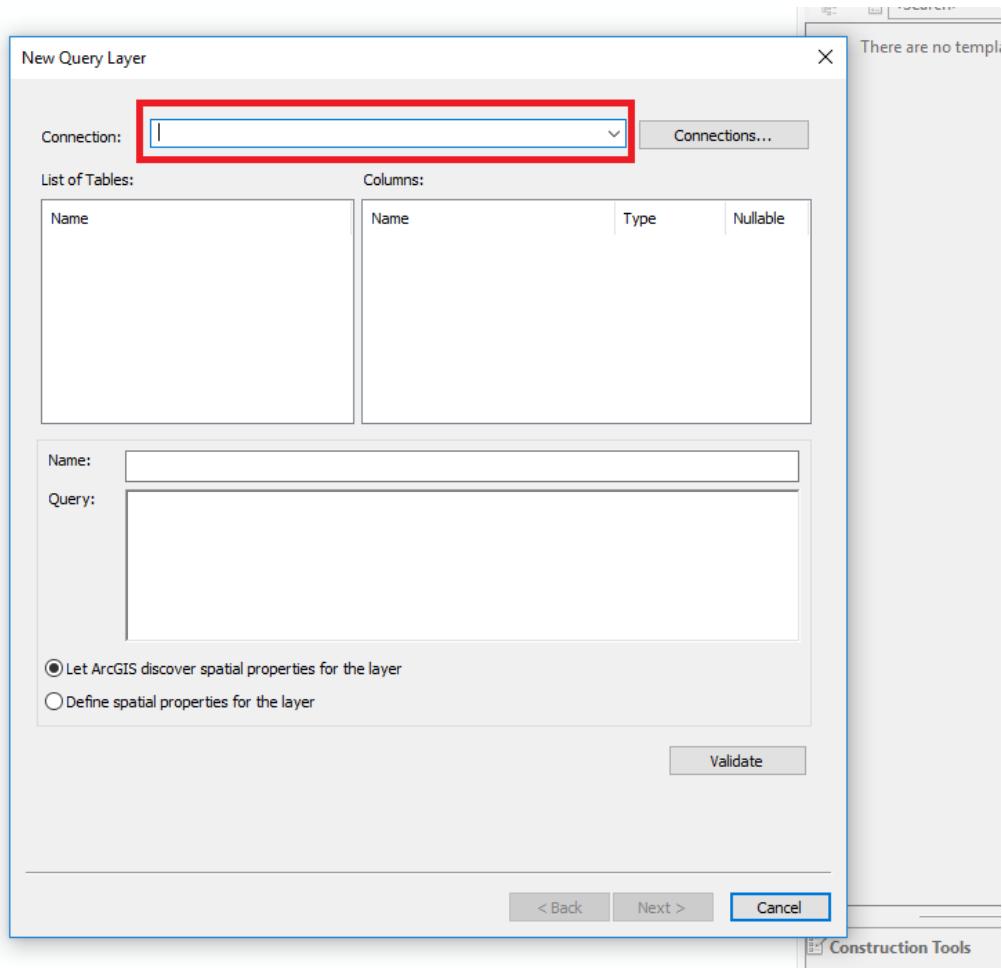


Figure 0.9: New Query Layer Dialog

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

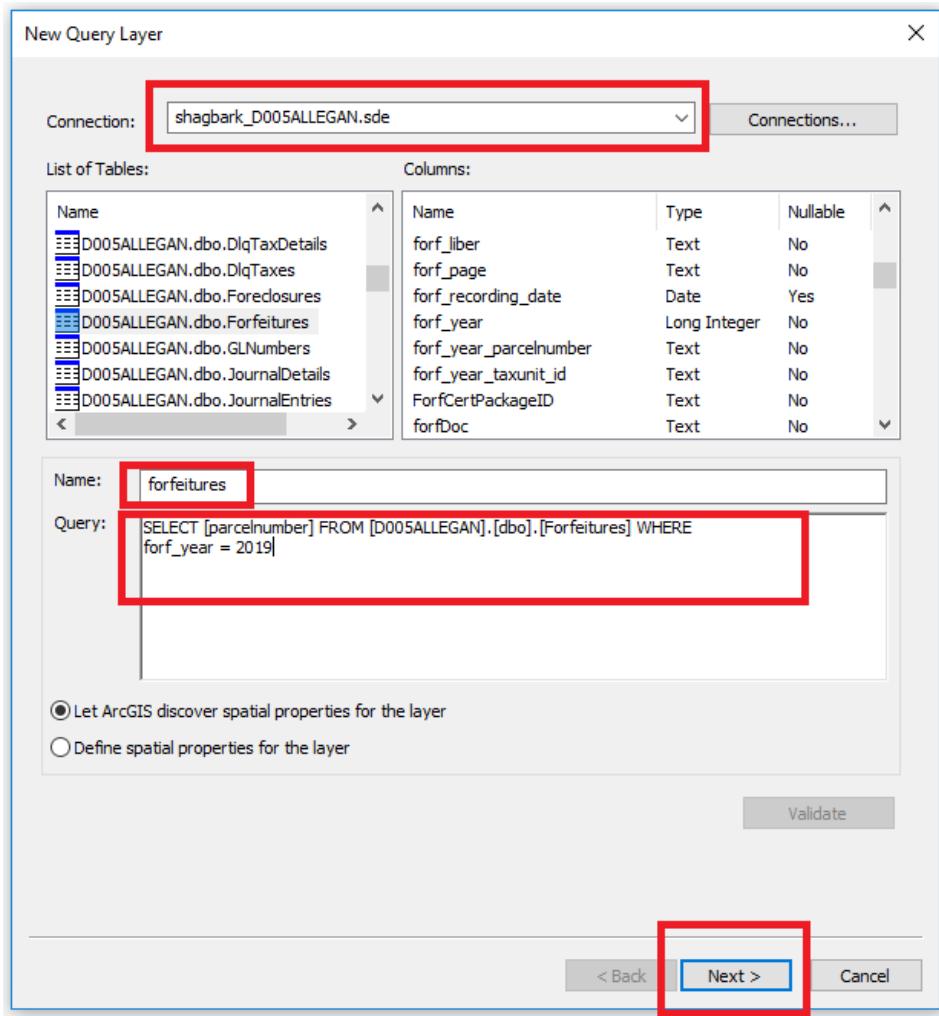


Figure 0.10: Forfeiture Query Layer Details

- Press Next

Select a Unique Identifier

- Press Finish

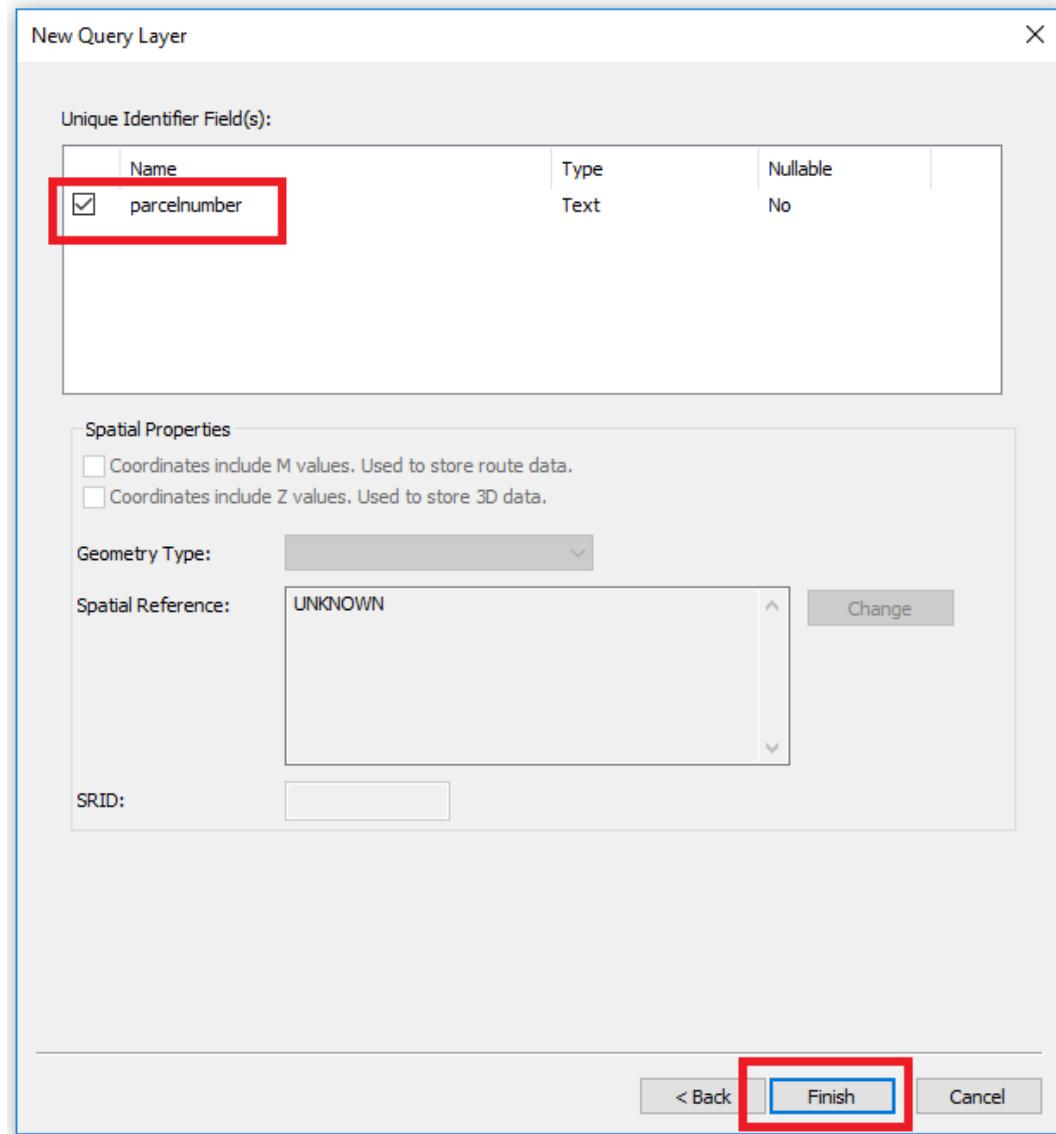


Figure 0.11: Query Layer Unique ID

Table is added to the map

The screenshot shows the ArcGIS Pro interface with two main windows: the Table Of Contents and the Table window.

Table Of Contents: This window lists the layers in the project. A red box highlights the entry for "D005ALLEGAN" which contains the "D005ALLEGAN.DBO.forfeitures" table.

Table Window: This window displays the contents of the "D005ALLEGAN.DBO.forfeitures" table. The table has two columns: "parcelnumber" and "ESRI_OID". The data is as follows:

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

At the bottom of the Table window, it says "(0 out of 836 Selected)".

Figure 0.12: Forfeiture Table Added

Add Parcels Layer to the map

Add ACParcelsCombined to the map to provide parcel geometry and attributes

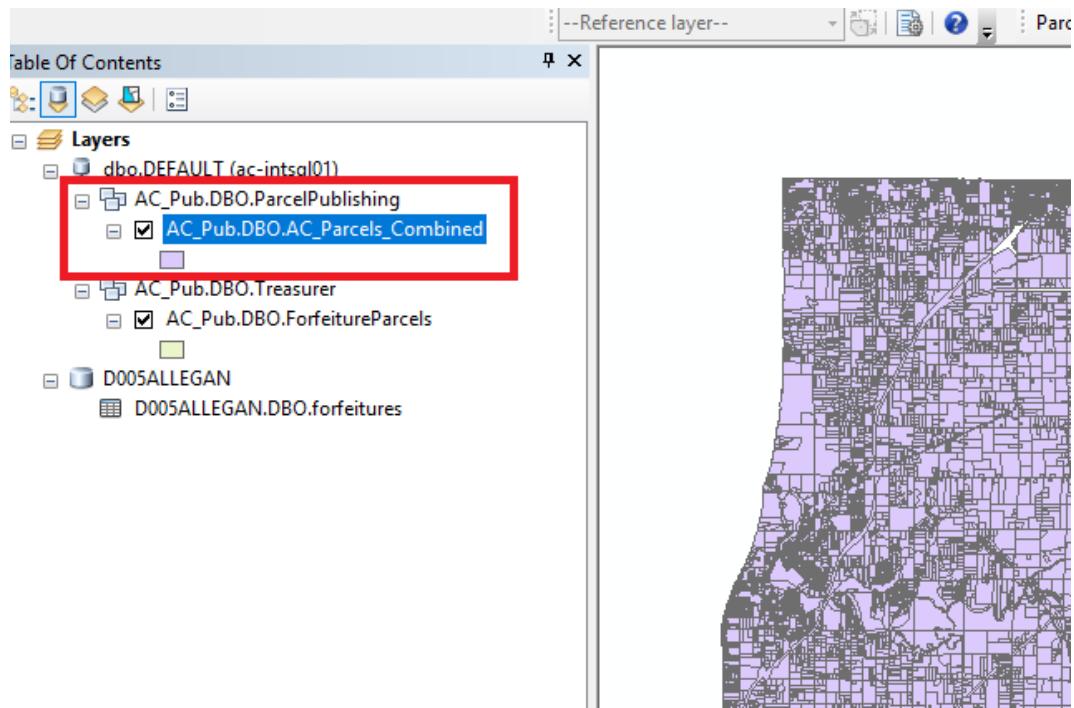


Figure 0.13: Parcels Layer Added

Create Join

Create new join to ACParcelsCombined of forfeitures based on parcel numbers

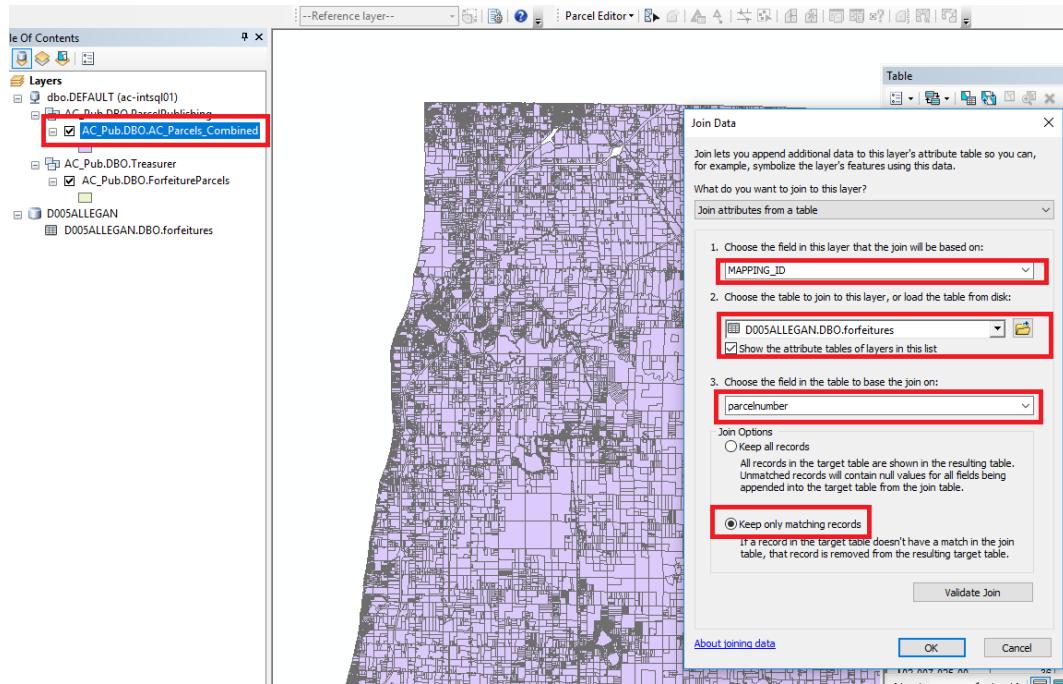


Figure 0.14: Join Parcels

Export Joined Features to a temp location

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

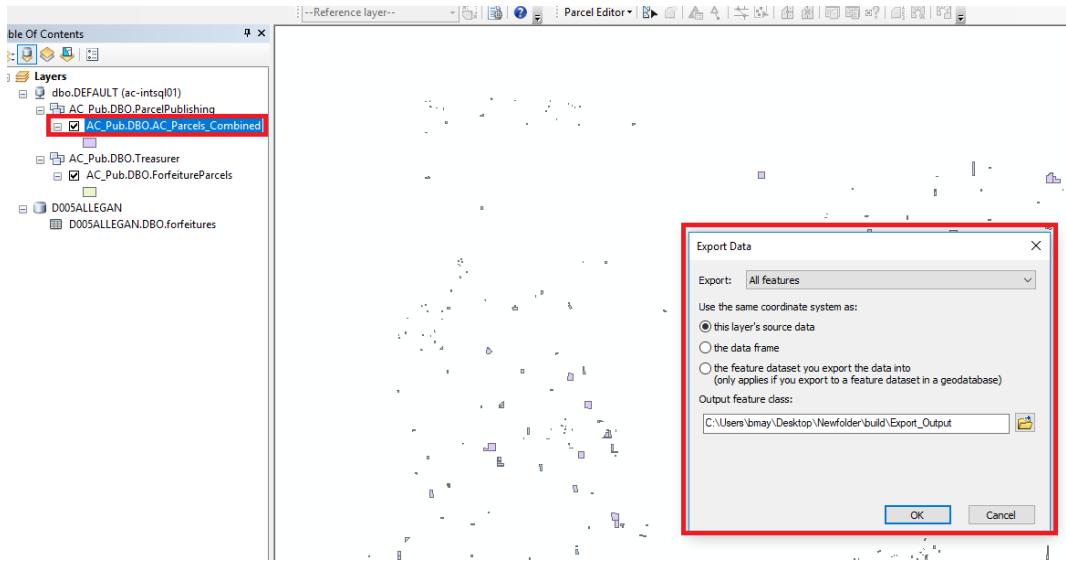


Figure 0.15: Export Joined Features

- choose location and press OK

Load data from temp location to forfeitureParcels

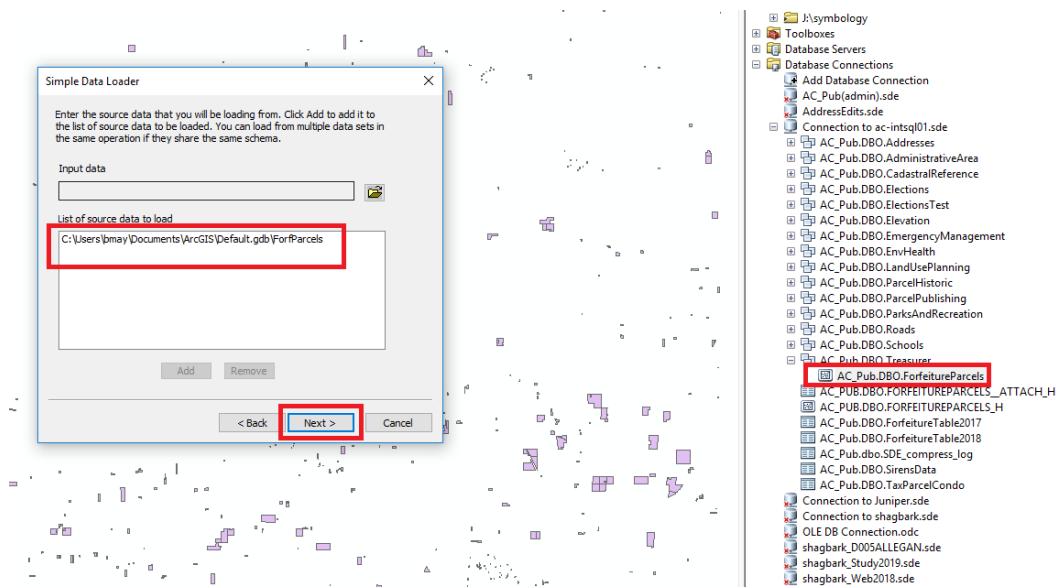


Figure 0.16: Load Data 1

push next

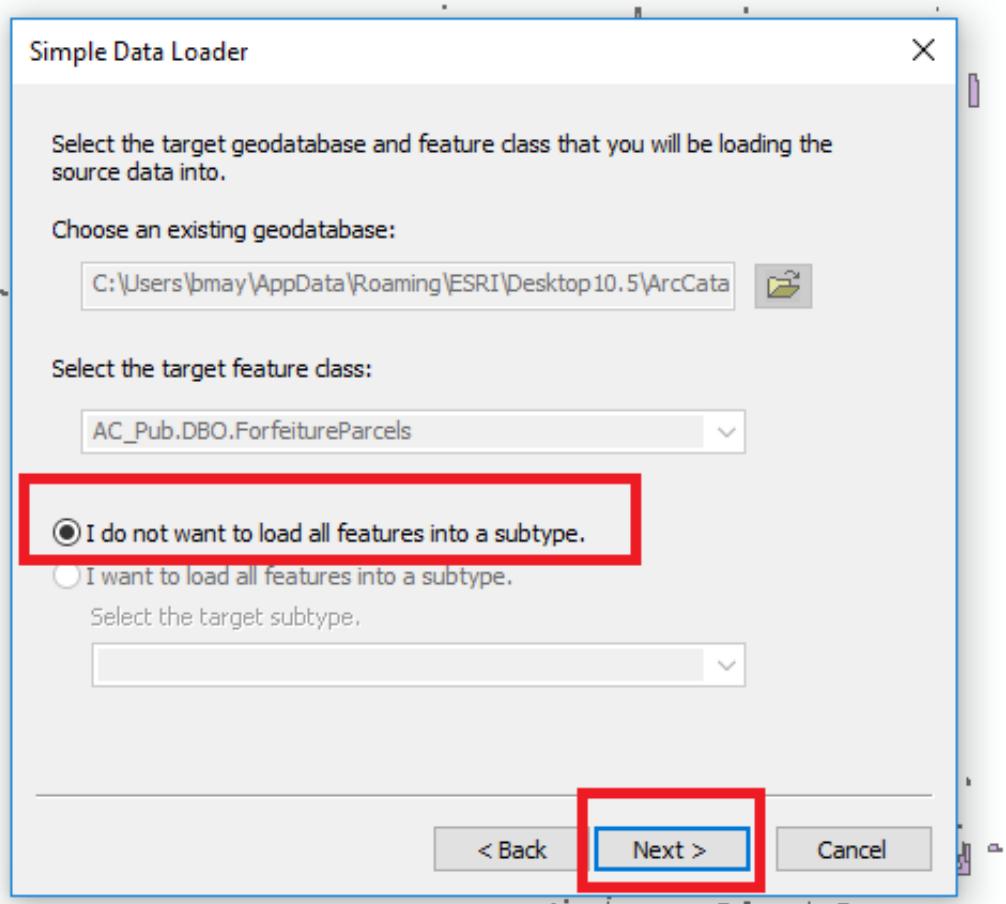


Figure 0.17: Load Data 2

Match these fields

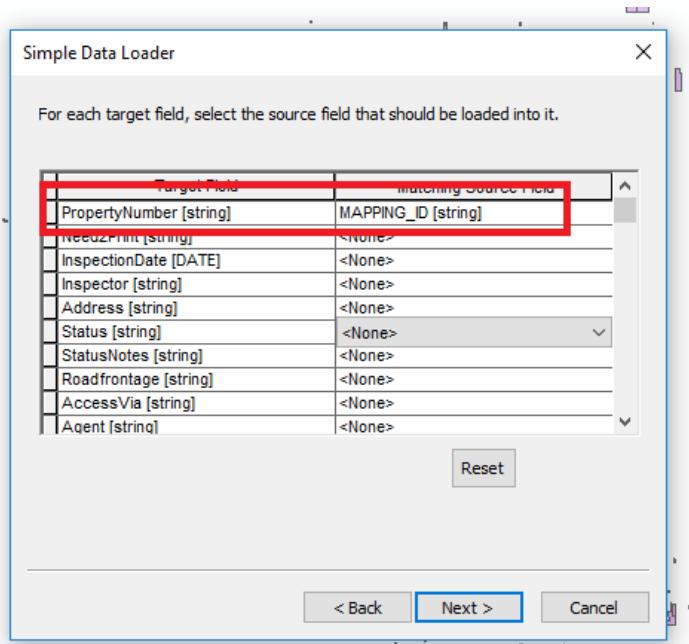


Figure 0.18: Match Fields 1

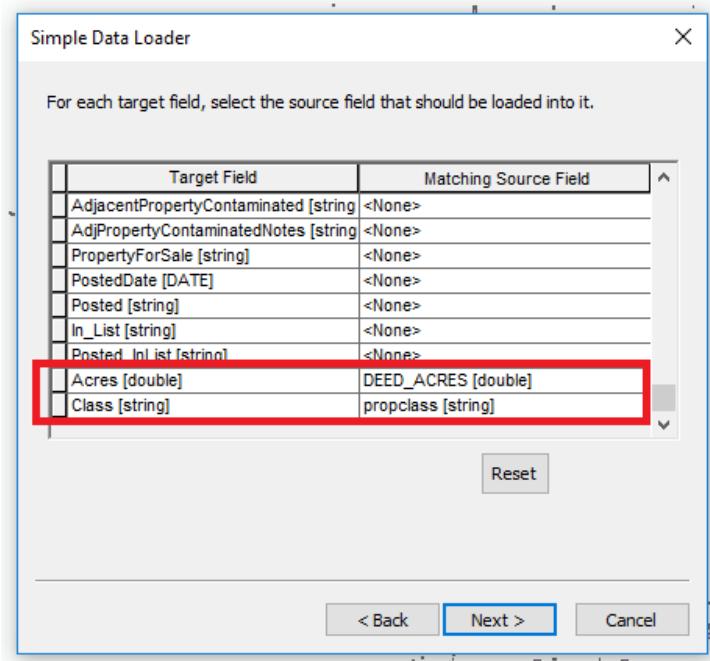


Figure 0.19: Match Fields 2

push next

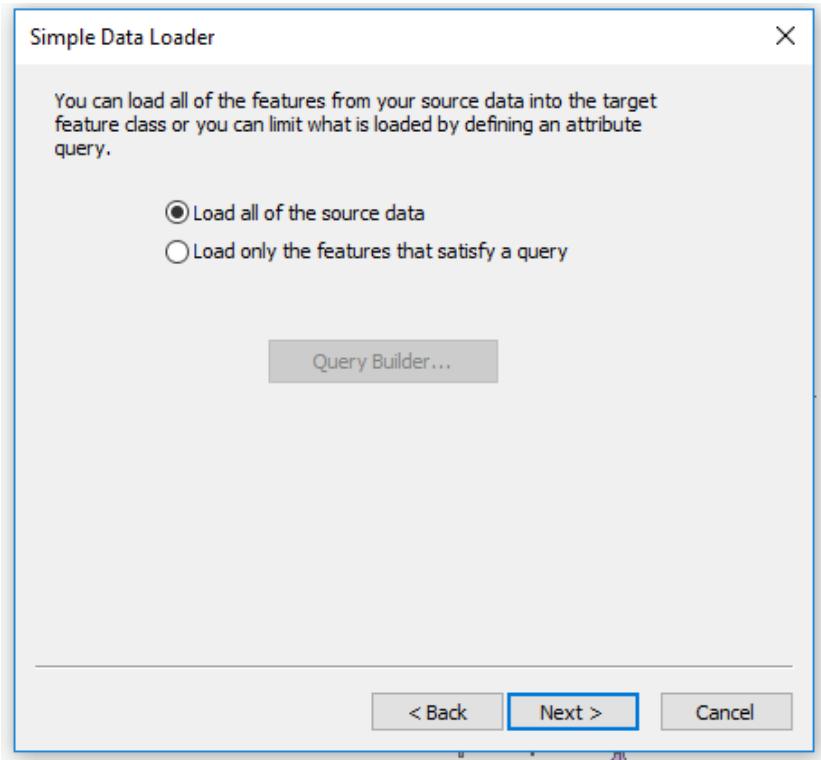


Figure 0.20: Load Data 3

Push Finish

Data Setup

Register as versioned and Add Global IDs

Right Click ⇒ Manage ⇒ Register as Versioned

and

Right Click ⇒ Manage ⇒ Add Global IDs

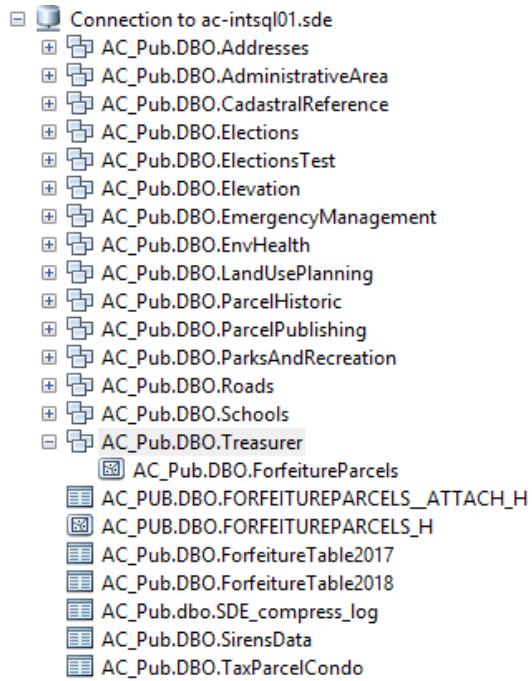


Figure 0.21: Setup Data

Create Attachments

Right Click ⇒ Manage ⇒ Add Attachments

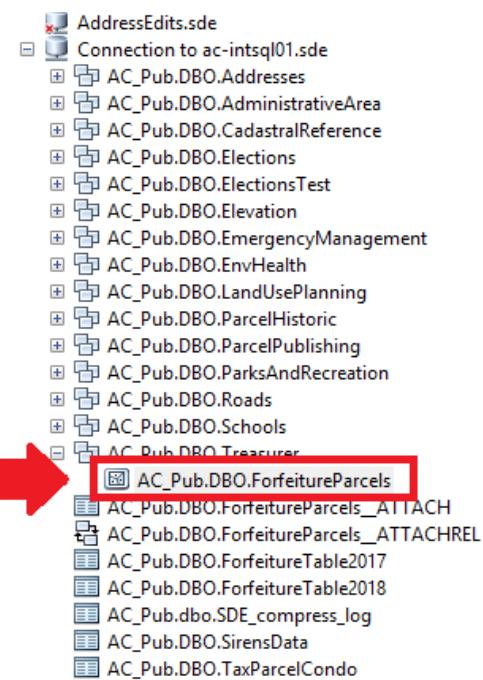


Figure 0.22: Create Attachments

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

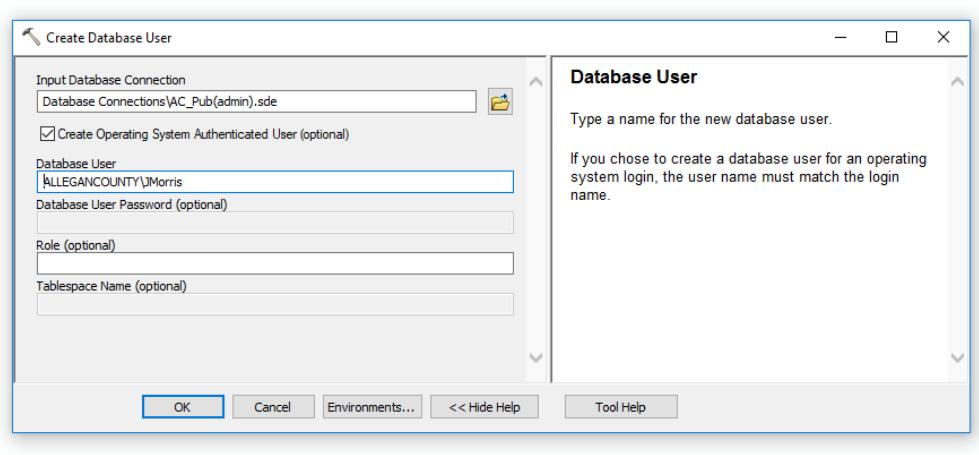


Figure 0.23: Add Db User

Add New User to Feature Dataset

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

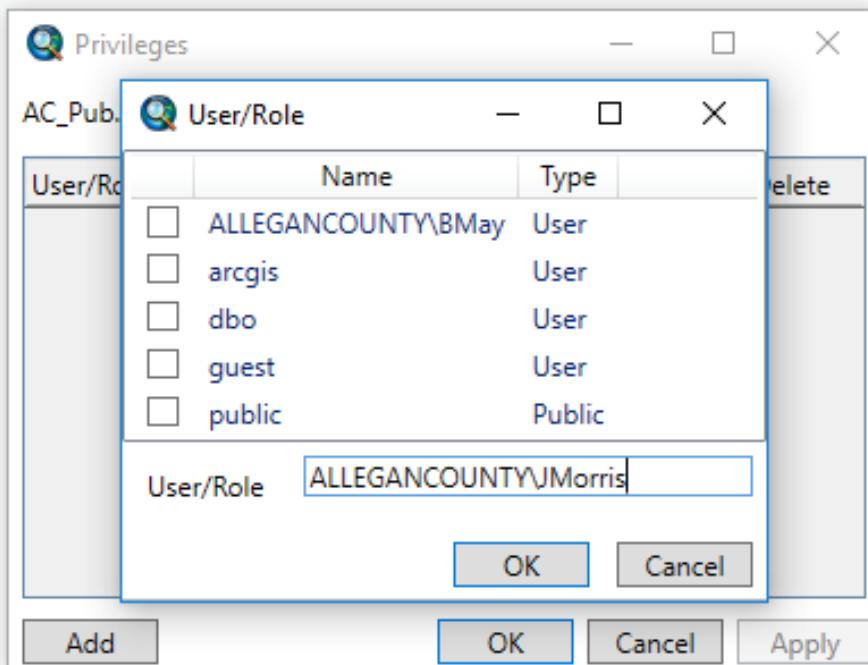


Figure 0.24: Add Feature Dataset User

Extend Privileges for New User

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

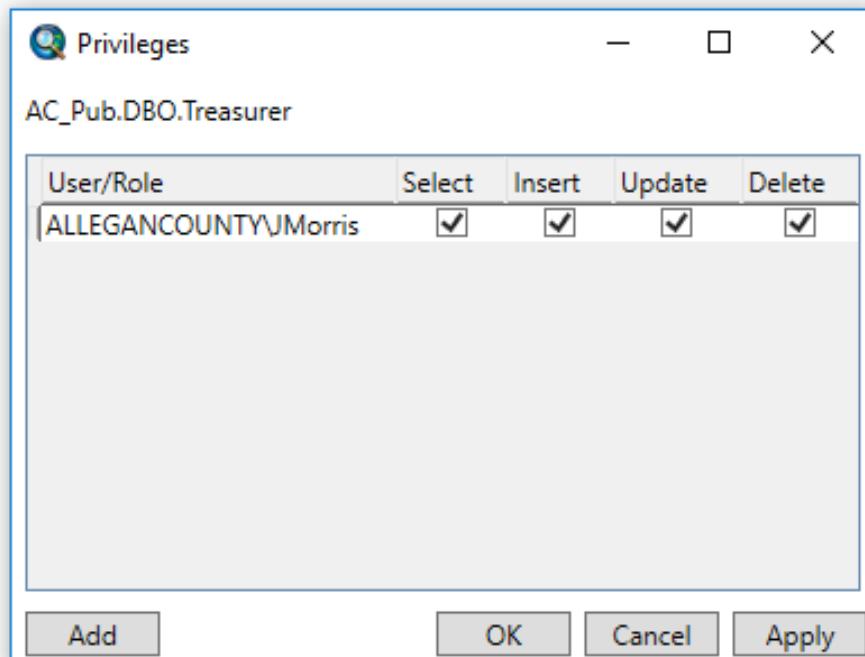
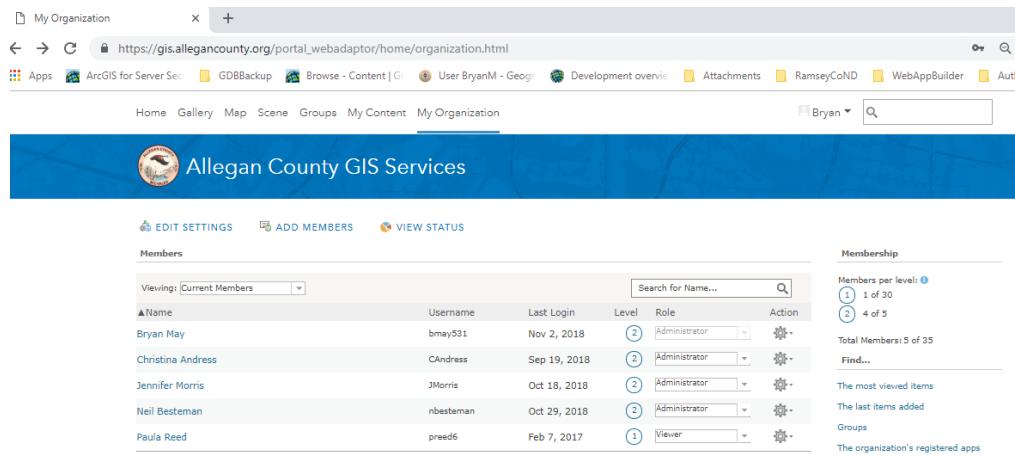


Figure 0.25: Extend Feature Dataset Privileges

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. The URL in the address bar is https://gis.allegancounty.org/portal_webadaptor/home/organization.html. The page includes a navigation bar with links for Home, Gallery, Map, Scene, Groups, My Content, and My Organization. A search bar at the top right shows the name 'Bryan'. Below the navigation is a banner for 'Allegan County GIS Services'. The main content area 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]

On the right side, there is a sidebar titled 'Membership' with sections for 'Members per level', 'Total Members: 5 of 35', 'Find...', 'The most viewed items', 'The last items added', 'Groups', and 'The organization's registered apps'.

Figure 0.26: Portal Add User 1

Add Members to Portal

Push add members ⇒ built in member

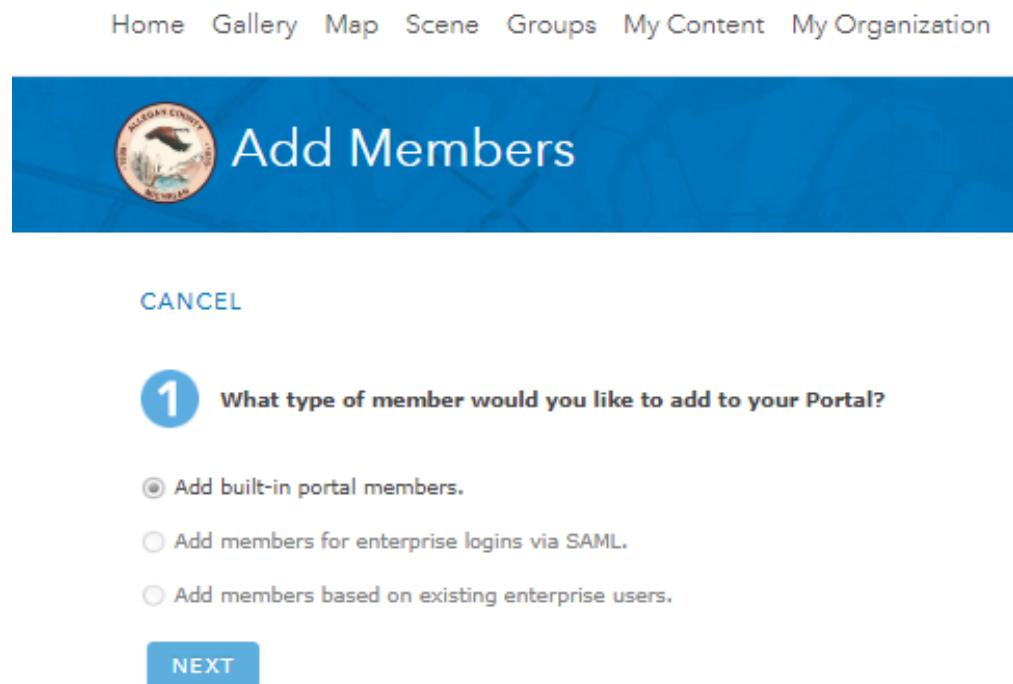
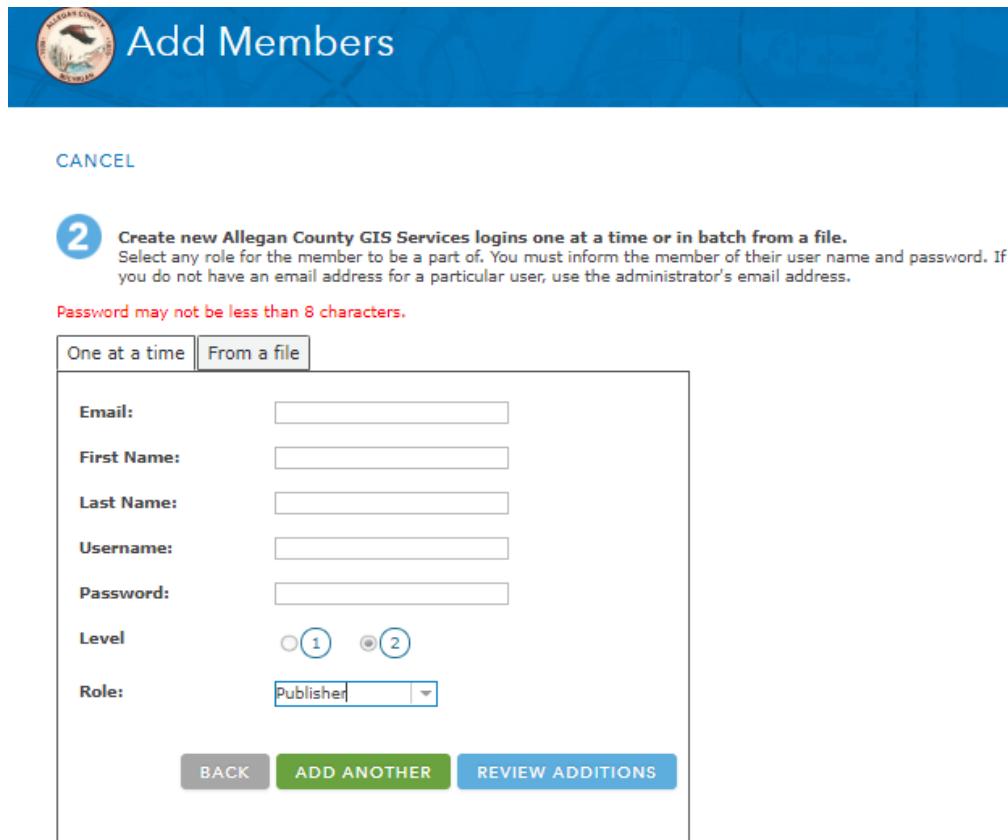


Figure 0.27: Portal Add User 2

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, bold, white font. Below the title, there is a blue header bar with the word "CANCEL" in white capital letters.

The main content area contains a step indicator "2" followed by the text: "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 below this text.

The form itself has two tabs at the top: "One at a time" (selected) and "From a file". The "One at a time" tab contains fields for "Email", "First Name", "Last Name", "Username", "Password", "Level" (with radio buttons for 1 and 2), and "Role" (set to "Publisher").

At the bottom of the form are three buttons: "BACK", "ADD ANOTHER" (highlighted in green), and "REVIEW ADDITIONS".

Figure 0.28: Portal Add User 3

Manage Treasurer Group

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

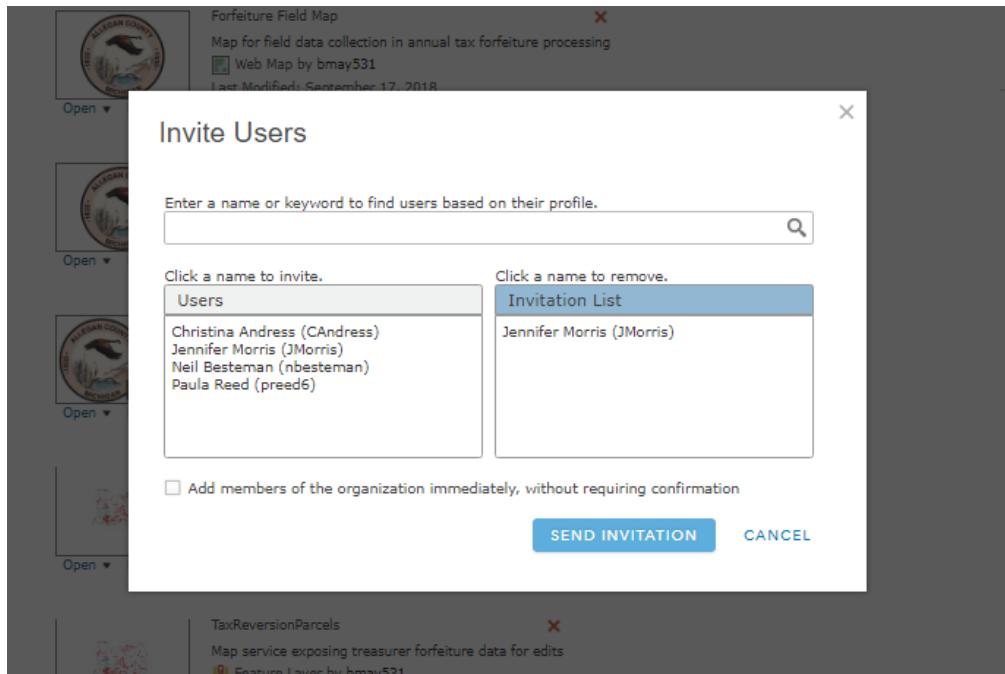


Figure 0.29: Portal Add User 4

Share Content To The Group

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

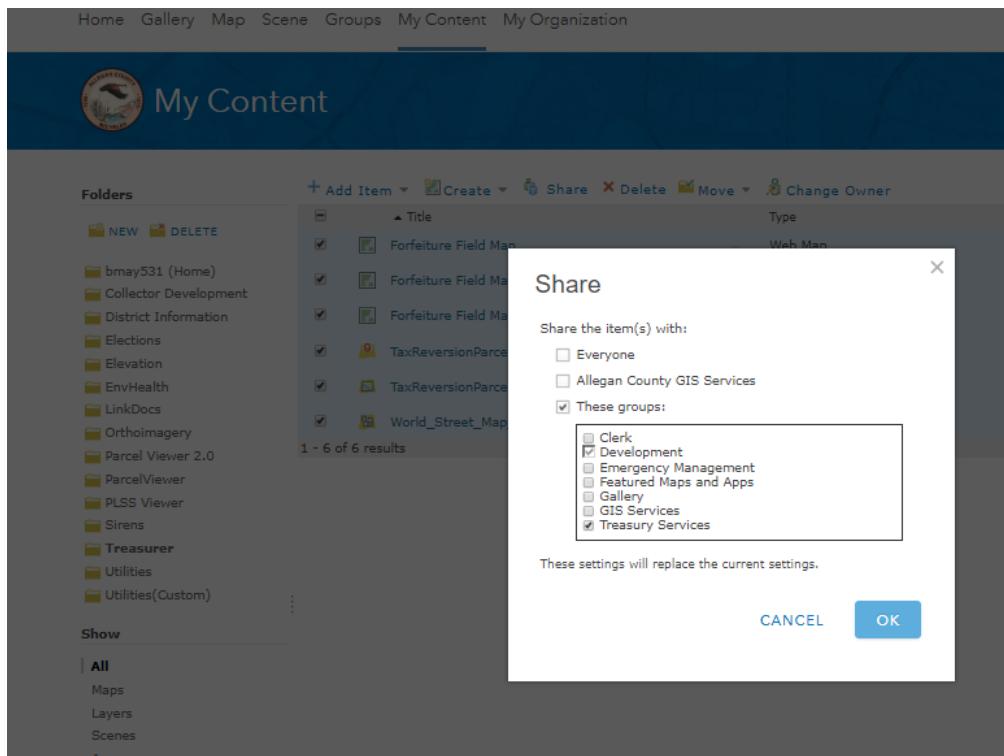


Figure 0.30: Portal AddUser 5

Schema Change Procedure

Form Edits Procedure

USER MANUAL

Collection Device Setup

Collector Application Setup Details

Install Collector for ArcGIS

- Available from the Google Play Store



Collector for ArcGIS

Esri

Everyone

[UNINSTALL](#)

[OPEN](#)

100
THOUSAND

Downloads

3.9
★★★★★

1,214 •



Productivity



Similar

Accurate Data Collection Made Easy



WHAT'S NEW

- Various bug fixes and improvements

[READ MORE](#)

Figure 0.31: Download the App

Configure Collector

for Organization Website, Type:

{\textcolor{HeaderOrangeC}{
https://gis.alleganco

nty.org/portal_webadaptor}}

then:

Press Continue

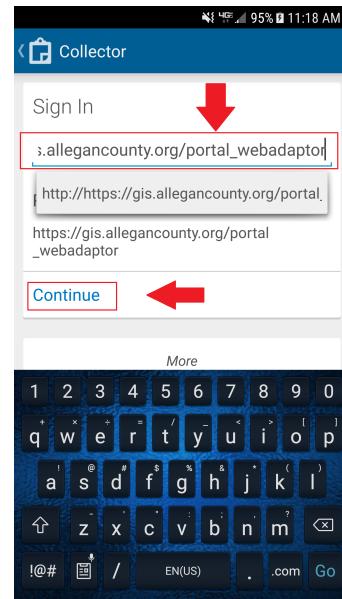


Figure 0.32: Collector Connection

Enter Credentials

then:

Press SIGN IN

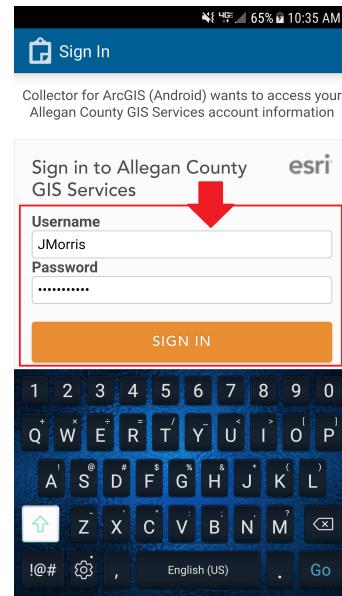


Figure 0.33: Enter Credentials

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

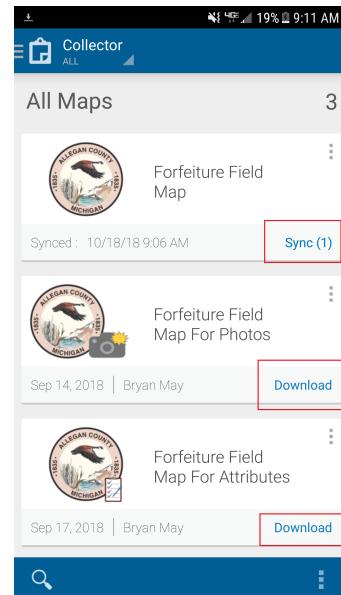


Figure 0.34: Collector Maps Menu

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

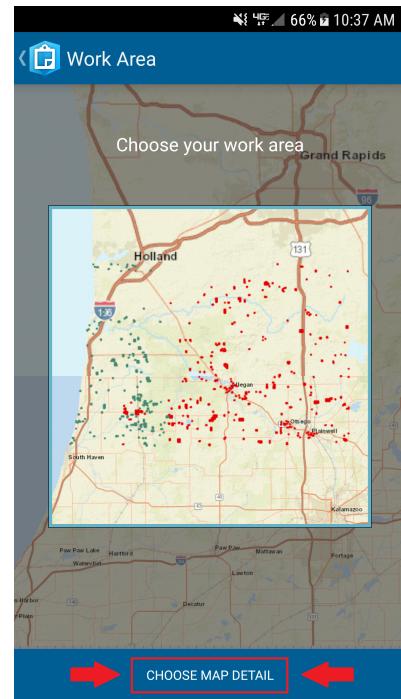


Figure 0.35: Choose Work Area (large)

Choose Map Detail

Zoom into the level of detail desired.

Press Download

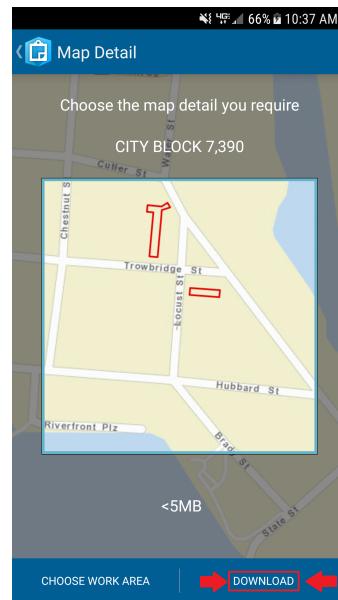


Figure 0.36: Choose Map Detail

This area is ready for field data collection.

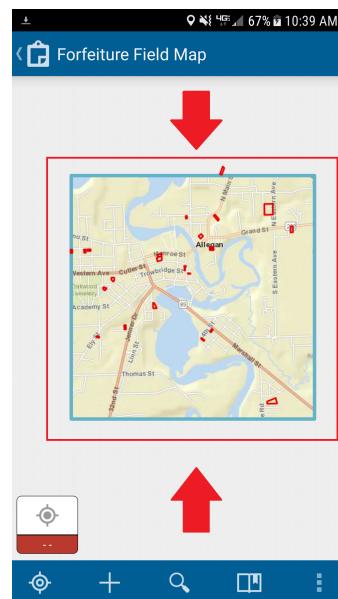


Figure 0.37: Map on Device

Open Camera Application Setup Details

Install Open Camera

- Available from the Google Play Store

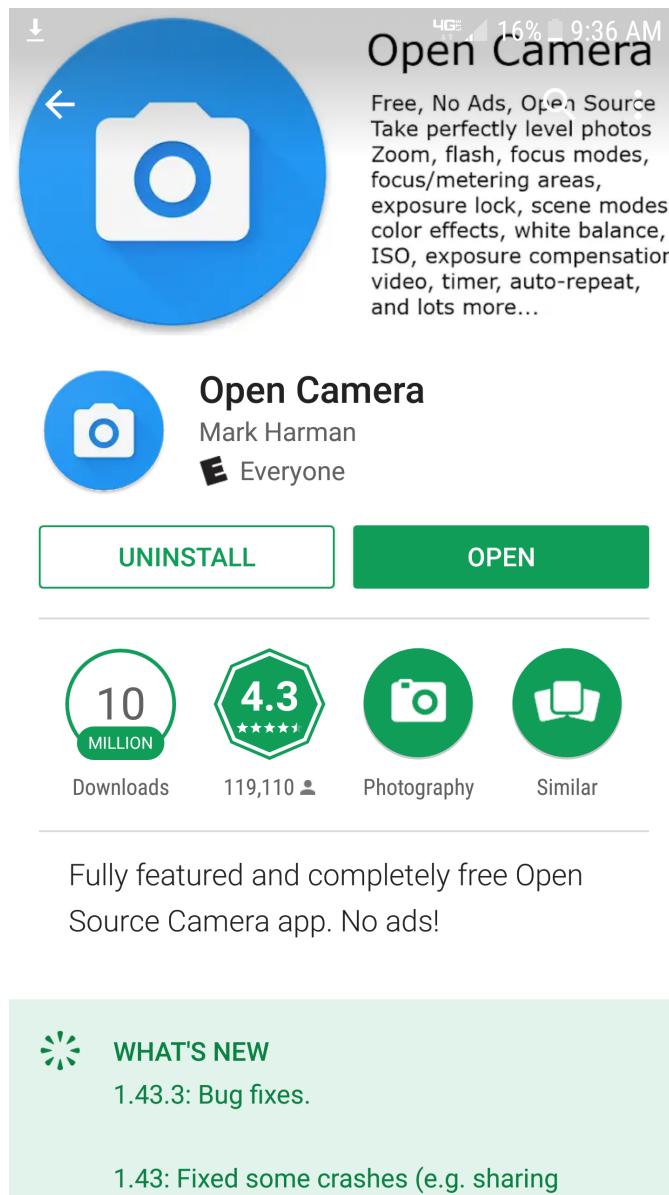


Figure 0.38: Open Camera from Google Play Store

Configure Open Camera

In the Open Camera Application:

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

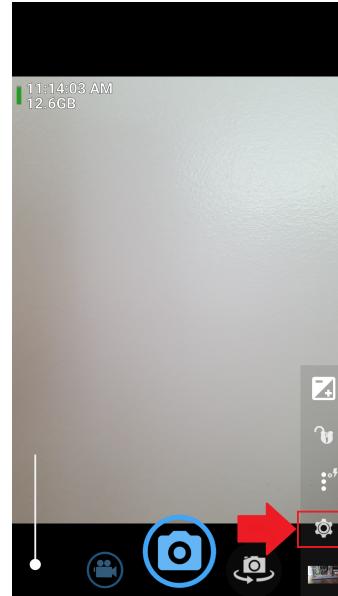


Figure 0.39: Find Settings Menu

Press the Photo Settings button

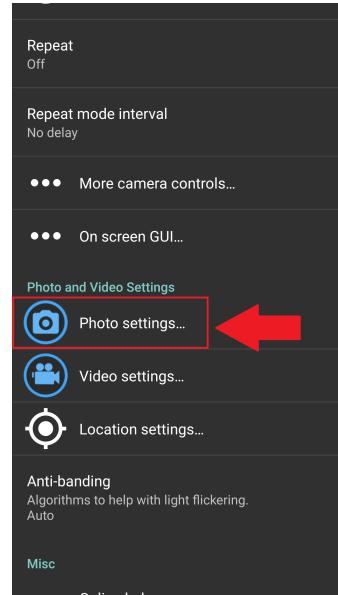


Figure 0.40: Setting Screen

Set Photo Resolution

In photo settings:

Press the Camera resolution button

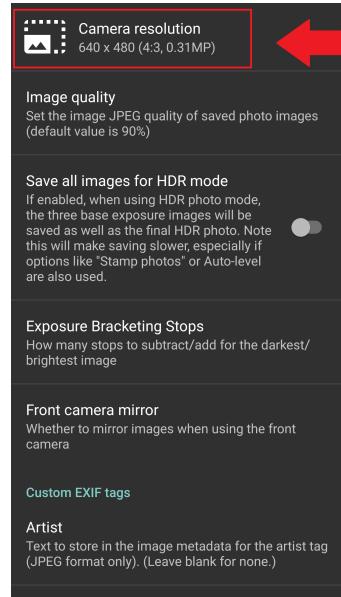


Figure 0.41: Photo Settings Menu

Select **640 x 480**

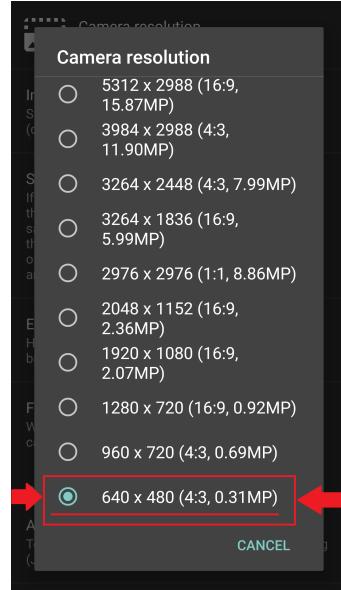


Figure 0.42: Camera Resolution Setting

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:

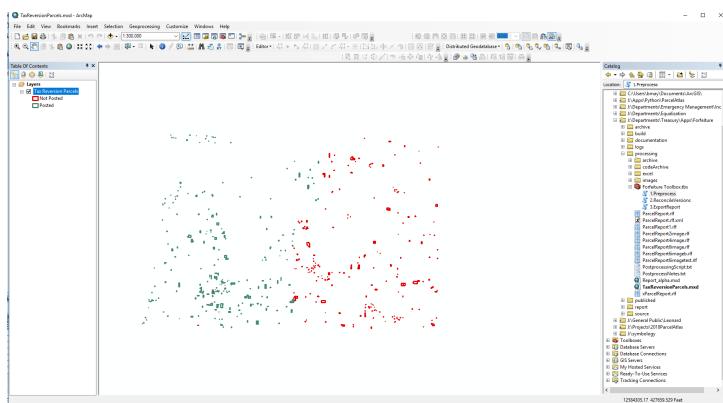


Figure 0.43: Processing Tools

Open tool 1

Synchronize the Forfeiture Field Map

Note the date and time:

Press Sync

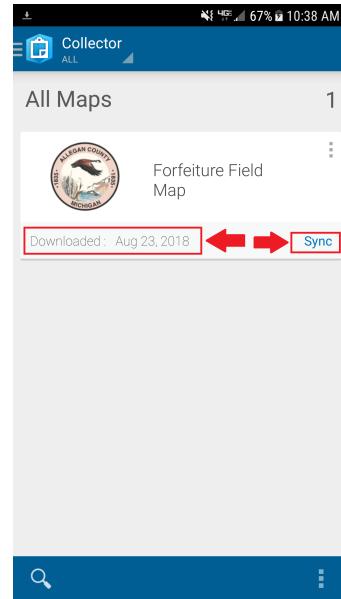


Figure 0.44: Map Downloaded

Note the date and time

Map is synchronized

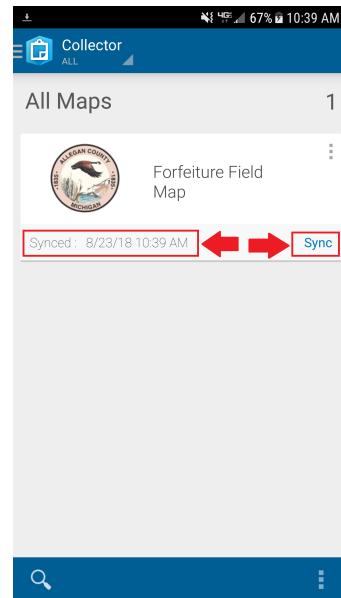


Figure 0.45: Map Synchronized

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 0.46: Select Parcel

Push the edit button

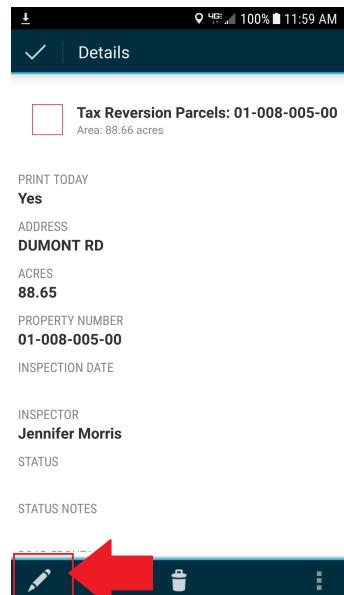


Figure 0.47: Parcel Details

Device 1 Field Operation Cont.

Select Yes for Print Today

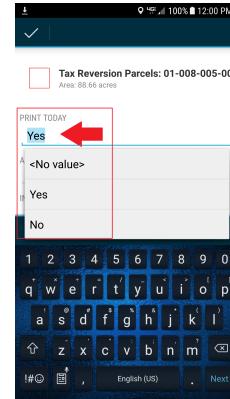


Figure 0.48: Yes or No

Select Use Current or enter any date

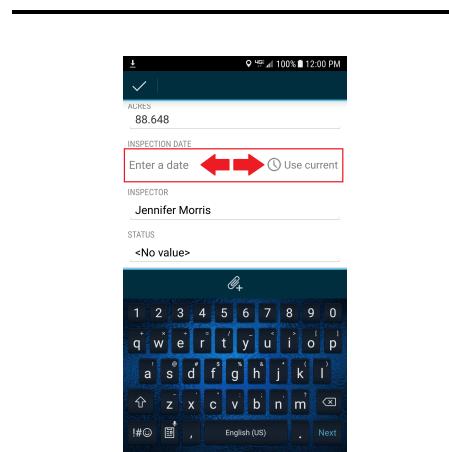


Figure 0.49: Enter Date

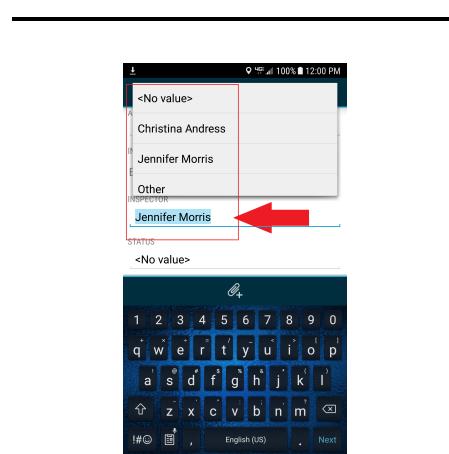


Figure 0.50: Select Inspector

Device 1 Field Operation Cont.

Select Occupied or Not Occupied

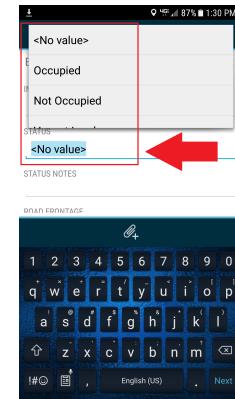
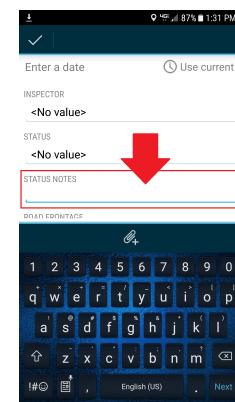


Figure 0.51: Status

Enter status notes up to 120 characters



Select Yes or No for Road Frontage

Figure 0.52: Status Notes

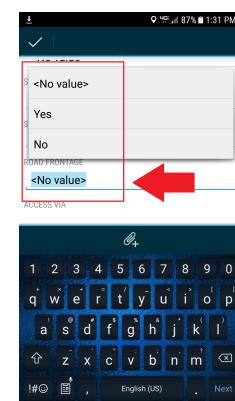


Figure 0.53: Road Frontage

Device 1 Field Operation Cont.

Enter road used for access

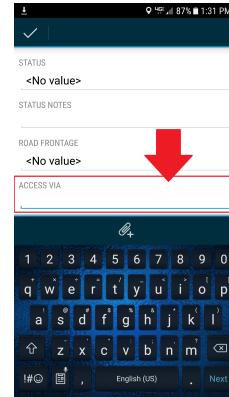
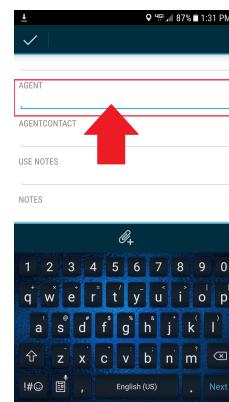


Figure 0.54: Access Via

Enter Agent Name



Enter Agent Contact Info

Figure 0.55: Agent

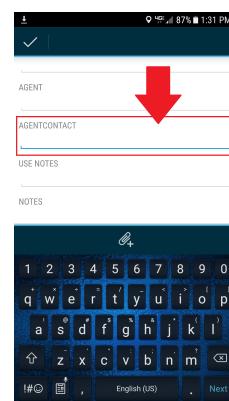


Figure 0.56: Agent Contact

Device 1 Field Operation Cont.

Enter Use Notes up to 120 characters

Enter Notes up to 120 characters

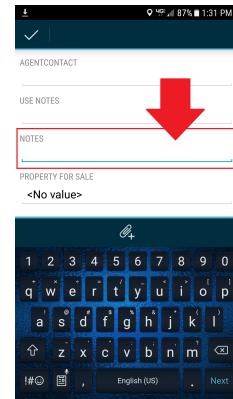


Figure 0.57: Use Notes

Enter property for sale yes or no

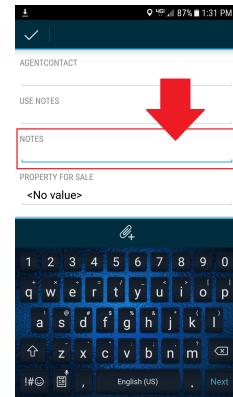


Figure 0.58: Notes

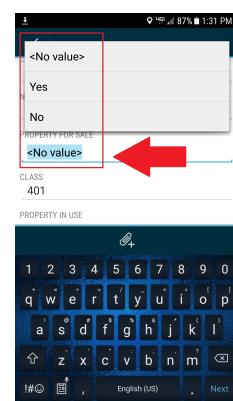


Figure 0.59: Property for Sale

Device 1 Field Operation Cont.

Property in Use Yes or No

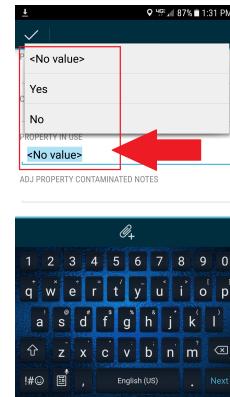
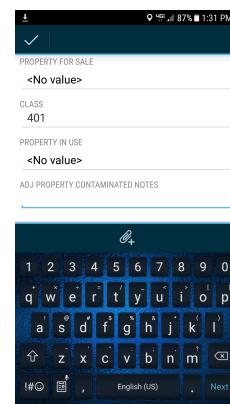


Figure 0.60: Property in Use

Placeholder



prefilled

Figure 0.61: Placeholder

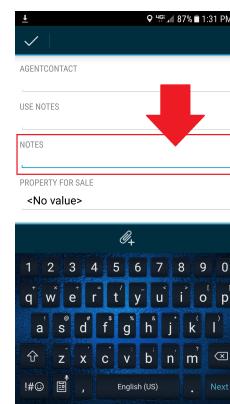


Figure 0.62: Property Contaminated

Device 1 Field Operation Cont.

Enter notes up to 120 characters

Adjacent Property Contaminated prefilled

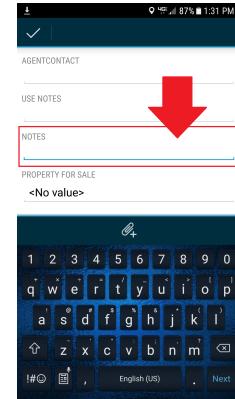


Figure 0.63: Notes up to 120 characters

Property Contaminated notes prefilled

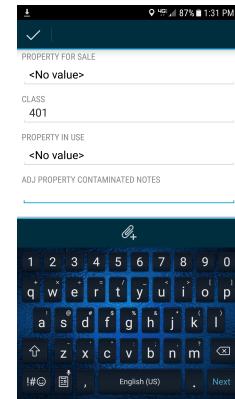


Figure 0.64: Adjacent Property Contaminated

Figure 0.65: Property Contaminated

Device 1 Field Operation Cont.

Property Maintained Yes or No

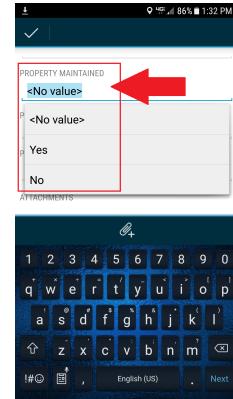


Figure 0.66: Property Maintained

Picture Comments up to 120 characters

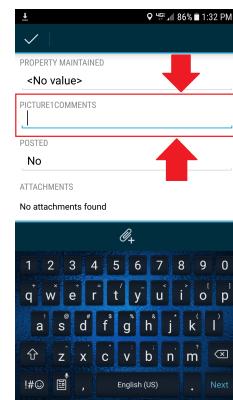


Figure 0.67: Picture Comments

Placeholder

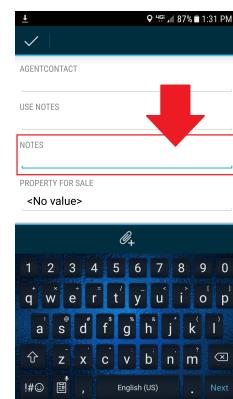
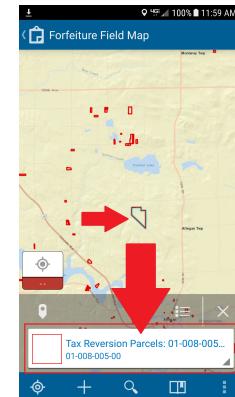


Figure 0.68: Placeholder

Device 2 Field Operation

Select a parcel from the map



Push Attachment Button

Figure 0.69: Select Parcel

Select Gallery

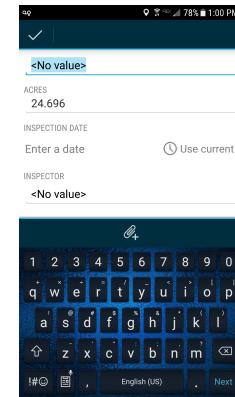


Figure 0.70: Push Attachment Button

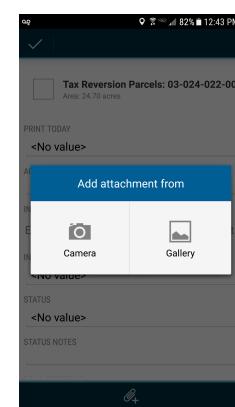


Figure 0.71: Add Attachment From Gallery

Device 2 Field Operation Cont.

Navigate to the Open Camera Folder

Select the appropriate image

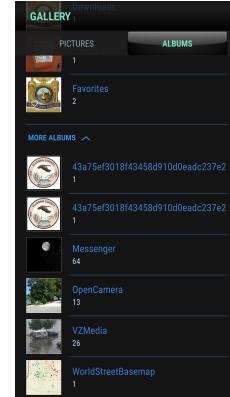


Figure 0.72: Open Camera Folder

Press the check button to save the image to the parcel

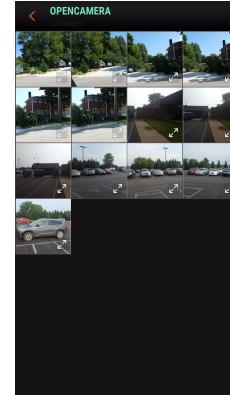


Figure 0.73: In the Open Camera Folder

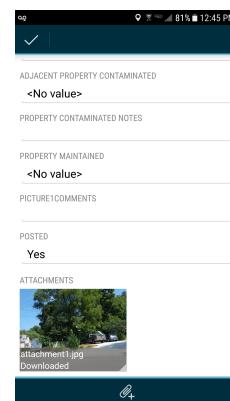


Figure 0.74: Image in the App

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

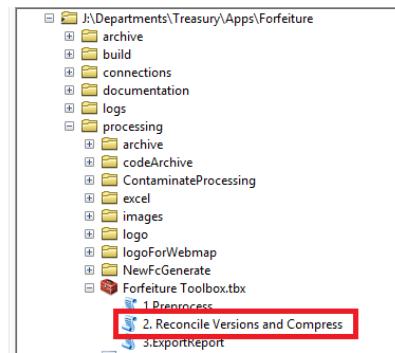


Figure 0.75: Reconcile Versions and Compress Tool

Generates forms for each site visited

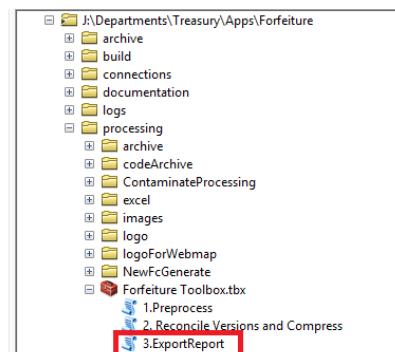


Figure 0.76: Export Report Tool

Execute the Export Report Tool

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

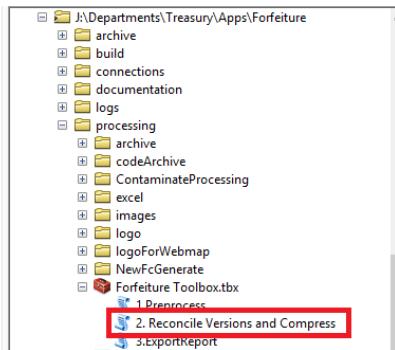


Figure 0.77: Reconcile Versions and Compress Tool

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

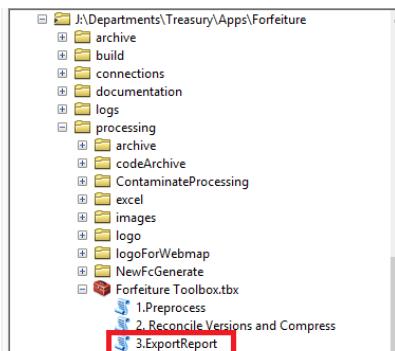


Figure 0.78: Export Report Tool

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 0.79: Open Camera from Google Play Store